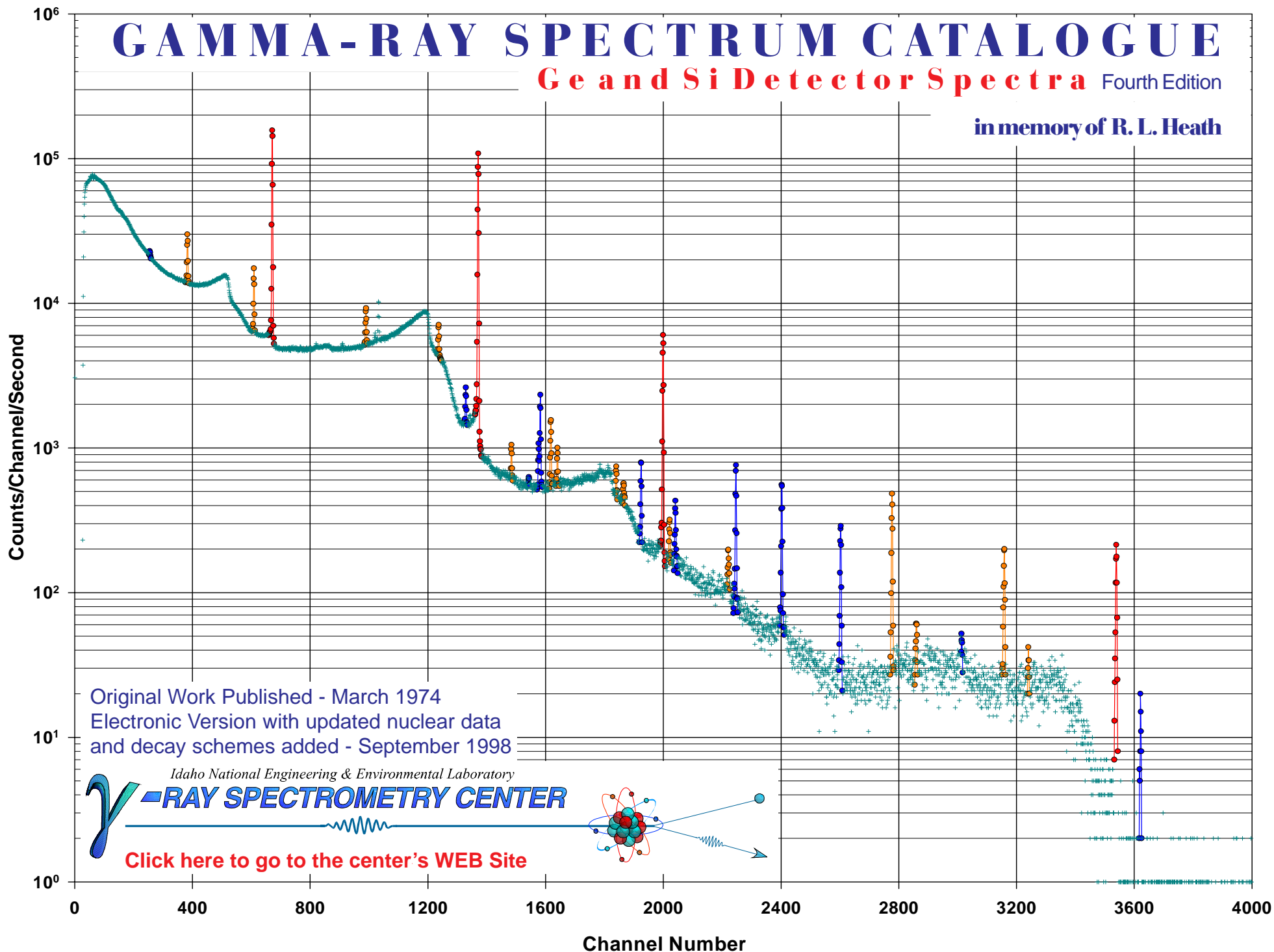


GAMMA-RAY SPECTRUM CATALOGUE

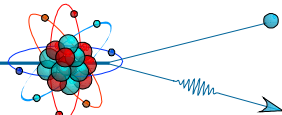
Ge and Si Detector Spectra Fourth Edition

in memory of R. L. Heath



Original Work Published - March 1974
Electronic Version with updated nuclear data
and decay schemes added - September 1998

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GAMMA-RAY SPECTRUM CATALOGUE

Ge(Li) and Si(Li) Spectrometry

Foreword

This electronic file, and the associated CD-ROM, provides a new edition of the Gamma-ray Spectrum Catalogue of spectra from radionuclides as measured with germanium and silicon semiconductor detectors. The authors have produced the file in memory of Russell L. Heath, who began its production. It was the vision of Russ Heath to provide these spectra and associated decay data in a form that is of value to today's γ -ray spectroscopists. This application oriented view appears in the choice to provide partial decay schemes which generally include just the γ rays observed in the associated spectra.

The original Catalogue was a widely used resource for the spectroscopists of the 1970's and 1980's. It is the authors' hope that this electronic version, and future versions, will be equally useful. It has potential application in the education of new spectroscopists, in use by scientists in other fields who use nuclear techniques as well as by the fields of nuclear technology, nuclear waste management, and nuclear medicine.

R. L. Heath originally published these spectra in 1974 as report ANCR-1000-2. The tables in the original publication have been updated with current data and partial decay schemes have been added. Several fission product spectra were included in the original Catalogue, but are not included here because the numerical data are no longer available. The origin and processing of the data for these radionuclides are as follows.

We have available the numerical data for the spectra, so the spectra have been replotted, color coded, and the peaks relabeled. The color codes in the spectra are red for γ -ray peaks from the nuclide of interest that are a factor of ten above the spectral continuum under the peak and blue for peaks below this threshold. Orange is used for peaks that do not represent γ -rays from the isotope measured (i.e., peaks from x-rays, 511-keV annihilation radiation, other nuclides, or single and double escape peaks). In assigning γ -ray peaks to the radionuclide of interest, the data in the associate table (as discussed below) was taken as definitive. That is, some peaks identified with this nuclide in the original Catalogue are not so identified here, because they are not in the table and are presumably from impurity radionuclides. The energies in the spectra have been truncated from the table values (i.e., the values have not been rounded.)

The data tables include information from the following sources. The γ -ray energies and absolute intensities (or emission probabilities) in γ rays per 100 decays are from the Evaluated Nuclear Structure Data File (ENSDF) maintained at the National Nuclear Data Center (NNDC) at the Brookhaven National Laboratory. All

of the γ rays in ENSDF are included in these tables, except for the decay chains. These data were transferred, in part, by computer codes, which changed the format of the uncertainties. In the process of this conversion the exact form of the uncertainties may have been changed, for example, from 0.2 to 0.20. Also, the converted intensities were in a Fn.4 format, so in some cases where the intensities or their uncertainties were less than 0.0001, these values have been lost. These data were extracted from the ENSDF over the period from January to September 1998. Since the ENSDF file is updated regularly, the subsequent ENSDF values may differ from those given here.

The intensity of the 511-keV annihilation radiation was computed as $2.0 \times I_{\beta^+} \times 0.990$ where I_{β^+} is the total positron intensity (β^+ per 100 decays) in the NUDAT version of the ENSDF file and the factor 0.990 corrects for the positrons that annihilate in flight and thereby produce photons of other energies.

The relative γ -ray intensities as measured by Heath and associates and quoted in the original Catalogue are included in these tables. As noted above, some of these entries in the original Catalogue have been omitted because the γ rays are not included in the ENSDF γ -ray list. The sensitivity codes in the last column of the tables are based on the height of the peak above the spectral continuum as follows: the value is 1 if the peak/continuum ratio is ≥ 10 ; 2 if the ratio is between 5 and 10; 3 if the ratio is between 2 and 5, and 4 otherwise.

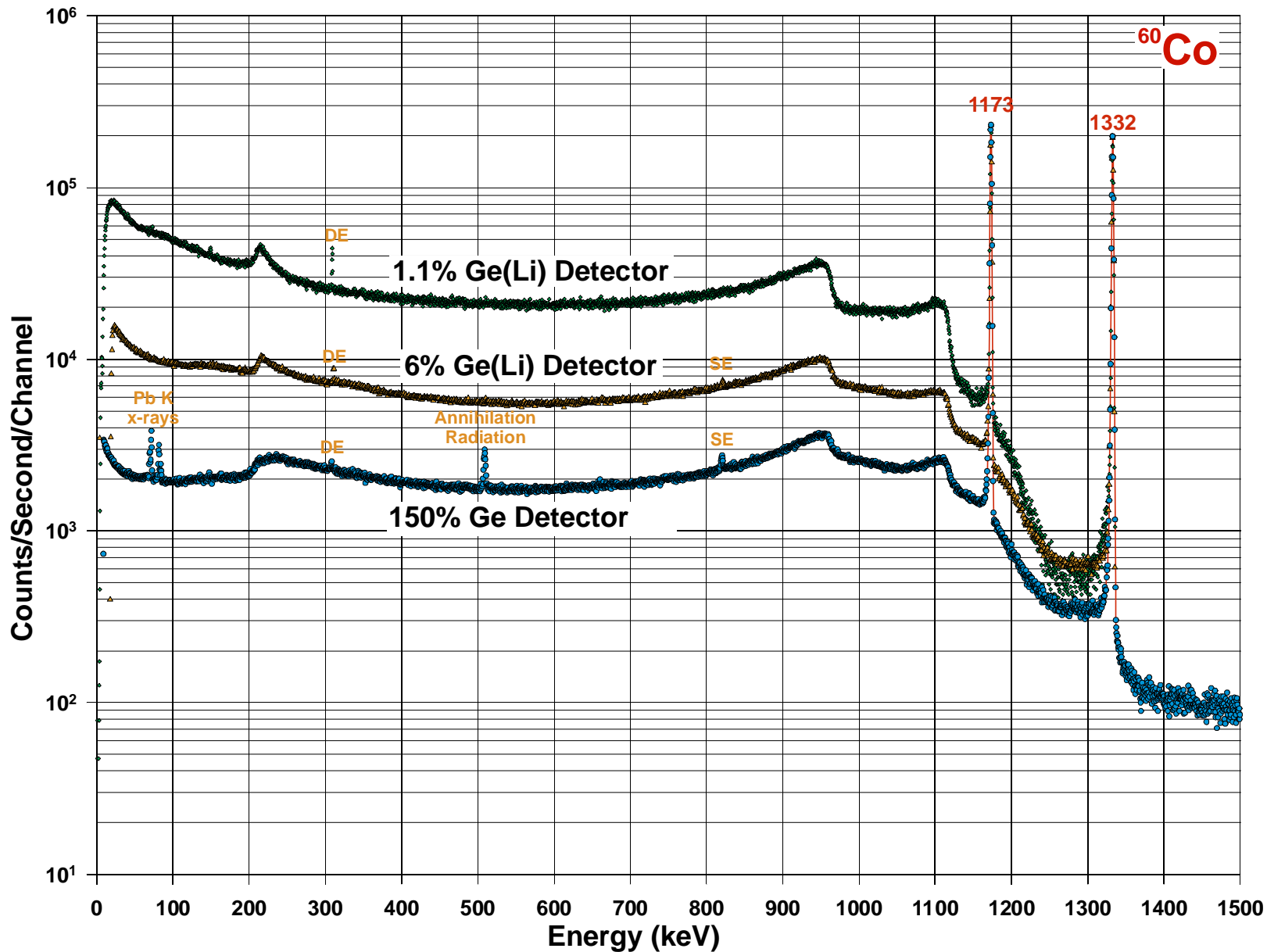
The γ -ray entries in the tables are color coded as in the spectra. Black γ -ray entries indicate γ -ray magnitudes that were insufficient to be detected with the detector used for that particular spectral measurement. The space to the left of the table has been used for notes identifying one of the radionuclides when two main ones are present, the annihilation radiation, and multiplets (i.e., "D").

Partial decay schemes have been added to the content of the original Catalogue. These schemes include all of the stronger γ rays, in particular, all of the γ rays identified in the spectrum and all of those having Heath intensities. The half-lives, spins and parities, branchings (e.g., between β^- and electron capture), level energies, and α and β decay intensities were taken from the ENSDF file. These schemes should be useful in determining which observed peaks may have contributions or losses from coincidence summing for measurements in a large solid-angle geometry. These schemes are color coded as in the spectra. Black γ rays generally have been included for completeness of the decay scheme.



For the long lived, high mass radionuclides that have extended decay chains, skeleton drawings of these chains have been included, see for example ^{226}Ra . However, decay schemes are only given for the parent nuclide. The associated tables include all of the parent γ rays, but the only γ rays from the daughter nuclides are those identified in the spectrum. For the spectra from thorium and uranium ore samples, the tables only list the nuclide identifications for each peak and the associated γ -ray energy from ENSDF.

To indicate the change that has occurred in observed γ -ray spectra since these original spectra were collected, the following figure shows the influence of the volume of a Ge detector on the simple spectrum of ^{60}Co . These spectra have been normalized to the same peak heights and show that the increase in detector volume produces a significant decrease in the Compton height.



γ -ray spectra of ^{60}Co for various size detectors



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In addition to the references cited in the original Catalogue, the following more recent books and standards are included as references. The first two books are specifically about γ -ray spectrometry, the second two are more generally about radiation detection, and the final two items are national and international standards on the use, calibration, and measurement of γ rays.

1. "Gamma and X-ray Spectrometry with Semiconductor Detectors" by K. Debertin and R. G. Helmer, North-Holland, Amsterdam (1988).
2. "Practical Gamma-ray Spectrometry" by G. Gilmore and J. Hemingway, John Wiley and Sons LTD., Chichester (1995)
3. "Radiation Detection and Measurement", second edition, by G. T. Knoll, John Wiley and Sons, New York (1989).
4. "Measurement and Detection of Radiation" by N. Tsoulfanidas, Hemisphere Publishing (1983)
5. ANSI N42.14-1998, American National Standard, "Calibration and Use of Germanium Spectrometers for the Measurement of Gamma-ray Emission Rates of Nuclides".
6. CEI/IEC 1452(1995), International Standard, "Measurement of Gamma-ray Emission Rates of Radionuclides - Calibration and Use of Germanium Spectrometers".

The original Catalogue included a list of precise γ -ray energies that were useful in the calibration of Ge detectors; the table on the following page gives a similar, but up-to-date, list of these γ -ray energies for Ge detector calibration. These data come from an evaluation of data by R. G. Helmer and C. van der Leun (University of Utrecht, the Netherlands, deceased June 1998.)

The effort to develop and produce a new edition of this Spectrum Catalogue in electronic format was established at the INEEL in 1995 by R. L. Heath. After the death of Dr. Heath in October 1997, the major contributors to this effort included R. G. Helmer, J. R. Davidson, and R. J. Gehrke. This Program has been supported by the Office of Science and Technology, Office of Environmental Management and the Division of Nuclear Physics, Office of High Energy and Nuclear Physics, U.S. Department of Energy under DOE Idaho Operations Contract DE-AC07-94ID13223 with Lockheed-Martin Idaho Technologies Co.

The authors would appreciate comments on the contents of this database and its electronic publication.

Send comments to:

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Table of Precise γ -ray Energies for Ge Detector Calibration

Nuclide	E_{γ} (keV)	ΔE_{γ}^*	Nuclide	E_{γ} (keV)	ΔE_{γ}^*	Nuclide	E_{γ} (keV)	ΔE_{γ}^*	Nuclide	E_{γ} (keV)	ΔE_{γ}^*	Nuclide	E_{γ} (keV)	ΔE_{γ}^*
¹⁷² Hf, ¹⁷² Lu	23.9330	2	^{95m} Tc	204.1161	17	¹⁹² Ir	588.581	7	¹⁹² Ir	884.5365	7	^{110m} Ag	1384.2931	20
¹⁶¹ Tb	25.65135	3	¹⁹² Ir	205.7943	9	¹⁵⁴ Eu	591.755	3	^{110m} Ag	884.6781	13	¹⁸² Ta	1387.39	3
²⁴¹ Am	26.3446	2	¹⁶⁰ Tb	215.6452	11	¹²⁵ Sb	600.597	2	⁴⁶ Sc	889.271	2	¹⁵² Eu	1408.013	3
⁹⁹ Mo	40.58323	17	¹⁸² Ta	222.1085	3	¹²⁴ Sb	602.726	23	⁸⁸ Y	898.036	4	⁶⁶ Ga	1418.754	5
¹⁶¹ Tb	48.91533	5	¹³³ Ba	223.2368	13	¹⁹² Ir	604.41105	25	¹⁵⁴ Eu	904.064	3	¹²⁴ Sb	1436.554	7
¹³³ Ba	53.1622	6	¹⁸² Ta	229.3207	6	¹²⁵ Sb	606.713	3	¹⁵² Eu	919.337	4	¹⁵² Eu	1457.643	11
¹⁶¹ Tb	57.1917	3	¹⁵² Eu	244.6974	8	¹⁹² Ir	612.46215	26	^{110m} Ag	937.485	3	^{110m} Ag	1475.7792	23
²⁴¹ Am	59.5409	2	¹⁵⁴ Eu	247.9288	7	^{108m} Au	614.276	4	¹⁶⁰ Tb	962.311	3	¹⁴⁴ Ce	1489.148	3
¹⁶⁹ Yb	63.12044	4	¹⁶⁹ Yb	261.07712	9	^{110m} Ag	620.3553	17	¹⁶⁰ Tb	966.166	2	¹⁵⁴ Eu	1494.048	5
¹⁸² Ta	65.72215	15	¹⁸² Ta	264.074	3	¹²⁵ Sb	635.95	3	¹²⁴ Sb	968.195	4	^{110m} Ag	1505.028	20
⁷⁵ Se	66.0518	8	⁷⁵ Se	264.6576	9	¹²⁴ Sb	645.852	19	⁵⁶ Co	977.363	4	⁶⁶ Ga	1508.158	7
¹⁸² Ta	67.7497	10	¹³³ Ba	276.3989	12	^{110m} Ag	657.76	11	⁵⁶ Co	1037.8333	24	^{110m} Ag	1562.294	18
¹⁵³ Sm, ¹⁵³ Gd	69.67300	13	²⁰³ Hg, ²⁰³ Pb	279.1952	10	¹³⁷ Cs	661.657	3	⁶⁶ Ga	1039.22	3	¹²⁴ Sb	1690.971	4
¹⁶¹ Tb	74.56669	6	⁷⁵ Se	279.5422	10	¹²⁵ Sb	671.441	6	^{95m} Tc	1039.26	6	²⁰⁷ Bi	1770.228	9
¹⁷² Hf, ¹⁷² Lu	78.7422	6	¹⁵² Eu	295.9387	17	¹⁹⁸ Au	675.8836	7	¹²⁴ Sb	1045.125	4	⁵⁶ Co	1771.327	3
¹⁷² Hf, ¹⁷² Lu	81.7509	5	¹⁹² Ir	295.9565	15	^{110m} Ag	677.6217	12	²⁰⁷ Bi	1063.656	3	⁵⁶ Co	1810.726	4
¹⁷⁰ Tm	84.25474	8	¹⁶⁰ Tb	298.5783	17	¹⁵² Eu	678.623	5	¹⁵² Eu	1085.837	10	⁸⁸ Y	1836.052	13
¹⁸² Ta	84.68024	26	¹³³ Ba	302.8508	5	²⁰³ Hg, ²⁰³ Pb	680.515	3	¹⁹⁸ Au	1087.6842	7	⁸⁴ Rb	1897.751	11
¹⁶⁰ Tb	86.7877	3	⁷⁵ Se	303.9236	10	^{110m} Ag	687.0091	18	¹⁵² Eu	1089.737	5	⁶⁶ Ga	1898.823	8
¹⁶⁹ Yb	93.61447	8	¹⁶⁹ Yb	307.73586	10	¹⁵² Eu	688.67	5	⁵⁹ Fe	1099.245	3	⁶⁶ Ga	1918.329	5
⁷⁵ Se	96.734	9	¹⁹² Ir	308.45507	17	¹⁵⁴ Eu	692.4205	18	¹⁵² Eu	1112.076	3	⁵⁶ Co	1963.703	11
¹⁵³ Sm, ¹⁵³ Gd	97.431	21	¹⁹² Ir	316.50618	17	¹⁴⁴ Ce	696.505	4	⁶⁵ Zn	1115.539	2	⁵⁶ Co	2015.176	5
¹⁸² Ta	100.10595	7	⁵¹ Cr	320.0824	4	⁹⁴ Nb	702.639	4	⁴⁶ Sc	1120.537	3	⁵⁶ Co	2034.752	5
¹⁵³ Sm, ¹⁵³ Gd	103.18012	17	¹⁵² Eu	344.2785	12	^{110m} Ag	706.676	15	¹⁸² Ta	1121.29	3	¹²⁴ Sb	2090.93	7
¹⁶⁹ Yb	109.77924	4	¹³³ Ba	356.0129	7	¹²⁴ Sb	713.776	4	⁶⁰ Co	1173.228	3	⁵⁶ Co	2113.092	6
¹⁸² Ta	113.6717	22	¹⁵² Eu	367.7891	20	¹²⁴ Sb	722.782	3	⁵⁶ Co	1175.0878	22	¹⁴⁴ Ce	2185.645	5
¹⁸² Ta	116.4179	6	¹³³ Ba	383.8485	12	¹⁵⁴ Eu	723.3014	22	¹⁶⁰ Tb	1177.954	3	⁶⁶ Ga	2189.616	6
¹⁶⁹ Yb	118.1894	14	¹¹³ Sn	391.698	3	⁹⁵ Zr	724.193	3	¹⁸² Ta	1189.04	3	⁵⁶ Co	2212.898	3
⁷⁵ Se	121.1155	11	⁷⁵ Se	400.6572	8	^{110m} Ag	744.2755	18	¹⁵² Eu	1212.948	11	⁵⁶ Co	2598.438	4
¹⁵² Eu	121.7817	3	²⁰³ Hg, ²⁰³ Pb	401.32	3	¹⁵⁴ Eu	756.802	23	¹⁸² Ta	1221.395	3	²²⁸ Th	2614.511	10
⁵⁷ Co	122.06065	12	¹⁵² Eu	411.1165	12	^{110m} Ag	763.9424	17	¹⁸² Ta	1231.004	3	⁶⁶ Ga	2751.835	5
¹⁵⁴ Eu	123.0706	9	¹⁹⁸ Au	411.80205	17	^{95m} Tc	765.803	6	⁵⁶ Co	1238.2736	22	²⁴ Na	2754.008	11
¹⁶⁹ Yb	130.52293	6	¹⁹² Ir	416.4688	7	¹⁵² Eu	778.9045	24	¹⁵⁴ Eu	1246.121	4	⁵⁶ Co	3009.559	4
⁷⁵ Se	136.0001	6	¹²⁵ Sb	427.874	4	^{95m} Tc	786.1922	27	¹⁸² Ta	1257.407	3	⁵⁶ Co	3201.93	11
⁵⁷ Co	136.47356	29	^{108m} Au	433.937	4	¹²⁴ Sb	790.706	7	¹⁶⁰ Tb	1271.873	5	⁶⁶ Ga	3228.8	6
⁹⁹ Mo	140.511	1	¹⁵⁴ Eu	444.4924	19	¹⁵² Eu	810.451	5	¹⁸² Ta	1273.719	3	⁵⁶ Co	3253.402	5
¹⁴¹ Ce	145.4433	14	^{110m} Ag	446.812	3	⁵⁸ Co	810.7593	20	¹⁵⁴ Eu	1274.429	4	⁵⁶ Co	3272.978	6
¹⁸² Ta	152.42991	26	¹²⁵ Sb	463.365	4	^{110m} Ag	818.0244	18	²² Na	1274.537	7	⁶⁶ Ga	3380.85	6
¹⁸² Ta	156.3864	3	¹⁹² Ir	468.06885	26	^{95m} Tc	820.622	7	¹⁸² Ta	1289.145	3	⁶⁶ Ga	3422.04	8
¹³³ Ba	160.612	16	⁷ Be	477.6035	2	⁶⁶ Ga	833.5324	21	⁵⁹ Fe	1291.59	6	⁵⁶ Co	3451.119	4
¹⁵³ Sm, ¹⁵³ Gd	172.85307	19	¹⁹² Ir	484.5751	14	⁵⁴ Mn	834.838	5	¹⁵² Eu	1299.142	8	⁶⁶ Ga	4085.853	9
¹²⁵ Sb	176.314	2	¹⁵² Eu	488.6792	20	^{95m} Tc	835.146	6	¹²⁴ Sb	1325.504	4	⁶⁶ Ga	4461.202	9
¹⁶⁹ Yb	177.21307	6	¹⁰⁶ Ru	511.8534	23	⁵⁶ Co	846.7638	19	⁶⁰ Co	1332.492	4	⁶⁶ Ga	4806.007	9
¹⁸² Ta	179.39381	25	⁸⁵ Sr	514.0048	22	¹⁵² Eu	867.38	3	⁶⁶ Ga	1333.112	5			
¹⁶⁰ Tb	197.0341	10	²⁰⁷ Bi	569.698	2	⁹⁴ Nb	871.114	3	⁵⁶ Co	1360.196	4			
¹⁶⁹ Yb	197.95675	7	^{95m} Tc	582.0775	21	¹⁵⁴ Eu	873.1834	23	¹²⁴ Sb	1368.157	5			
¹⁸² Ta	198.35187	29	²²⁸ Th	583.187	2	¹⁶⁰ Tb	879.378	2	²⁴ Na	1368.625	5			
⁷⁵ Se	198.606	12	¹⁵² Eu	586.2648	26	⁸⁴ Rb	881.6041	16	¹⁸² Ta	1373.824	3			

* Uncertainty applies to the last digit or two digits of the energy.

The following is the text of the original Catalogue with notes indicating any changes or deletions.

Abstract

A new edition of the Gamma-Ray Spectrum Catalogue has been issued. The second volume of this edition, which is being released at this time, is devoted to the presentation of experimental pulse amplitude spectra obtained with Ge(Li) and Si(Li) spectrometers. As in the previous edition (IDO-16880) issued in 1964, this edition presents experimental spectra for over 300 individual radio nuclides. The application of high-resolution gamma-ray spectrometry for quantitative isotopic analysis requires a precise knowledge of the energies and intensities of major gamma rays emitted in the decay of a given isotope. For this reason the catalogue effort has included the development of techniques for the measurement of energies and intensities using Ge(Li) spectrometry. The data presented for each nuclide includes tabulated experimental values for gamma-ray energies and intensities with associated experimental error. A brief description of experimental methods and equipment employed to obtain these data is presented together with tables of measured values of gamma rays adopted for energy calibration of the gamma-ray spectrometers used to obtain these data.

Acknowledgments

The development of experimental techniques and the rather monumental task of experimental collection and analysis of data presented in the Spectrum Catalogue represent the combined effort of many members of the laboratory staff. The preparation of previous editions of the Catalogue has been supported by the Division of Reactor Research and Development and the Division of Applied Technology of the U. S. Atomic Energy Commission. Experimental measurements were made principally by R. J. Gehrke, L. D. Mclsaac, J. E. Cline, R. C. Greenwood, R. G. Helmer, and the author. Development of techniques and computer software for the analysis of pulse-amplitude spectra has been largely due to the efforts of R. G. Helmer, Marie Putnam, E. W. Killian and W. R. Myers. The development and implementation of on-line data acquisition and analysis systems have been the responsibility of G. O. English, L. O. Johnson, W. R. Myers, E. W. Killian, R. C. Davies, E. E. Owen, R. A. Coates and M. S. Cole. Source preparation and chemical purification of source material were accomplished under the direction of L. D. Mclsaac. Data file management was the responsibility of Evelyn Baston and the exacting and important task of data table preparation and checking was accomplished by Carol Ball. Statistical drafting and graphic arts were the responsibility of D. W. Elison, G. Hammer, Ora Archuleta, and the reproduction staff under the direction of V. E. Wagner, L. F. Hansen, and H. W. Longhurst.

In addition, a vote of thanks is extended to the technical staff at each of the experimental facilities that were used in the production of isotopic source material. The production of a single quality spectrum, of necessity, involves the combined efforts of many talents and specialties.

It is the sincere desire of the laboratory staff that the results presented in the Catalogue will be of general use to scientists in many disciplines.



Introduction

The Gamma-Ray Spectrum Catalogue has been a continuing effort of this laboratory for the past ten years. The purpose of this effort has been to provide a collection of experimental x-ray and gamma-ray spectra obtained with pulse-amplitude spectrometers for general laboratory use in the analysis of gamma-ray spectra. The first two editions of the Catalogue^(1,2) contained pulse-amplitude spectra obtained with NaI scintillation spectrometers. These data were intended to present an internally consistent set of response functions obtained under specified laboratory conditions. The 2nd Edition also contained extensive text and supplementary material required for general laboratory use of the techniques of gamma-ray spectrometry.

The effort during the past several years has been to update this collection of data to include experimental data obtained with semiconductor detectors, principally lithium-drifted Si and Ge devices. The improved energy resolution afforded by these detectors, together with refined electronics, offers the ability to measure energies and intensities of gamma rays with high precision. Since the utility of the high-resolution gamma-ray spectrometer is related to the quantitative analysis of complex spectra and isotopic assay, experimental techniques and reference data including precision energies and intensities of gamma rays emitted in the decay of radionuclides is essential. The current edition of the Catalogue contains experimental spectra for over 300 nuclides obtained with state-of-the-art gamma-ray spectrometers. These data include results of experimental determination of the energies and intensities of all photon transitions that are significant features in the gamma-ray spectrum of a single nuclide. This work, carried out over a period of the past seven years, represents the results of a long-range effort to develop experimental techniques required to successfully apply high-resolution photon spectrometry as a laboratory tool for both basic and applied nuclear spectrometry.

A typical experimental spectrum, as it appeared in the Catalogue, is shown in Figure 1.

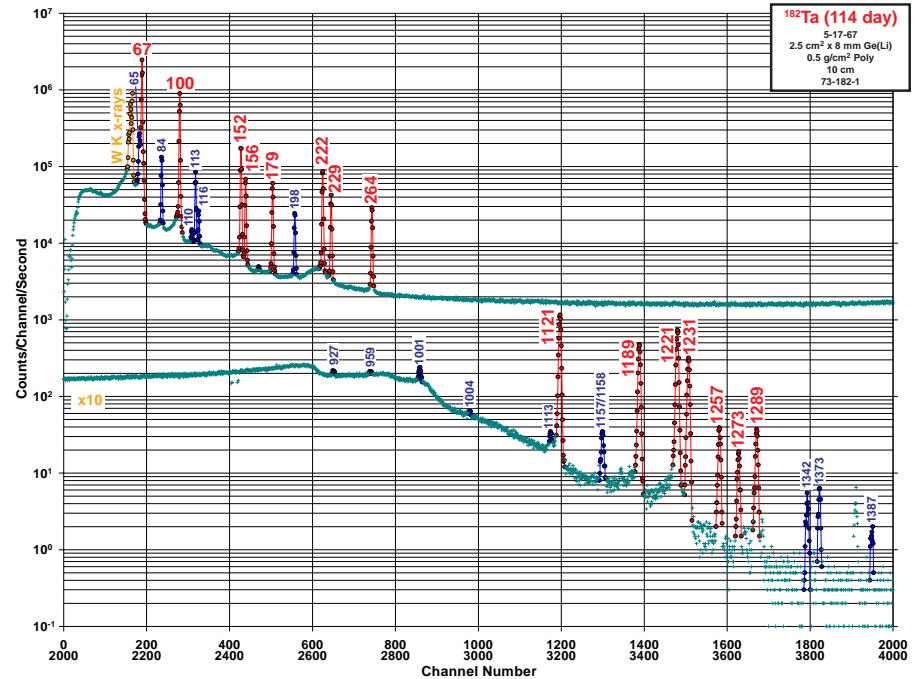


Figure 1. Plot of a typical experimental gamma-ray spectrum as it appears in the current 1998 Catalogue.

This pulse-amplitude spectrum represents the experimental response of a lithium-drifted Ge detector to radiation emitted in the decay of 115-day ^{182}Ta . The data was originally presented on an 11-in. x 17-in. computer data plot, suitably annotated to indicate the major features of the spectrum.



The experimental values obtained for gamma-ray energies and relative intensities are listed on the reverse side of each plate as shown in Figure 2. Columns 1 through 4 list gamma-ray energies and relative intensities with estimated experimental error. Column 5, designated S for "Sensitivity Index", lists values assigned to each gamma ray on an arbitrary scale of 1 to 4. This quantity provides an indication of the magnitude of the full-energy peak in the spectrum relative to the underlying background continuum, and is applied in table search algorithms used in automated data analysis routines for isotopic assignment. The scale is defined in the following manner: A peak which exceeds the underlying background by more than a factor of 10 is assigned a value of 1. Peaks which exceed the background level by a factor of 5-10, a value of 2; by 2-5, a value of 3; and those which exceed the background of less than 2, a value of 4. To illustrate this concept, the peaks in the spectrum shown in Figure 1 are labeled using this scale. This approach provides a more reliable measure of importance than relative intensity. In certain cases the low-energy region of the photon spectrum has been measured using lithium-drifted Si detectors. A typical example of a Si(Li) spectrum is shown in Figure 3.

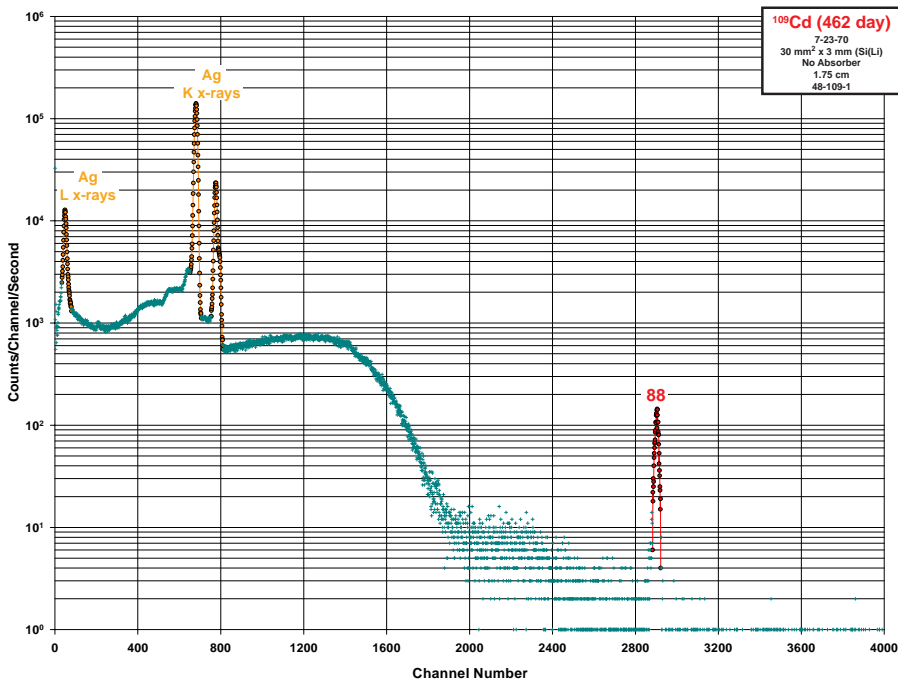


Figure 3. Plot of the experimental spectrum of low-energy photons emitted in the decay of ¹⁰⁹Cd as it appears in the current (1998) Catalogue. These data were obtained using a high-resolution Si(Li) spectrometer.

GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁸²Ta

Half Life: 114.43 (3) day

Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ¹⁸¹Ta (n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
31.738	0.001		0.486	0.011	4
42.715			0.278	0.006	4
65.722			2.92	0.07	4
67.750		100.	41.2	0.9	1
84.681		6.04	2.65	0.07	2
100.106		30.40	14.10	0.26	1
110.41	0.05	0.27	0.087	0.004	4
113.673		3.93	1.89	0.04	2
116.419	0.001	0.90	0.431	0.009	3
121.50	0.20		0.0026	0.0007	4
152.431		15.62	6.93	0.13	1
156.388		6.01	2.64	0.05	1
179.395		7.04	3.08	0.06	1
198.353		3.40	1.441	0.028	2
222.110		17.05	7.49	0.14	1
229.322	0.001	8.42	3.63	0.07	1
264.075		8.40	3.61	0.07	1
351.05	0.10		0.0091	0.0011	4
829.70	0.10		0.015	0.006	4
891.980	0.002		0.056	0.004	4
927.992	0.002	1.50	0.620	0.012	4
959.730	0.002		0.348	0.008	4
1001.695	0.002	5.34	2.07	0.04	3
1035.80	0.20		0.0073	0.0024	4
1044.410	0.002		0.237	0.006	4
1113.40	0.05	0.83	0.446	0.009	3
1121.301	0.002	79.94	34.9	0.6	1
1135.90	0.20				4
1157.313	0.002	2.22	0.59	0.11	3
1158.082	0.002		0.40	0.06	
1180.78	0.10		0.086	0.005	4
1189.050	0.002	37.41	16.22	0.28	1
1221.407	0.002	62.10	27.0	0.5	1
1223.803	0.002		0.23	0.08	4
1231.016	0.002	26.02	11.44	0.20	1
1257.418	0.002	3.50	1.488	0.026	1
1273.730	0.002	1.49	0.650	0.011	1
1289.156	0.002	3.24	1.349	0.024	1
1342.72	0.05	0.61	0.251	0.004	2
1373.836	0.002	0.51	0.218	0.004	2
1387.402	0.002	0.15	0.0708	0.0015	3
1410.10	0.10		0.0394	0.0012	4
1453.124	0.002		0.0284	0.0009	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

Figure 2. Experimental values for gamma-ray energies and intensities for the ¹⁸²Ta spectrum as they appear in the current (1998) Catalogue. These values are tabulated following the decay schemes of each plate.



As previously indicated the 2nd Edition of the Catalogue consisted of two volumes. The first volume contained extensive text describing the experimental techniques of gamma-ray spectrometry using NaI scintillation detectors. The second volume contained the experimental spectra and associated experimental data. The current edition will follow a similar format. The second volume, being issued at this time, contains the experimental spectra presented in graphical form with results of gamma-ray energy and intensity measurements.

The first volume of this edition will contain a description of important experimental considerations in the use of Ge(Li) and Si(Li) spectrometers for the quantitative and qualitative measurement of gamma-ray spectra. This will include a discussion of the factors which influence detector response (i.e., resolution, counting rate effects, electronic stability and linearity), and the experimental techniques used for the analysis of gamma-ray spectra to obtain precision energies and intensities. The characteristics of all spectrometers used for the experimental results contained in the Catalogue will be included. In addition the first volume will contain selected sorted information from the data file of gamma-ray energies and intensities. This will include principal gamma rays from all nuclides ordered by energy for different ranges of half-life and mode of nuclide production. These selected subsets of the data set form the basis for table look-up in the application of computer techniques for automated analysis of spectra. This volume is planned for publication within the next year. Recognizing the existing need for the large volume of experimental data represented by the Catalogue effort, it was felt that the second volume should be made available at this time and not be held up by the tedious preparation required for Volume 1.

In view of the many applications of Ge(Li) gamma-ray spectrometers for isotopic analysis of radioactivity, a number of specialized experimental spectra have been included in the Catalogue. These include gamma-ray spectra of gross fission products, rare gases and their daughter nuclides associated with fission, and the natural radioactive decay chains. The fission product gamma-ray spectra have been measured as a function of irradiation and decay time for ²³⁵U thermal fission. A typical example of this class of experimental data is shown in Figure 4, which presents the gross gamma-ray spectrum of short-lived fission product rare gases and their associated daughter nuclides. This particular spectrum represents data obtained from a sealed gas sample, measured 8 minutes after collection. These composite spectra are valuable in determining possible interference in the analysis of complex gross fission product spectra.

The large volume of data represented by this effort may be utilized in many ways. It provides an internally consistent set of data as a base for the generation of files of gamma-ray energies and intensities for automated analysis of gamma-ray spectra. These data have been incorporated into a computer data file of radionuclide decay data at this laboratory. This file is accessed and updated using interactive graphics with provision for sorted output using a wide variety of selection criteria. It is presently intended that the effort will continue to obtain data on additional nuclides with continued improvement in the precision of energy and intensity measurements, as the techniques are refined. It is felt that this integrated approach to the measurement and compilation of selected types of nuclear data represents an appropriate method of obtaining specialized data sets that meet specific requirements. User acceptance of these data will provide the justification for continued or expanded efforts in the development of the data base technology for experimental gamma-ray spectrometry. Current plans for future extension of the data base include the refinement of experimental spectral measurements to improve the sensitivity to weak gamma-ray transitions by measurement with improved spectrometers employing large Compton-rejection mantle detector arrangements.



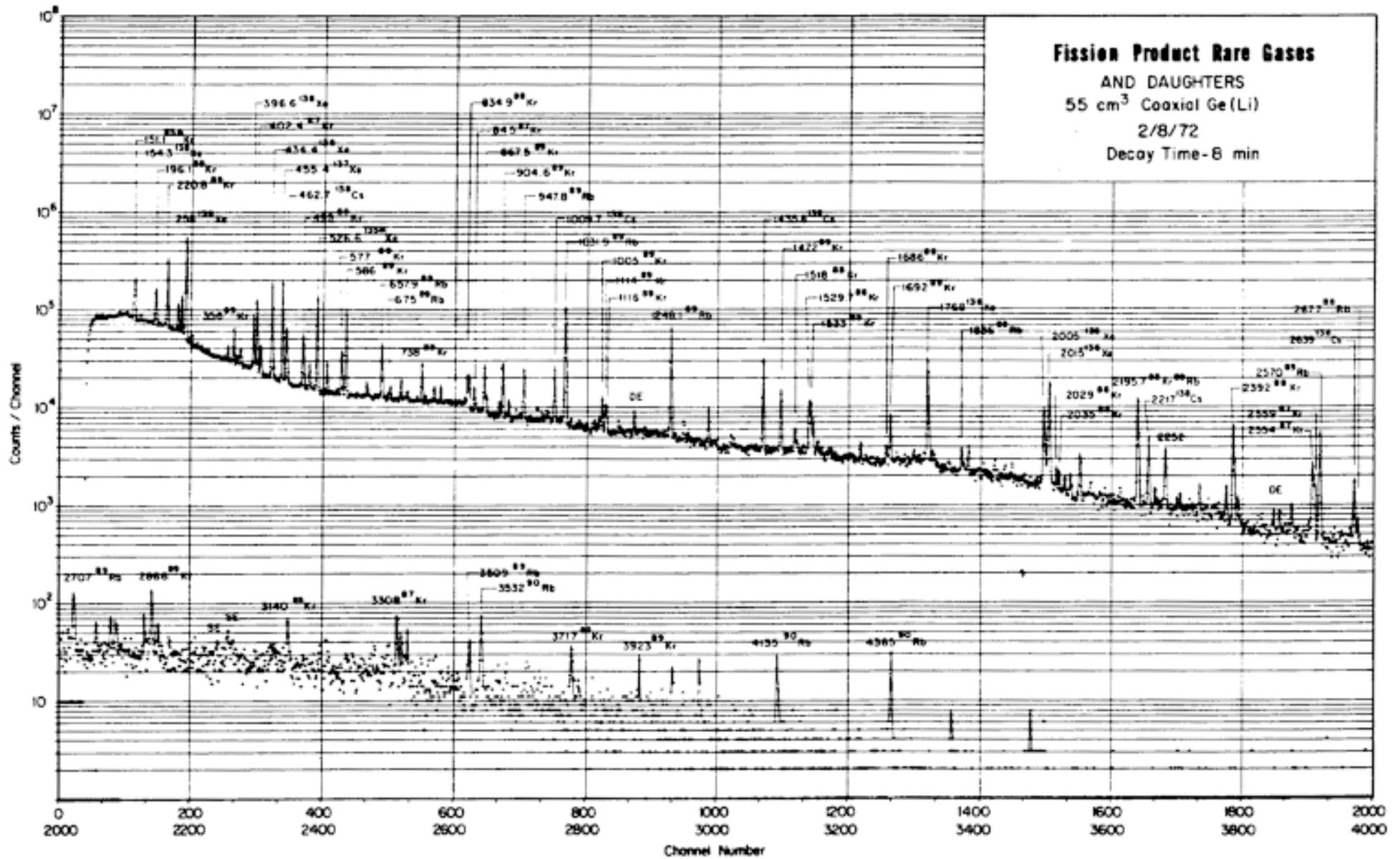


Figure 4

Gamma-ray spectrum of the rare-gas fraction of gross fission products measured after an 8-minute decay with a 65 cm³ Ge(Li) spectrometer.
(This spectrum was scanned from the original Catalogue)



Experimental Measurements

In the development of experimental techniques for the use of NaI scintillation spectrometers, the concept of a standard detector and experimental source-detector geometry was developed. The 3-in. diameter x 3-in. cylindrical NaI(Tl) detector was adopted in a standard geometry and the detector response characterized with considerable precision. With a known sensitive volume and standard geometry it was possible to achieve a laboratory standard spectrometer which has been adopted in many laboratories throughout the world. Unfortunately, the 3-in. x 3-in. semiconductor radiation detector has eluded us to the present and the state-of-the-art has not made it possible to produce detectors with a precisely defined sensitive volume. Over the past 6 or 7 years we have steadily progressed through small volume planar devices of 1 or 2 cm³ volume to high-quality coaxial-drift detectors with sensitive volumes approaching 100 cm³. For this reason and other factors related to the performance of low-noise electronics required to achieve good energy resolution, it has not been practical to consider a standard semiconductor laboratory spectrometer concept. Since the data contained in the present data file have been collected over a period from early in 1966 to the present time, a variety of high-quality spectrometer systems have been used in these experimental measurements. The characteristics of the detectors used are presented in Table 1. During this period, considerable effort has been expended at this and other laboratories in the development and refinement of electronics to utilize the energy resolution afforded by semiconductor detectors and to develop techniques for the analysis of pulse-height data to obtain precision values for the energies and intensities of gamma rays. The experimental techniques developed at this laboratory have been described in the literature ^(3,4,5).

TABLE I
CHARACTERISTICS OF DETECTORS USED FOR CATALOGUE DATA

No.	Type	Volume Sensitive	Voltage Applied	Resolution (FWHM) (electronic)	Resolution (FWHM) (1332 keV)	Drift Depth
1	Ge(Li) planar	2.5 cm ² x 4 mm	800 V	1.3 keV (ext. FET)	2.5 keV	8 mm
2	Ge(Li) planar	2.5 cm ² x 8 mm	800 V	0.65 keV (cooled FET)	1.78 keV	8 mm
3	Ge(Li) planar	4.55 cm ² x 8 mm	1500 V	0.85 keV (cooled FET)	1.85 keV	8 mm
4	Si(Li) planar	30 mm ² x 3 mm	100 V	0.22 keV (cooled FET)	(Fe K x-ray)	3 mm
5	Ge(Li) closed coaxial	35 cm ³ 3.3 cm dia x 4.0 cm	1750 V	0.98 keV (cooled FET)	1.90 keV	12 mm
6	Ge(Li) closed coaxial	55 cm ³ 4.0 cm dia x 4.9 cm	3000 V	0.71 keV (cooled FET)	1.88 keV	18 mm
7	Ge(Li) closed coaxial	65 cm ³ 4.3 cm diam. x 5.5 cm	3300 V	0.85 keV (cooled FET)	1.88 keV	19 mm
8	Ge(Li) closed coaxial	70 cm ³ 4.5 cm diam. x 5.2 cm	3500 V	0.87 keV (cooled FET)	1.90 keV	18 mm
9	Ge(Li) closed coaxial	80 cm ³ 4.6 cm dia x 5.44 cm	3100 V	1.0 keV (cooled FET)	1.93 keV	18 mm
10	Ge(Li) open coaxial	50 cm ³ 4.03 cm dia X 4.30 cm	2500 V	1.3 keV (ext. FET)	2.0 keV	12 mm



All data in the Catalogue were obtained using spectrometer systems which have been carefully calibrated to establish electronic system linearity and stability using both computer-controlled pulse generators⁽⁶⁾ and multiple source techniques. A typical example of spectrometer system linearity obtained by measurement of a number of precisely known gamma rays is shown in Figure 5. This figure is a plot of data obtained at three different values of system gain.

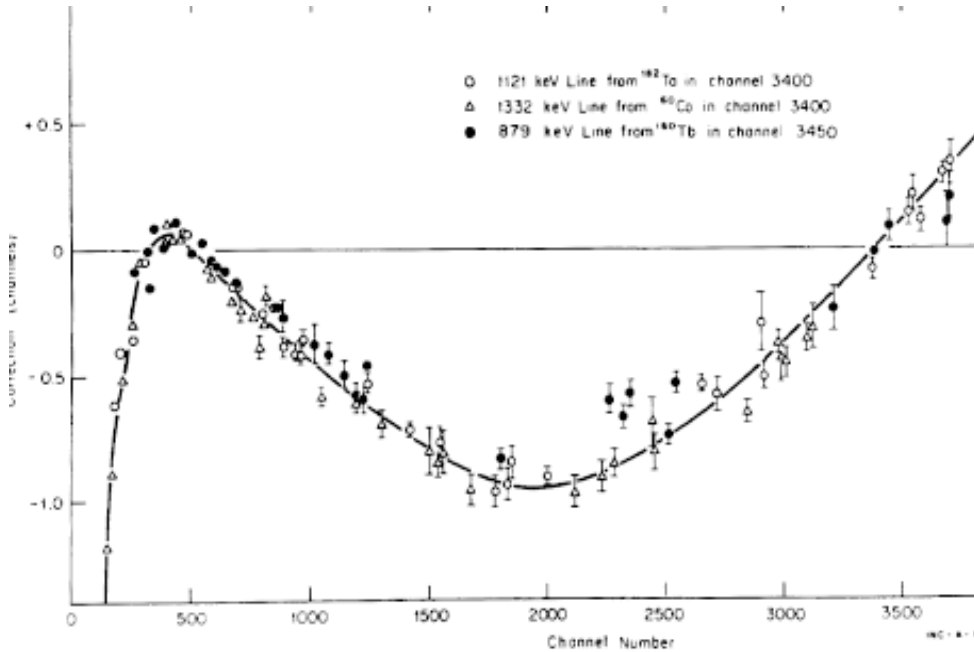


Figure 5. Plot illustrating experimental measurement of Ge(Li) spectrometer system linearity using gamma-ray energy standard reference lines. Data for three measurements using different energy scales are presented for comparison.

All energy and intensity measurements were made using techniques developed at this laboratory and described in recent publications⁽⁷⁾. The analysis of all data to obtain energies and intensities was accomplished using the computer code GAUSS V⁽⁸⁾, which has evolved from non-linear regression techniques developed for the analysis of NaI data⁽⁴⁾

The procedure followed in the analysis of a pulse-amplitude spectrum using GAUSS involves the following steps: (1) the identification and location of peaks in the spectrum, (2) the determination of the energy vs. channel scale using the positions and energies of internal calibration lines, (3) calculation of energies and intensities by least-squares analysis to determine peak centroids and areas. Over the past several years, a program has been developed at this laboratory to re-examine the reference energy scales used in gamma-ray spectroscopy and to provide a series of precisely-measured gamma-ray transitions for use as calibration standards. To date, three groups of energy measurements covering the energy range from 30 keV to 3600 keV have been published.^(9,10,11) These measurements provide a large number of precise gamma-ray transition energies for use in energy measurements. A list of calibration energies used at this laboratory for energy measurements is given in Table II. All energy values presented in the Catalogue are based on calibration lines.

Table II Gamma-ray Energy Standards Recommended for Energy Calibration

Editors Note: Table II has been deleted and replaced with updated values in the Foreword of this document. [Click here to jump to the updated table.](#)



At higher energies, a few well measured transitions exist and work is progressing to provide more reference lines up to 5 MeV. Above the pair threshold, the field-increment effect⁽⁵⁾ introduces many geometric problems which affect the precision of energy determination. This is particularly true when measurements are made using large volume closed-end coaxial detectors. Because of this, all energy measurements are made using only full-energy peaks in the spectrum with careful control of source-detector geometry.

A typical laboratory data system in use for the simultaneous acquisition and analysis of pulse-amplitude spectra is shown in block form in Figure 6 and as a photograph in Figure 7. This system employs a processor-controlled graphics display oscilloscope for the application of interactive graphics techniques to the analysis of data and editing of data files. A 1200-Baud asynchronous data link provides access to other laboratory spectrometers and will provide a link to the laboratory 360/75 system for remote batch terminal operation.

PDP/9 LABORATORY DATA SYSTEM

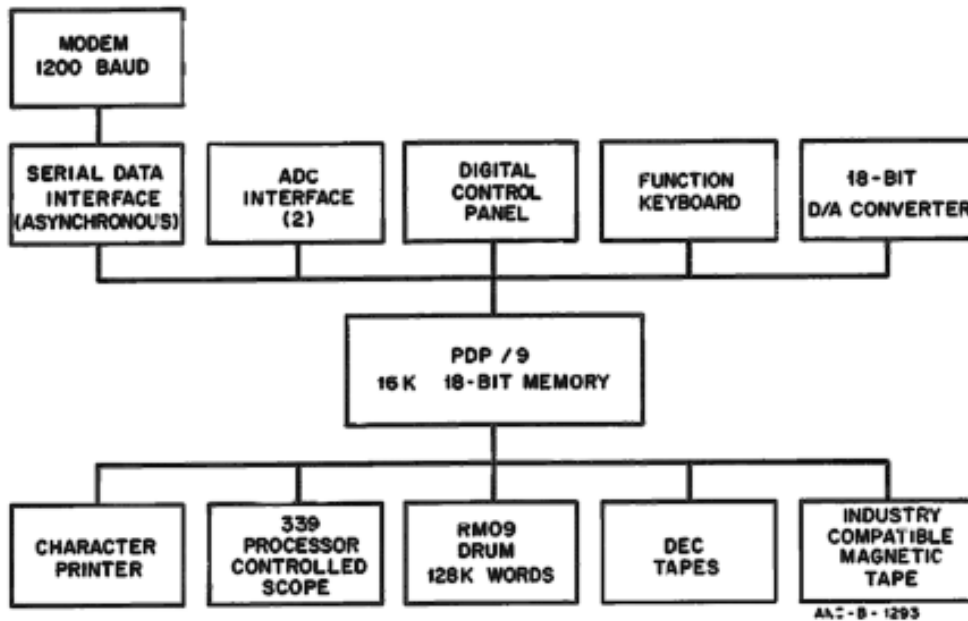


Figure 6. Block diagram of on-line data acquisition and analysis system is used for processing of data for the Spectrum Catalogue. This system employs a Digital Equipment Corporation PDP-9 computer

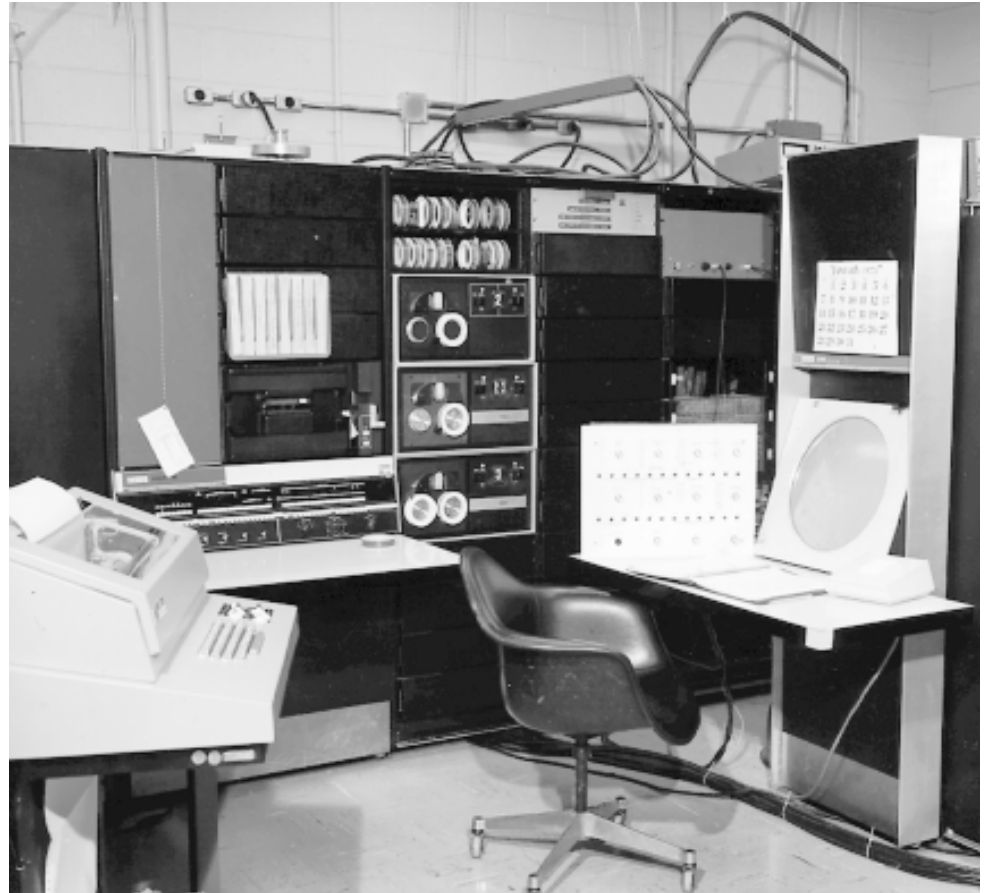


Figure 7. Photograph of computer data analysis system showing interactive display console with function keyboard and control panel.



Source Production

The measurement of gamma-ray spectra of over 300 individual nuclides has involved the use of a number of large experimental facilities. To produce a relatively pure sample of a given nuclide usually requires a selection of one of several possible nuclear reactions, a tailored radiochemical procedure for purification of the desired nuclide, and a selection of measurement time to optimize the experiment. Since spectra of both neutron and proton deficient nuclei are of interest, this required the use of both nuclear reactors and accelerators. The facilities used for the production of source material for measurement are listed in Table III, which indicates the facility and types of reactions used. The major reactor facilities at the NRTS have fast pneumatic shuttle facilities as well as in-tank irradiation facilities for individual samples. Portable shuttle facilities were utilized at particle accelerators for production and measurement of short-lived nuclides. In the use of accelerators, particle energy was also employed as a variable to enhance the production of a single nuclide. In all cases, either spec-pure or mass-separated material was employed for irradiation. Following irradiation, the sample material was chemically purified and decay data utilized to assign all observed transitions to a given radionuclide.

Table III
FACILITIES USED TO PRODUCE ISOTOPIC SAMPLES

Facility	Particle	Energy	Reactions
U. of Colorado cyclotron	proton, ^3He protons	10-35 MeV	p,xn; ^3He ,xn; p, γ
GGA Linac	electron	20-30 MeV	γ ,xn; γ ,p
LRL Linac Livermore	electron	100 Mev	γ ,xn; γ ,p
SREL electron synchrocyclotron	proton	590 MeV	p,xn; spallation
ORNL production cyclotron	proton	20 MeV	p,xn

INEEL

Reactor	Maximum Thermal Neutron Flux	Facilities Used
MTR	2×10^{14} n/cm ² /sec	Fast pneumatic shuttle In-tank capsule
ETR	8×10^{14} n/cm ² /sec	Pneumatic In-tank capsule Gas loop experiment
ATR	10^{15} n/cm ² /sec	In-tank capsule (thermal)
EBR II	10^{14} n/cm ² /sec fast flux	In-tank capsule (fast)



In summary, it should be stated that the collection of experimental data presented in this edition of the Gamma-Ray Spectrum Catalogue represents a continuing effort to provide a consistent set of experimental data for use in the application of gamma-ray spectrometry. Experimental data for additional nuclides not included in this volume are available. These data and information on the experimental analysis spectra contained in this volume may be obtained by contacting this laboratory. Inquiries related to the Catalogue should be directed to:

Gamma-Ray Spectrum Catalogue
National Reactor Testing Station
Aerojet Nuclear Company
550 Second Street
Idaho Falls, Idaho 83401

Attention: R. L. Heath

**Editors Note: Use address given in foreword.
Click Here to jump to correct address.**

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Table IV - Table of Spectra

<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
4 Beryllium	⁷ Be	53.3 (2) day	04-07-1	55 cm ³ coaxial (c) Ge(Li)	Li (p,n)
	⁷ Be	53.3 (2) day	04-07-2	2.5 cm ² x 8 mm Ge(Li)	Li (p,n)
9 Fluorine	²⁰ F	11.4 sec	09-020-1	2.5 cm ² x 8 mm Ge(Li)	F(n, γ)
11 Sodium	²² Na	2.60 (1) Yr	11-022-1	65 cm ³ coaxial (c) Ge(Li)	²³ Na (n,2n)
	²⁴ Na	15.00 (2) hr	11-024-1	65 cm ³ coaxial (c) Ge(Li)	²³ Na (n, γ)
	²⁵ Na	59.0 sec	11-025-1	4.55 cm ² x 8 mm Ge(Li)	²⁵ Mg (n,p)
12 Magnesium	²⁷ Mg	9.46 (2) min	12-027-1	2.5 cm ² x 8 mm Ge(Li)	²¹ Mg (n, γ)
13 Aluminum	²⁶ Al	7.4 x 10 ⁶ yr	13-026-1	55 cm ³ coaxial (c) Ge(Li)	²⁶ Mg (p,n)
	²⁸ Al	2.24 (1) min	13-028-1	4.55 cm ² x 8 mm Ge(Li)	¹⁷ Al(n, γ)
16 Sulfur	³⁷ S	5.06 min	15-037-1	2.5 cm ² x 8 mm Ge(Li)	³⁶ S (n, γ)
17 Chlorine	³⁸ Cl	37.3 (1) min	17-038-1	65 cm ³ coaxial (c) Ge(Li)	³⁷ Cl(n, γ)
18 Argon	⁴¹ Ar	1.83 hr	18-041-1	70 cm ³ coaxial (c) Ge(Li)	⁴⁰ Ar (n, γ)
19 Potassium	³⁸ K	7.7 min	19-038-1	4.55 cm ² x 8 mm Ge(Li)	¹⁹ K (γ ,n)
	⁴⁰ K	1.28 x 10 ⁹ yr	19-040-1	55 cm ³ coaxial (c) Ge(Li)	³⁹ K (n, γ)
	⁴² K	12.36 (1) hr	19-042-1	55 cm ³ coaxial (c) Ge(Li)	⁴¹ K (n, γ)
	⁴³ K	22.0 hr	19-043-1	2.5 cm ² x 8 mm Ge(Li)	⁴⁴ Ca (γ ,p)
20 Calcium	⁴⁹ Ca	8.8 (3) min	20-049-1	35 cm ³ coaxial (c) Ge(Li)	⁴⁸ Ca (n, γ)
21 Scandium	^{44m} Sc	58.6 hr	21-044m(044)-I	35 cm ³ coaxial (c) Ge(Li)	⁴⁵ Sc (γ ,n)
	⁴⁴ Sc	3.92 hr			
	⁴⁶ Sc	83.85 (10) day	21-046-1	65 cm ³ coaxial (c) Ge(Li)	⁴⁵ Sc (n, γ)
	⁴⁷ Sc	3.39 (4) day	21-047-1	55 cm ³ coaxial W Ge(Li)	⁴⁷ Ti (n,p)
	⁴⁸ Sc	43.8 (1) hr	21-048-1	2.5 cm ² x 8 mm Ge(Li)	⁴⁹ Ti (γ ,p)



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<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
22 Titanium	⁴⁴ Ti	47.0 yr	22-044(21-044)-I	55 cm ³ coaxial(c) Ge(Li)	⁴⁵ Sc(p,2n)
	⁴⁴ Sc	3.92 hr			
	⁴⁴ Ti	47.0 yr	22-044-2	30 mm ² x 3 mm Si(Li)	⁴⁵ Sc(p,2n)
	⁴⁵ Ti	3.08 hr	22-045-1	2.5 cm ² x 4 mm Ge(Li)	⁴⁶ Ti (γ,n)
	⁵¹ Ti	5.76 min	22-051-1	2.5 cm ² x 8 mm Ge(Li)	⁵⁰ Ti (n,γ)
23 Vanadium	⁴⁸ V	15.97 day	23-048-1	50 cm ³ coaxial (o) Ge(Li)	⁴⁸ Ti (p,n)
	⁵² V	3.75 min	23-052- 1	2.5 cm ² x 8 mm Ge (Li)	⁵¹ V (n,γ)
24 Chromium	⁴⁸ Cr	23.0 hr	24-048-1	4.55 cm ² x 8 mm Ge(Li)	⁵⁰ Cr (γ,2n)
	⁴⁹ Cr	42.0 min	24-049-1	4.55 cm ² x 8 mm Ge(Li)	⁵⁰ Cr (γ,n)
	⁵¹ Cr	27.72 (3) day	24-051-1	55 cm ³ coaxial (c) Ge(Li)	⁵⁰ Cr(n,γ)
25 Manganese	⁵² Mn	21.0 min	25-052m-1	35 cm ³ coaxial (c) Ge(Li)	⁵² Cr(p,n)
	⁵² Mn	5.67 (9) day	25-052-1	55 cm ³ coaxial (c) Ge(Li)	⁵² Cr(p,n)
	⁵⁴ Mn	312.6 (3) day	25-054-1	55 cm ³ coaxial W Ge(Li)	⁵⁴ Fe(n,p)
	⁵⁶ Mn	2.587 (6) hr	25-056-1	35 cm ³ coaxial (c) Ge(Li)	⁵⁵ Mn(n,γ)
26 Iron	⁵² Fe	8.5 hr	26-052-1	4.55 cm ² x 8 mm Ge(Li)	⁵⁴ Fe(γ,2n)
	⁵³ Fe	8.5 min	26-053-1	4.55 cm ² x 8 mm Ge(Li)	¹⁴ Fe(γ,n)
	⁵⁵ Fe	2.7 yr	26-055-1	30mm ² x 3 mm Si(Li)	⁵⁴ Fe(n,γ)
	⁵⁹ Fe	44.6 (1) day	26-059-1	65 cm ³ coaxial (c) Ge(Li)	"Fe(n,γ)
27 Cobalt	⁵⁶ Co	77.3 (3) day	27-056-1	55 cm ³ coaxial (c) Ge(Li)	⁵⁶ Fe (p,n)
	⁵⁷ Co	271 (2) day	27-057-1	55 cm ³ coaxial (c) Ge(Li)	⁵⁸ Ni (γ,p)
	⁵⁷ Co	271 (2) day	27-057-3	2.5 cm ² x 8 mm Ge(Li)	⁵⁸ Ni (γ,p)
	⁵⁸ Co	71.3 (2) day	27-058-1	55 cm ³ coaxial (c) Ge(Li)	⁵⁸ Fe (n,p)
	^{60m} Co	10.5 min	27-060m-1	30 mm ² x 3 mm Si(Li)	⁵⁹ Co (n,γ)
	⁶⁰ Co	5.268 (5) yr	27-060-1	55 cm ³ coaxial (c) Ge(Li)	⁵⁹ Co (n,γ)
	⁶⁰ Co	5.268 (5) yr	27-060-3	55 cm ³ coaxial (c) Ge(Li)	⁵⁹ Co (n,γ)
⁶¹ Co	99.0 min	27-061-1	4.55 cm ² x 8 mm Ge(Li)	⁶¹ Ni (γ,p)	



Table IV - Table of Spectra

<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
28 Nickel	⁵⁶ Ni	6. 1 (1) day	28-056-1	35 cm ³ coaxial (c)Ge(Li)	⁵⁸ Ni (γ ,2n)
	⁵⁷ Ni	36.0 hr	28-057-1	4.55 cm ² x 8 mm Ge(Li)	⁵⁸ Ni(γ ,n)
	⁶⁵ Ni	2.56 hr	28-065-1	55 cm ³ coaxial (c) Ge(Li)	⁶⁵ Ni(n, γ)
29 Copper	⁶⁰ Cu	23.0 min	29-060-1	4.55 cm ² x 8 mm Ge(Li)	⁶⁰ Ni(p,n)
	⁶¹ Cu	3.3 hr	29-061-1	2.5 cm ² x 4 mm Ge(Li)	⁶³ Cu(γ ,2n)
	⁶² Cu	9.8 min	29-062-1	2.5 cm ² x 4 mm Ge(Li)	⁶¹ Cu(γ ,n)
	⁶⁴ Cu	12.78 (5) hr	29-064-1	55 cm ³ coaxial (c) Ge(Li)	⁶³ Cu(n, γ)
	⁶⁶ Cu	5.1 min	29-066-1	2.5 cm ² x 8 mm Ge(Li)	⁶⁵ Cu(n, γ)
	⁶⁷ Cu	61.0 hr	29-067-1	2.5 cm ² x 8 mm Ge(Li)	⁶⁸ Zn(γ ,p)
30 Zinc	⁶² Zn	9.3 hr	30-062-1	2.5 cm ² x 4 mm Ge(Li)	⁶⁴ Zn(γ ,2n)
	⁶³ Zn	38.0 min	30-063-2	4.55 cm ² x 8 mm Ge(Li)	⁶⁴ Zn(γ ,n)
	⁶⁵ Zn	243.7 (2) day	30-065-1	55 cm ³ coaxial (c) Ge(Li)	⁶⁴ Zn(n, γ)
	^{69m} Zn	13.9 hr	30-069m(069)-1	65 cm ³ coaxial (c) Ge(Li)	⁶⁸ Zn(n, γ)
	⁶⁹ Zn	57.0 min			
	^{71m} Zn	3.92 (5) hr	30-071m-1	65 cm ³ coaxial (c) Ge(Li)	⁷⁰ Zn(n, γ)
	⁷¹ Zn	2.4 (1) min	30-071-1	2.5 cm ² x 8 mm Ge(Li)	⁷⁰ Zn(n, γ)
	⁷² Zn	46.6 (2) hr	30-072-1	4.55 cm ² x 8 mm Ge(Li)	Ge(γ ,xp)
31 Gallium	⁶⁶ Ga	9.4 hr	31-066-1	35 cm ³ coaxial (c) Ge(Li)	⁶⁶ Zn(p,n)
	⁶⁷ Ga	3.25 day	31-067-1	2.5 cm ² x 4 mm Ge(Li)	⁶⁹ Ga(γ ,2n)
	⁶⁸ Ga	68.0 min	31-068-1	4.55 cm ² x 8 mm Ge(Li)	⁶⁹ Ga(γ ,n)
	⁷⁰ Ga	21.1 (7) min	31-070-1	4.55 cm ² X 8 mm Ge(Li)	⁶⁹ Ga(n, γ)
	⁷² Ga	14.1 hr	31-072-1	65 cm ³ coaxial (c) Ge(Li)	⁷¹ Ga(n, γ)
	⁷³ Ga	4.8 hr	31-073-1	2.5 cm ² x 4 mm Ge(Li)	⁷⁴ Ge(γ ,p)
32 Germanium	⁶⁹ Ge	1.58 day	32-069-1	4.55 cm ² x 8 mm Ge(Li)	⁷¹ Ge(γ , n)
	⁷¹ Ge	11.0 day	32-071-1	30 mm ² x 3 mm Si(Li)	⁷⁰ Ge(n, γ)
	⁷⁵ Ge	82.0 min	32-075-1	4.55 cm ² x 8 mm Ge(Li)	⁷⁴ Ge(n, γ)



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<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
33 Arsenic	^{70}As	53.0 (6) min	33-070-1	3.5 cm ² x 8 mm Ge(Li)	$^{70}\text{Ge}(p,n)$
	^{73}As	76.0 day	33-073-1	30 mm ² x 3 mm Si(Li)	$^{74}\text{Ge}(p,2n)$
	^{74}As	17.7 day	33-074-1	2.5 cm ² x 8 mm Ge(Li)	$^{75}\text{As}(\gamma, n)$
	^{76}As	26.32 (7) hr	33-076-2	55 cm ³ coaxial (c) Ge(Li)	$^{75}\text{As}(n,\gamma)$
	^{77}As	38.7 hr	33-077-1	35 cm ³ coaxial (c) Ge(Li)	$^{78}\text{Se}(\gamma, p)$
34 Selenium	^{73}Se	7.1 hr	34-073-1	2.5 cm ² x 4 mm Ge(Li)	$^{74}\text{Se}(\gamma,n)$
	^{75}Se	120.0 (1) day	34-075-1	65 cm ³ coaxial (c) Ge(Li)	$^{74}\text{Se}(n,\gamma)$
	^{77m}Se	17.5 sec	34-077m-1	2.5 cm ² x 8 mm Ge(Li)	$^{76}\text{Se}(n,\gamma)$
	^{81m}Se	57.0 min	34-081m(081)-I	70 cm ³ coaxial (c) Ge(Li)	$^{80}\text{Se}(n,\gamma)$
	^{81}Se	18.6 min			
	^{83}Se	23.0 min	34-083-1	65 cm ³ coaxial (c) Ge(Li)	$^{82}\text{Se}(n,\gamma)$
35 Bromine	^{75}Br	1.6 hr	35-075-1	4.55 cm ² x 8 mm Ge (Li)	$\text{Se}(p,xn)$
	^{76}Br	16.5 hr	35-076-1	2.5 cm ² x 8 mm Ge(Li)	$\text{Se}(p,xn)$
	^{77}Br	57.0 hr	35-077-1	4.55 cm ² x 8 mm Ge(Li)	$\text{Se}(p,xn)$
	^{80m}Br	4.4 hr	35-080m(080)-I	50 cm ³ coaxial (c) Ge(Li)	$^{79}\text{Br}(n,\gamma)$
	^{80}Br	18.0 min			
	^{82}Br	35.4 (1) hr	35-082-1	65 cm ³ coaxial (c) Ge(Li)	$^{81}\text{Br}(n,\gamma)$
	^{83}Br	2.41 hr	35-083-1	70 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	^{84}Br	31.7 (2) min	35-084-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
36 Krypton	^{85}Kr	10.73 (6) yr	36-085-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f) Chem.
	^{87}Kr	76.4 (10) min	36-087-1	65 cm ³ coaxial (c) Ge(Li)	$^{86}\text{Kr}(n,\gamma)$
	^{88}Kr - ^{88}Rb	2.795 (25) hr - 17.79 (10) min	36-088(37-088)-I	65 cm ³ coaxial (c) Ge(Li)	U(n,f) m.s.
37 Rubidium	^{83}Rb	83.0 day	37-083-1	65 cm ³ coaxial (c) Ge(Li)	$\text{Rb}(\gamma,xn)$
	^{84}Rb	33.0 (2) day	37-084-1	2.5 cm ² x 4 mm Ge(Li)	$\text{Rb}(\gamma,n)$
	^{86m}Rb	1.02 (2) min	37-086m-1	2.5 cm ² x 8 mm Ge(Li)	$^{85}\text{Rb}(n,\gamma)$
	^{86}Rb	18.66 (2) day	37-086-1	2.5 cm ² x 8 mm Ge(Li)	$^{85}\text{Rb}(n,\gamma)$
	^{88}Rb	17.79 (10) min	37-088-1	35 cm ³ coaxial (c) Ge(Li)	$^{87}\text{Rb}(n,\gamma)$
	^{89}Rb	15.4 (1) min	37-089-1	55 cm ³ coaxial (c) Ge(Li)	U(n,f) Chem.



Table IV - Table of Spectra

<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
38 Strontium	⁸³ Sr	32.4 hr	38-083-1	4.55 cm ² x 8 mm Ge(Li)	⁸⁴ Sr(γ ,n)
	^{85m} Sr	69.5 (5) min	38-085m-1	2.5 cm ² x 4 mm Ge(Li)	⁸⁶ Sr(γ ,n)
	⁸⁵ Sr	64.5 (5) day	38-085-1	55 cm ³ coaxial (c) Ge(Li)	⁸⁵ Rb(p,n)
	⁸⁵ Sr	64.5 (5) day	38-085-2	2.5 cm ² x 8 mm Ge(Li)	⁸⁵ Rb(p,n)
	^{87m} Sr	2.81 (1) hr	38-087m-1	2.5 cm ² x 4 mm Ge(Li)	⁸⁶ Sr(n, γ)
	⁹¹ Sr	9.67 hr	38-091-1	35 cm ³ coaxial (c) Ge(Li)	U(n,f) Chem.
	⁹² Sr	2.71 (1) hr	38-092-1	35 cm ³ coaxial (c) Ge(Li)	U(n,f) Chem.
39 Yttrium	^{87m} Y - ⁸⁷ Y	14.0 hr - 80.0 hr	39-087m(087)-1	4 cm ² x 4 mm Ge(Li)	Sr(p,xn)
	⁸⁸ Y	106.6 day	39-088-1	55 cm ³ coaxial (c) Ge(Li)	⁸⁸ Sr(p,n)
	^{90m} Y	3.14 hr	39-090m-1	4.55 cm ² x 8 mm Ge(Li)	⁸⁹ Y(n, γ)
	^{91m} Y	50.0 min,			
	⁹² Y	3.54 (1) hr,	39-091m,92,93-1	35 cm ³ coaxial (c) Ge(Li)	U(n,f) Chem.
	⁹³ Y	10.2 hr			
	^{91m} Y	50.0 min	39-91m-2	2.5 cm ² x 8 mm Ge(Li)	U(n,f) Chem.
40 Zirconium	^{89m} Zr	4.2 min	40- 089m-1	4.55 cm ² x 8 mm Ge(Li)	⁹⁰ Zr(γ ,n)
	⁸⁹ Zr	78.0 hr	40 - 089-1	4.55 cm ² x 8 mm Ge(Li)	⁹⁰ Zr(γ , n)
	⁹⁵ Zr	64.6 (6) day	40 - 095-1	55 cm ³ coaxial (c) Ge(Li)	⁹⁴ Zr(n, γ)
	⁹⁵ Zr- ⁹⁵ Nb equilibrium	64.6 day	40 - 095(41-095)-I	65 cm ³ coaxial (c) Ge(Li)	⁹⁴ Zr(n, γ)
	⁹⁷ Zr- ⁹⁷ Nb equilibrium	35.1 (1) day			
		16.85 hr	40 - 0 97(41-097)-I	4.55 cm ² x 8 mm Ge(Li)	⁹⁶ Zr(n, γ)
	74.0 min				
41 Niobium	^{92m} Nb	10.15 (2) day	41- 092m-1	2.5 cm ² x 8 mm Ge (Li)	⁹³ Nb(γ ,n)
	^{94m} Nb	6.3 min	41- 094m-1	35 cm ³ coaxial (c) Ge (Li)	⁹³ Nb(n, γ)
	⁹⁴ Nb	2 X 10 ⁴ yr	41 -094-1	55 cm ³ coaxial (c) Ge(Li)	⁹³ Nb(n, γ)
	⁹⁵ Nb	35.1 (1) day	41 -095-1	55 cm ³ coaxial (c) Ge(Li)	⁹⁵ Zr(decay)
	⁹⁶ Nb	23.4 hr	41- 096-1	4.55 cm ² x 8 mm Ge(Li)	⁹⁶ Zr(p,n)
	⁹⁷ Nb	74.0 min	41- 097-1	4.55 cm ² x 8 mm Ge (Li)	⁹⁷ Zr(decay)



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42 Molybdenum	⁹³ Mo	500.0 yr	42-093-1	30 mm ² x 3 mm Si(Li)	⁹³ Nb(p,n)
	⁹⁹ Mo	66.2 (5) hr	42-099(43-099m)-I	65 cm ³ coaxial W Ge(Li)	⁹⁸ Mo(n, γ)
	⁹⁹ Tc	6.02 (3) hr			
	¹⁰¹ Mo	14.6 min	42-101-1	65 cm ³ coaxial (c) Ge(Li)	¹⁰⁰ Mo(n, γ)
43 Technetium	^{94m} Tc	53.0 min	43-094m(094)-I	3.5 cm ² x 8 mm Ge(Li)	⁹⁴ Mo(p,xn)
	⁹⁴ Tc	4.8 hr			
	^{95m} Tc	61.0 (2) day	43-095m(095)-I	4.55 cm ² x 8 mm Ge(Li)	⁹⁴ Mo(p,n)
	⁹⁵ Tc	20.0 (5) hr			
	⁹⁵ Tc	20.0 (5) hr	43-095-1	2.5 cm ² x 8 mm Ge(Li)	⁹⁵ Mo(p,n)
	^{99m} Tc	6.02 (3) hr	43-099m-1	65 cm ³ coaxial (c) Ge(Li)	⁹⁹ Mo(decay)
	¹⁰¹ Tc	14.2 min	43-101-1	70 cm ³ coaxial (c) Ge(Li)	¹⁰¹ Mo(decay)
	¹⁰⁴ Tc	18.0 min	43-104-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
44 Ruthenium	¹⁰³ Ru	39.45 (10) day	44-103-1	2.5 cm ³ x 8 mm Ge(Li)	¹¹² Ru(n γ)
	¹⁰⁵ Ru	4.44 hr	44-105-1	55 cm ³ coaxial (c) Ge(Li)	¹⁰⁴ Ru(n γ)
	¹⁰⁶ Ru	369.0 (2) day	44-106(45-106)-I	55 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	¹⁰⁶ Rh	30.4 (5) sec			
45 Rhodium	⁹⁹ Rh	16.0 day	45-099-4	2.5 cm ² x 8 mm Ge(Li)	¹⁰³ Rh(γ ,3n)
	^{101m} Rh	4.5 day	45-101m-1	2.5 cm ² x 8 mm Ge(Li)	¹⁰³ Rh(γ ,2n)
	^{102m} Rh	2.9 yr	45-102m-1	2.5 cm ² x 8 mm Ge(Li)	¹⁰¹ Rh(γ ,n)
	^{102m} Rh	2.9 yr	45-102m(102)-2	2.5 cm ² x 8 mm Ge(Li)	Ru(p,xn)
	¹⁰² Rh	206.0 day			
	^{102m} Rh	2.9 yr	45-102ri-1	2.5 cm ² x 8 mm Ge(Li)	Ru(p,xn)
	^{103m} Rh	57.0 min	45-103m-1	30 mm ² x 3 mm Si(Li)	¹⁰³ Rh(γ , γ)
46 Palladium	¹⁰¹ Pd	8.5 hr	46-101-1	2.5 cm ² x 8 mm Ge(Li)	¹⁰² Pd(γ ,n)
	¹⁰³ Pd	17.0 day	46-103-1	2.5 cm ² x 8 mm Ge(Li)	¹⁰⁴ Pd(γ ,n)
	^{109m} Pd	4.7 min	46-109m-1	2.5 cm ² x 8 mm Ge(Li)	¹⁰⁸ Pd(n, γ)
	¹⁰⁹ Pd	13.46 (2) hr	46-109-1	65 cm ³ coaxial (c) Ge(Li)	¹⁰⁸ Pd(n, γ)



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<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
47 Silver	^{105}Ag	40.0 day	47-105,106m-1	4.55 cm ² x 8 mm Ge(Li)	Pd(p,xn)
	$^{106\text{m}}\text{Ag}$	8.4 day			
	^{106}Ag	24.0 min	47-106-1	4.55 cm ² x 8 mm Ge(Li)	$^{107}\text{Ag}(\gamma, n)$
	$^{108\text{m}}\text{Ag}$	127.0 (21) yr	47-108m-1	55 cm ³ coaxial (c) Ge(Li)	$^{107}\text{Ag}(n, \gamma)$
	^{108}Ag	2.41 (1) min	47-108-1	2.5 cm ² x 8 mm Ge(Li)	$^{107}\text{Ag}(n, \gamma)$
	$^{110\text{m}}\text{Ag}$	252.0 (2) day	47-110m-1	55 cm ³ coaxial (c) Ge(Li)	$^{109}\text{Ag}(n, \gamma)$
	^{111}Ag	7.46 (1) day	47-111-1	55 cm ³ coaxial (c) Ge(Li)	$^{110}\text{Pd}(n, \gamma)$
48 Cadmium	^{107}Cd	6.49 (5) hr	48-107(47-107m)-l	65 cm ³ coaxial (c) Ge(Li)	$^{107}\text{Ag}(p, n)$
	$^{107\text{m}}\text{Ag}$	44.0 sec			
	^{109}Cd	453.2 (18) day	48-109-1	30 mm ² x 3 mm Si(Li)	$^{109}\text{Ag}(p, n)$
	$^{111\text{m}}\text{Cd}$	48.6 (3) min	48-111m-1	4.55 cm ² x 8 mm Ge(Li)	$^{110}\text{Cd}(n, \gamma)$
	$^{115\text{m}}\text{Cd}$	44.8 (3) day	48-115m-1	35 cm ³ coaxial (c) Ge(Li)	$^{114}\text{Cd}(n, \gamma)$
	^{115}Cd	53.38 (4) hr	48-115(49-115m)-i	65 cm ³ coaxial (c) Ge(Li)	$^{114}\text{Cd}(n, \gamma)$
	$^{115\text{m}}\text{In}$	4.5 hr			
	$^{117\text{m}}\text{Cd}$	3.2 hr	48-117m(117)-i	65 cm ³ coaxial (c) Ge(Li)	$^{116}\text{Cd}(n, \gamma)$
	^{117}Cd	2.5 hr			
49 Indium	^{111}In	2.83 (2) day	49-111-1	2.5 cm ² x 4 mm Ge(Li)	$^{113}\text{In}(\gamma, 2n)$
	$^{114\text{m}}\text{In}$	49.51 (1) day	49-114m(114)-l	65 cm ³ coaxial (c) Ge(Li)	$^{113}\text{In}(n, \gamma)$
	^{114}In	72.0 sec			
	$^{116\text{m}}\text{In}$	54.34 (9) min	49-116m-1	55 cm ³ coaxial (c) Ge(Li)	$^{111}\text{In}(n, \gamma)$
	$^{117\text{m}}\text{In}$	1.7 hr	49-117m(117)-1	65 cm ³ coaxial (c) Ge(Li)	$^{117}\text{Cd}(\text{decay})$
	^{117}In	45.0 min			
50 Tin	^{113}Sn	115.2 (8) day	50-113-1	2.5 cm ² x 8 mm Ge(Li)	$^{112}\text{Sn}(n, \gamma)$
	$^{113\text{m}}\text{Sn}$	1.66 hr	50-113-2	50 cm ³ coaxial (o) Ge(Li)	$^{112}\text{Sn}(n, \gamma)$
			50-113-3	65 cm ³ coaxial (c) Ge(Li)	$^{112}\text{Sn}(n, \gamma)$
			50-117m-1	2.5 cm ² x 8 mm Ge(Li)	$^{116}\text{Sn}(n, \gamma)$
	$^{117\text{m}}\text{Sn}$	14.0 day			
	$^{123\text{m}}\text{Sn}$	40.08 (7) min	50-123m-1	4.55 cm ² x 8 mm Ge(Li)	$^{122}\text{Sn}(n, \gamma)$
	^{125}Sn	9.64 (3) day	50-125-1	55 cm ³ coaxial (c) Ge(Li)	$^{124}\text{Sn}(n, \gamma)$



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<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
51 Antimony	^{116m}Sb	60.0 min	51-116m-1	35 cm ³ coaxial(c) Ge(Li)	$\text{Sb}(\gamma, \text{xn})$
	^{116}Sb	15.0 min	51-116-1	35 cm ³ coaxial (c) Ge(Li)	$\text{Sb}(\gamma, \text{xn})$
	^{117}Sb	2.8 hr	51-117-1	35 cm ³ coaxial (c) Ge (Li)	$\text{Sb}(\gamma, \text{xn})$
	^{118m}Sb	3.5 min	51-118m-1	35 cm ³ coaxial (c) Ge(Li)	$\text{Sb}(\gamma, \text{xn})$
	^{118}Sb	5.2 hr	51-118-1	35 cm ³ coaxial (c) Ge(Li)	$\text{Sb}(\gamma, \text{xn})$
	^{120m}Sb	5.8 day	51-120m-1	4.55 cm ² x 8 mm Ge(Li)	$^{121}\text{Sb}(\gamma, \text{n})$
	^{122}Sb	2.714 (6) day	51-122-1	4.55 cm ² x 8 mm Ge(Li)	$^{121}\text{Sb}(\text{n}, \gamma)$
	^{124}Sb	60.20 (2) day	51-124-1	55 cm ³ coaxial (c) Ge(Li)	$^{123}\text{Sb}(\text{n}, \gamma)$
	^{125}Sb	2.77 (4) Yr	51-125-1	65 cm ³ coaxial (c) Ge(Li)	$^{124}\text{Sn}(\text{n}, \gamma, \alpha)$
^{126}Sb	12.4 day	51-126-1	55 cm ³ coaxial (c) Ge(Li)	$^{126}\text{Sn}(\text{decay})$	
52 Tellurium	^{119m}Te	4.7 day	52-119m-1	4.55 cm ² x 8 mm Ge(Li)	$^{120}\text{Te}(\gamma, \text{n})$
	^{129}Te	70.0 min	52-129-1	65 cm ³ coaxial (c) Ge(Li)	$^{128}\text{Te}(\text{n}, \gamma)$
	^{131m}Te	30.0	52-131m(54-131)-I	65 cm ³ coaxial (c) Ge(Li)	$^{130}\text{Te}(\text{n}, \gamma)$
	^{131}Xe hr	25-min			
	^{131}Te	25.0 min	52-131-1	65 cm ³ coaxial (c) Ge(Li)	$^{130}\text{Te}(\text{n}, \gamma)$
	^{132}Te -	77.9 (5)hr -	52-132(53-132)-I	65 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	^{132}I	(equilibrium 2.28 (2) hr			
	^{133m}Te	54.0 min	52-133m(133)	2.5 cm ² x 8 mm Ge(Li)	U(n,f) chem.
^{133}Te	(equilibrium:12.4 min)				
53 Iodine	^{126}I	13.2 day	53-126-1	2.5 cm ² x 4 mm Ge (Li)	$^{127}\text{I}(\gamma, \text{n})$
	^{128}I	24.97 (3) min	53-128-1	4.55 cm ² x 8 mm Ge(Li)	$^{127}\text{I}(\text{n}, \gamma)$
	^{131}I	8.06 (1) day	53-131-1	55 cm ³ coaxial (c) Ge(Li)	U(n,f)chem.
	^{132}I	2.28 (2) hr	53-132-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f)chem.
	^{133}I	20.8 hr	53-133-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f)chem.
	^{134}I	52.6 min	53-134-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f)chem.
	^{135}I	6.7 hr	53-135-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f)chem.
54 Xenon	^{131m}Xe	11-98 (3) day	54-131m-1	2.5 cm ² x 8 mm Ge (Li)	U(n,f) chem.
	^{133}Xe	5.29 (1) day	54-133(133m)-1	65 cm ³ coaxial (c) Ge (Li)	U(n,f) chem.
	^{133m}Xe	2.22 (4) day			
	^{135}Xe	9.14 (5) hr	54-135-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.



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55 Cesium	^{132}Cs	6.5 day	55-132-1	4.55 cm ² x 8 mm Ge(Li)	$^{133}\text{Cs}(\gamma, n)$
	^{134m}Cs	2.9 hr	55-134m-1	4.55 cm ² x 8 mm Ge(Li)	$^{131}\text{Cs}(n, \gamma)$
	^{134}Cs	2.06 yr	55-134-1	55 cm ³ coaxial (c) Ge(Li)	$^{133}\text{Cs}(n, \gamma)$
	^{137}Cs	29.94 (20) yr	55-137-1	55 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	^{137}Cs	29.94 (20) yr	55-137-3	50 cm ³ coaxial (o) Ge(Li)	U(n,f) chem.
	^{138}Cs	32.2 (1) min	55-138-1	55cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
56 Barium	^{131}Ba	11.5 day	56-131 1	2.5 cm ² x 8 mm Ge(Li)	$^{130}\text{Ba}(n, \gamma)$
	^{133}Ba	10.9 (1) yr	56-133-1	65cm ³ coaxial (c) Ge(Li)	$^{132}\text{Ba}(n, \gamma)$
	^{139}Ba	82.71 (18) min	56-139-1	60cm ³ coaxial (c) Ge(Li)	$^{138}\text{Ba}(n, \gamma)$
	^{140}Ba	12.79 (1) day	56-140-1	70cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	^{140}Ba - ^{140}La	12.79 (1) day	56-140(57-140)-I	65cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
	^{140}La	40.26 (2) hr			
	^{141}Ba	18.0 min	56-141-1	35cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
^{142}Ba	11.0 min	56-142-1	35cm ² coaxial (c) Ge(Li)	U(n,f) chem.	
57 Lanthanum	^{140}La	40.26 (2) hr	57-140-1	55 cm ³ coaxial (c) Ge(Li)	$^{139}\text{La}(n, \gamma)$
	^{142}La	87.0 min	57-142-1	65 cm ³ coaxial (c) Ge(Li)	U(n,f) chem.
58 Cerium	^{139}Ce	137.2 (4) day	58-139-1	65 cm ³ coaxial (c) Ge(Li)	$^{139}\text{La}(p, n)$
	^{141}Ce	32.38 (2) day	58-141-1	65 cm ³ coaxial (c) Ge(Li)	$^{140}\text{Ce}(n, \gamma)$
	^{144}Ce	284.4 (4) day	58-144(59-144)-I	55 cm ³ coaxial (c) Ge(Li)	U(n,f) ch
	^{144}Pr	17.28 (5) min			
59 Praseodymium	^{140}Pr	3.4 min	59-140-1	4.55 cm ² x 8 mm Ge(Li)	$^{141}\text{Pr}(\gamma, n)$
	^{142}Pr	19.2 hr	59-142-1	4.55 cm ² x 8 mm Ge(Li)	$^{141}\text{Pr}(n, \gamma)$
60 Neodymium	^{141}Nd	2.5 hr	60-141-1	2.5 cm ² x 4 mm Ge(Li)	$^{142}\text{Nd}(\gamma, n)$
	^{147}Nd	10.98 (1) day	60-147-1	65 cm ³ coaxial (c) Ge(Li)	$^{146}\text{Nd}(n, \gamma)$
	^{149}Nd	1.73 hr	60-149-1	2.5 cm ² x 8 mm Ge(Li)	$^{148}\text{Nd}(n, \gamma)$
	^{149}Nd	1.73 hr	60-149-2	2.5 cm ² x 8 mm Ge(Li)	$^{148}\text{Nd}(n, \gamma)$
	^{151}Nd	12.0 min	60-151-1	2.5 cm ² x 8 mm Ge(Li)	$^{150}\text{Nd}(n, \gamma)$
	^{151}Nd	12.0 min	60-151-2	2.5 cm ² x 8 mm Ge(Li)	$^{150}\text{Nd}(n, \gamma)$



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61 Promethium	¹⁴⁵ Pm	18.0 yr	61-145-1	30 mm ² x 3 mm Si (Li)	¹⁴⁵ Nd(p,n)
	¹⁴⁹ Pm	53.08 (11) hr	61-149-1	2.5 cm ² x 4 mm Ge(Li)	¹⁴⁸ Nd(n, γ)
62 Samarium	¹⁵¹ Sm	93.0 yr	62-151-1	30 mm ² x 3 mm Si (Li)	¹⁵⁰ Sm(n, γ)
	¹⁵³ Sm	46.5 hr	62-153-1	65 cm ³ coaxial (c) Ge(Li)	¹⁵² Sm(n, γ)
63 Europium	¹⁴⁶ Eu	4.63 day	63-146-1	2.5 cm ² x 8 mm Ge(Li)	¹⁴⁷ Sm(p,2n)
	¹⁴⁷ Eu	24.3 day	63-147-1.	2.5 cm ² x 8 mm Ge(Li)	¹⁴⁷ Sm(p,n)
	¹⁴⁹ Eu	93.0 day	63-149-1	2.5 cm ² x 4 mm Ge(Li)	¹⁴⁹ Sm(p,n)
	^{152m} Eu	9.3 hr	63-152m-1	65 cm ³ coaxial (c) Ge(Li)	¹⁵¹ Eu(n, γ)
	¹⁵² Eu	13.2 (3) yr	63-152-1	65 cm ³ coaxial (c) Ge(Li)	¹⁵¹ Eu(n, γ)
	¹⁵⁴ Eu	8.6 yr	63-154-1	2.5 cm ² x 8 mm Ge(Li)	¹⁵³ Eu(n, γ)
	¹⁵⁵ Eu	4.8 yr	63-155-1	30 mm ² x 3 mm Si(Li)	¹⁵⁴ Sm(n, γ , β)
	¹⁵⁶ Eu	15.17 (3) day	63-156-1	2.5 cm ² x 8 mm Ge(Li)	U(n,f) chem.
64 Gadolinium	¹⁵³ Gd	241.6 (2) day	64-153-1	2.5 cm ² x 8 mm Ge(Li)	¹⁵² Gd(n, γ)
	¹⁵⁹ Gd	18.6 hr	64-159-1	4.55 cm ² x 8 mm Ge(Li)	¹⁵⁸ Gd(n, γ)
65 Terbium	¹⁵⁵ Tb	5.6 day	65-155-1	2.5 cm ² x 8 mm Ge(Li)	Gd(p,xn)
	¹⁵⁶ Tb	5.4 day	65-156-1	2.5 cm ² x 8 mm Ge(Li)	Gd(p,xn)
	¹⁶⁰ Tb	73.0 day	65-160-2	2.5 cm ² x 8 mm Ge(Li)	¹⁵⁹ Tb(n, γ)
	¹⁶² Tb	7.5 min	65-162-1	2.5 cm ² x 8 an Ge(Li)	¹⁶³ Dy(γ ,p)
66 Dysprosium	¹⁶⁵ Dy	2.36 hr	66-165-1	4.55 cm ² x 8 mm Ge(Li)	¹⁶⁴ Dy(n, γ)
67 Holmium	¹⁶⁴ Ho	35.0 min	67-164-1	2.5 cm ² x 8 mm Ge(Li)	¹⁶⁵ Ho(γ ,n)
	^{166m} Ho	1200 yr	67-166m-1	2.5 cm ² x 8 mm Ge(Li)	¹⁶⁵ Ho(n, γ)
	¹⁶⁶ Ho	27.0 hr	67-166-1	2.5 cm ² x 8 mm Ge(Li)	¹⁶⁵ Ho(n, γ)
68 Erbium	¹⁷¹ Er	7.5 hr	68-171-1	4.55 cm ² x 8 mm Ge(Li)	¹⁷⁰ Er(n, γ)
69 Thulium	¹⁶⁵ Tm	29.0 hr	69-165-1	2.5 cm ² x 8 mm Ge (Li)	¹⁶⁶ Er (p,2n)
	¹⁶⁷ Tm	9.6 day	69-167-1	2.5 cm ² x 8 mm Ge (Li)	¹⁶⁷ Er(p,n)
	¹⁶⁸ Tm	86.0 day	69- 168- 1	2.5 cm ² x 8 mm Ge (Li)	¹⁶⁹ Tm(γ ,n)
	¹⁷⁰ Tm	127.0 day	69-170-1	2.5 cm ² x 8 mm Ge (Li)	¹⁶⁹ Tm(n, γ)



Table IV - Table of Spectra

<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
70 Ytterbium	^{167}Yb	18.0 min	167-1	$4.55 \text{ mc}^2 \times 8 \text{ mm Ge (Li)}$	$^{168}\text{Tm}(\gamma, n)$
	^{169}Yb	32.0 day	70-169-1	$4.55 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{168}\text{Yb}(n, \gamma)$
	^{175}Yb	4.2 day	70-175-1	$4.55 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{174}\text{Yb}(n, \gamma)$
71 Lutecium	^{172}Lu	6.7 day	71-172-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{172}\text{Yb}(p, n)$
	^{173}Lu	1.4 yr	71-173-1	$35 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{173}\text{Yb}(p, n)$
	$^{176\text{m}}\text{Lu}$	3.7 hr	71-176m-1	$30 \text{ mm}^2 \times 3 \text{ mm Si(Li)}$	$^{175}\text{Lu}(n, \gamma)$
	$^{177\text{m}}\text{Lu}$	161.0 day	71-177m-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{176}\text{Lu}(n, \gamma)$
	^{177}Lu	6.71 (1) day	71-177-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{176}\text{Lu}(n, \gamma)$
72 Hafnium	$^{180\text{m}}\text{Hf}$	5.5 hr	72-180m-1	$55 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{179}\text{Hf}(n, \gamma)$
	^{181}Hf	43.0 day	72-181-1	$65 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{180}\text{Hf}(n, \gamma)$
	^{183}Hf	1.08 hr	72-183-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{182}\text{Hf}(n, \gamma)$
73 Tantalum	$^{180\text{m}}\text{Ta}$	8.1 hr	73-180m-1	$2.5 \text{ cm}^2 \times 4 \text{ mm Ge(Li)}$	$^{180\text{T}}\text{a}(\gamma, \gamma)$
	$^{182\text{m}}\text{Ta}$	16.0 min	73-182m-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{181}\text{Ta}(n, \gamma)$
	^{182}Ta	115.0 (2) day	73-182-1	$55 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{181}\text{Ta}(n, \gamma)$
74 Tungsten	^{185}W	75.0 day	74-185-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{184}\text{W}(n, \gamma)$
	^{187}W	23.9 hr	74-187-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{186}\text{W}(n, \gamma)$
75 Rhenium	^{183}Re	70.0 day	75-183-1	$2.5 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{183}\text{W}(p, n)$
	$^{184\text{m}}\text{Re}$	165.0 day	75-184m(184)-2	$65 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{185}\text{Re}(\gamma, n)$
	^{184}Re	38.0 day			
	^{188}Re	16.7 hr	75-188-1	$4.55 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{187}\text{Re}(n, \gamma)$
76 Osmium	$^{185\text{o}}\text{s}$	94.0 day	76-185-1	$4.55 \text{ cm}^2 \times 8 \text{ mm Ge(Li)}$	$^{184}\text{Os}(n, \gamma)$
	$^{191\text{o}}\text{s}$	15.3 day	76-191-1	$35 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{190}\text{Os}(n, \gamma)$
77 Iridium	^{192}Ir	74.2 day	77-192-1	$55 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{191}\text{Ir}(n, \gamma)$
	^{194}Ir	19.38 hr	77-194-1	$35 \text{ cm}^3 \text{ coaxial (c) Ge(Li)}$	$^{193}\text{Ir}(n, \gamma)$



Table IV - Table of Spectra

<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
78 Platinum	^{193}Pt	500.0 yr	78-193-1	30 mm ² x 3 mm Si(Li)	$^{194}\text{Pt}(\gamma, n)$
	^{191}Pt	3.0 day			
	^{195}Pt	4.1 day	78-191,195m,197-1	70 cm ³ coaxial (c) Ge(Li)	$\text{Pt}(n, \gamma)$
	^{197}Pt	18.3 hr			
	^{199}Pt	30.8 min	78-199-1	4.55 cm ² x 8 mm Ge(Li)	$^{198}\text{Pt}(n, -\gamma)$
79 Gold	^{194}Au	39.5 hr	79-194-2	55 cm ³ coaxial (c) Ge(Li)	$^{194}\text{Pt}(p, n)$
	^{195}Au	184.0 day	79-195-1	65 cm ³ coaxial (c) Ge(Li)	$^{195}\text{Pt}(p, n)$
	^{196}Au	6.18 day	79-196-1	2.5 cm ² x 8 mm Ge(Li)	$^{197}\text{Au}(\gamma, n)$
	^{198}Au	2.696 (2) day	79-198-1	2.5 cm ² x 8 mm Ge (Li)	$^{197}\text{Au}(n, \gamma)$
	^{199}Au	3.139 (7) day	79-199-1	70 cm ³ coaxial (c) Gd (Li)	$^{198}\text{Pt}(n, \gamma, \beta)$ chem
80 Mercury	^{197m}Hg	23.8 hr	80-197m(197)-I	35 cm ³ coaxial (c) Ge(Li)	$^{196}\text{Hg}(n, \gamma)$
	^{197}Hg	64.1 hr			
	^{199m}Hg	43.0 min	80-199m,205-1	2.5 cm ² x 8 mm Ge(Li)	$\text{Hg}(n, \gamma)$
	^{205}Hg	5.5 min			
	^{203}Hg	46.59 (5) day	80-203-1	70 cm ³ coaxial (c) Ge(Li)	$^{202}\text{Hg}(n, \gamma)$
81 Thallium	^{208}Tl	3.07 (2) min	see decay of ^{228}Th		
82 Lead	^{203}Pb	52.1 hr	82-203-1	2.5 cm ² x 8 mm Ge(Li)	$^{204}\text{Pb}(\gamma, n)$
	^{210}Pb	22.3 yr	82-210-1	30 cm ² x 3 mm Si(Li)	^{226}Ra decay (chem)
	^{211}Pb	36.0 min	82-211-1	35 cm ³ coaxial (c) Ge(Li)	^{235}U decay (chem)
	(with daughters)				
	^{212}Pb	10.64 (2) hr	see ^{232}Th		
	^{214}Pb	26.8 min	see ^{226}Ra		
83 Bismuth	^{205}Bi	15.31 (4) day	83-205-1	2.5 cm ² x 8 mm Ge(Li)	$^{206}\text{Pb}(p, 2n)$
	^{207}Bi	38.0 yr	83-207-1	55 cm ³ coaxial (c) Ge(Li)	$^{207}\text{Pb}(p, n)$
	^{210}Bi	5.012 (2) day	see ^{228}Th + daughter		
	^{212}Bi	60.6 min	see ^{226}Ra + daughter		
88 Radium	^{226}Ra (with daughters)	1600 yr	88-226-1	55 cm ³ coaxial (c) Ge(Li)	^{238}U decay (chem)



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<u>ELEMENT</u>	<u>ISOTOPE</u>	<u>HALF-LIFE</u>	<u>PLATE NUMBER</u>	<u>DETECTOR</u>	<u>METHOD OF PRODUCTION</u>
89 Actinium	²²⁷ Ac (with daughters)	21.77 yr	89-227-1	35 cm ³ coaxial (c) Ge (Li)	²³⁵ U decay
90 Thorium	²²⁸ Th (with daughters)	1.91 yr	90-228-2	55 cm ³ coaxial (c) Ge(Li)	²³² Th decay (chem)
	²³² Th (with daughters)	1.406 x 10 ¹⁰ yr	90-232-1	65 cm ³ coaxial (c) Ge(Li)	natural Th (ore)
92 Uranium	²³² U	72.0 yr	92-232-1		
	²³⁴ U	2.48 x 10 ⁵ yr	92-234-1	2.5 cm ² x 8 MM Ge(Li)	U (M.S.)
	²³³ U	1.58 x 10 ⁵ yr	92-233-1	2.5 cm ² x 8 mm Ge(Li)	U (M.S.)
	²³⁵ U	7.10 x 10 ⁸ yr	92-235-1	30 mm ² x 3 mm Si(Li)	U (M.S.)
	²³⁵ U	7.10 X 10 ⁸ yr	92-235-2	55 cm ³ coaxial (c) Ge(Li)	U (M.S.)
	²³⁷ U	6.75 day	92-237-1	2.5 cm ² x 8 mm Ge(Li)	²³⁶ U(n,y)
	²³⁸ U	4.49 x 10 ⁹ yr	92-238-1	4.55 cm ² x 8 mm Ge(Li)	natural U (ore)
	²³⁸ U	4.49 x 10 ⁹ Yr	92-(ore)-i	65 cm ³ coaxial (c) Ge(Li)	natural U (ore)
	²³⁹ U	23.5 min	92-239-1	2.5 cm ² x 8 mm Ge(Li)	²³⁸ U(n,y)
	²³⁹ U	23.5 min	92-239-2	2.5 cm ² x 8 mm Ge(Li)	²³⁸ U(n,y)
93 Neptunium	²³⁷ Np	2.14 x 10 ⁶ yr	93-237-1	2.5 cm ² x 8 mm Ge(Li)	²⁴¹ Am decay,(chem)
	²³⁹ Np	2.35 day	93-239-1	2.5 cm ² x 8 mm Ge(Li)	²³⁸ U(n,y,b)
94 Plutonium	²³⁸ Pu	87.75 yr	94-238-1	2.5 cm ² x 8 mm Ge(Li)	²⁵² Cf decay
	²³⁸ Pu	87.75 yr	94-238-2	2.5 cm ² x 8 mm.Ge(Li)	²⁵² Cf decay (high energy)
	²⁴⁰ Pu	6537 yr	94-240-1	2.5 cm ² x 8 mm Ge(Li)	²³⁹ Pu (n,y)
95 Americium	²⁴¹ Am	433 yr	95-241-1	30 mm ² x 3 mm Si(Li)	²⁴¹ Pu decay (chem)
	²⁴¹ Am	433 yr	95-241-2	2.5 cm ² x 8 mm Ge(Li)	²⁴¹ Pu decay (chem)
97 Berkelium	²⁵⁰ Bk	3.22 hr	97-250-1	50 cm ³ coaxial (c) Ge(Li)	²⁵⁴ Es decay (chem)



List of Spectra & Decay Schemes

(all entries hot linked to associated page)

7Be(53 day)	39	46Sc(83 day)	73
7Be(53 day) Decay Scheme	40	46Sc(83 day) Decay Scheme	74
20F(11 sec.) 19O(26 sec.)	41	47Sc(3.3 day)	75
20F(11 sec.) Decay Scheme	42	47Sc(3.3 day) Decay Scheme	76
19O(26 sec.) Decay Scheme	42	48Sc(43 hr.)	77
22Na(2.6 yr.)	43	48Sc(43 hr.) Decay Scheme	78
22Na(2.6 yr.) Decay Scheme	44	44Ti(63 yr.) 44Sc(3.9 hr.)	79
24Na(14.9 hr.)	45	44Sc(3.9 hr.) Decay Scheme	80
24Na(14.9 hr.) Decay Scheme	46	44Ti(49 yr.) Decay Scheme	80
25Na(59 sec.)	47	44Ti(63 yr.)	81
25Na(59 sec.) Decay Scheme	48	44Ti(49 yr.) Decay Scheme	82
27Mg(9.4 min.)	49	45Ti(184 min.)	83
27Mg(9.4 min.) Decay Scheme	50	45Ti(184 min.) Decay Scheme	84
26Al(7.1x10⁵ yr.)	51	51Ti(5.7 min.)	85
26Al (7.1x10⁵ yr.) Decay Scheme	52	51Ti(5.7 min.) Decay Scheme	86
28Al(2.2 min.)	53	48V(15 day)	87
28Al(2.2 min.) Decay Scheme	54	48V(15 day) Decay Scheme	88
37S(5.0 min.)	55	52V(3.7 min.)	89
37S(5.0 min.) Decay Scheme	56	52V(3.7 min.) Decay Scheme	90
38Cl(37 min.)	57	48Cr(21 hr.)	91
38Cl(37 min.) Decay Scheme	58	48Cr(21 hr.) Decay Scheme	92
41Ar(109 min.)	59	49Cr(42 min.)	93
41Ar(109 min.) Decay Scheme	60	49Cr(42 min.) Decay Scheme	94
38K(7.6 min.)	61	51Cr(27 day)	95
38K(7.6 min.) Decay Scheme	62	51Cr(27 day) Decay Scheme	96
40K(1.2x10⁹ yr.)	63	52mMn(21 min.)	97
40K(1.2x10⁹ yr.) Decay Scheme	64	52mMn(21 min.) Decay Scheme	98
42K(12 hr.)	65	52Mn(5.5 day)	99
42K(12 hr.) Decay Scheme	66	52Mn(5.5 day) Decay Scheme	100
43K(22 hr.)	67	54Mn(312 day)	101
43K(22 hr.) Decay Scheme	68	54Mn(312 day) Decay Scheme	102
49Ca(8.7 min.)	69	56Mn(2.5 hr.)	103
49Ca(8.7 min.) Decay Scheme	70	56Mn(2.5 hr.) Decay Scheme	104
44mSc(58 hr.) 44Sc(3.9 hr.)	71	52Fe(8.5 hr.)	105
44Sc(3.9 hr.) Decay Scheme	72	52Fe(8.2 hr.) Decay Scheme	106
44mSc(58 hr.) Decay Scheme	72		



⁵³ Fe(8.5 min.).....	107	⁶³ Zn(38 min.).....	148
⁵³ Fe(8.5 min.) Decay Scheme	108	⁶³ Zn(38 min.) Decay Scheme	149
⁵⁵ Fe(2.7 yr.).....	109	⁶⁵ Zn(244 day).....	151
⁵⁵ Fe(2.7 yr.) Decay Scheme	110	⁶⁵ Zn(244 day) Decay Scheme	152
⁵⁹ Fe(44 day).....	111	^{69m} Zn(13 hr.) ⁶⁹ Zn(56 min.)	153
⁵⁹ Fe(44 day) Decay Scheme	112	^{69m} Zn(13 hr.) Decay Scheme	154
⁵⁶ Co(77 day)	113	⁶⁹ Zn(56 min.) Decay Scheme	154
⁵⁶ Co(77 day) Decay Scheme	114	^{71m} Zn(3.9 hr.).....	155
⁵⁷ Co(271 day)	116	^{71m} Zn(3.9 hr.) Decay Scheme	156
⁵⁷ Co(271 day) Decay Scheme	117	⁷¹ Zn(2.4 min.).....	158
⁵⁸ Co(70 day)	118	⁷¹ Zn(2.4 min.) Decay Scheme	159
⁵⁸ Co(70 day) Decay Scheme	119	⁷² Zn(46 hr.)	160
^{60m} Co(10 min.)	120	⁷² Zn(46 hr.) Decay Scheme	161
^{60m} Co(10 min.) Decay Scheme	121	⁶⁶ Ga(9.4 hr.)	162
⁶⁰ Co(5.2 yr.)	122	⁶⁶ Ga(9.4 hr.) Decay Scheme	163
⁶⁰ Co(5.2 yr.) Decay Scheme	123	⁶⁷ Ga(3.2 day)	165
⁶¹ Co(1.6 hr.)	124	⁶⁷ Ga(3.2 day) Decay Scheme	166
⁶¹ Co(1.6 hr.) Decay Scheme	125	⁶⁸ Ga(67 min.)	167
⁵⁶ Ni(5.9 day)	126	⁶⁸ Ga(67 min.) Decay Scheme	168
⁵⁶ Ni(5.9 day) Decay Scheme	127	⁷⁰ Ga(21 min)	169
⁵⁷ Ni(35 hr.)	128	⁷⁰ Ga(21 min.) Decay Scheme	170
⁵⁷ Ni(35 hr.) Decay Scheme	129	⁷² Ga(14 hr.)	171
⁶⁵ Ni(2.5 hr.)	130	⁷² Ga(14 hr.) Decay Scheme	
⁶⁵ Ni(2.5 hr.) Decay Scheme	131	gamma-rays emitted from high energy levels	172
⁶⁰ Cu(23 min.)	132	gamma-rays emitted from low energy levels	173
⁶⁰ Cu(23 min.) Decay Scheme	133	⁷³ Ga(4.8 hr.)	176
⁶¹ Cu(3.3 hr.)	136	⁷³ Ga(4.8 hr.) Decay Scheme	177
⁶¹ Cu (3.3 hr.) Decay Scheme	137	⁶⁹ Ge(39 hr.)	178
⁶² Cu(9.7 min.)	138	⁶⁹ Ge(39 hr.) Decay Scheme	179
⁶² Cu(9.7 min.) Decay Scheme	139	⁷¹ Ge(11 day)	181
⁶⁴ Cu(12 hr.)	140	⁷¹ Ge(11 day) Decay Scheme	182
⁶⁴ Cu(12 hr.) Decay Scheme	141	⁷⁵ Ge(82 min.)	183
⁶⁶ Cu(5.1 min.)	142	⁷⁵ Ge(82 min.) Decay Scheme	184
⁶⁶ Cu(5.1 min.) Decay Scheme	143	⁷⁰ As(52 min.).....	185
⁶⁷ Cu(61 hr.)	144	⁷⁰ As(52 min.) Decay Scheme	186
⁶⁷ Cu(61 hr.) Decay Scheme	145	⁷³ As(80 day)	188
⁶² Zn(9.1 hr.)	146	⁷³ As(80 day) Decay Scheme	189
⁶² Zn(9.1 hr.) Decay Scheme	147		



⁷⁴ As(17 day)	190	⁸⁷ Kr(76 min.)	235
⁷⁴ As(17 day) Decay Scheme	191	⁸⁷ Kr(76 min.) Decay Scheme	236
⁷⁶ As(1.07 day)	192	⁸⁸ Kr(2.8 hr.) ⁸⁸ Rb(17 min.)	238
⁷⁶ As(1.07 day) Decay Scheme	193	⁸⁸ Kr(2.8 hr.) Decay Scheme	
⁷⁷ As(38 hr.)	195	gamma-rays emitted from high energy levels	239
⁷⁷ As(38 hr.) Decay Scheme	196	gamma-rays emitted from low energy levels	240
⁷³ Se(7.1 hr.)	197	⁸³ Rb(86 day)	243
⁷³ Se(7.1 hr.) Decay Scheme	198	⁸³ Rb(86 day) Decay Scheme	244
⁷⁵ Se(119 day)	200	⁸⁴ Rb(32 day)	245
⁷⁵ Se(119 day) Decay Scheme	201	⁸⁴ Rb(32 day) Decay Scheme	246
^{77m} Se(17 sec.)	202	^{86m} Rb(1.0 min.)	247
^{77m} Se(17 sec.) Decay Scheme	203	^{86m} Rb(1.0 min.) Decay Scheme	248
^{81m} Se(57 min.) ⁸¹ Se(18 min.)	204	⁸⁶ Rb(18 day)	249
^{81m} Se(57 min.) Decay Scheme	205	⁸⁶ Rb(18 day) Decay Scheme	250
⁸¹ Se(18 min.) Decay Scheme	205	⁸⁸ Rb(17 min.)	251
⁸³ Se(22 min.)	206	⁸⁸ Rb(17 min.) Decay Scheme	252
⁸³ Se(22 min.) Decay Scheme		⁸⁹ Rb(15 min.)	254
gamma-rays emitted from high energy levels	207	⁸⁹ Rb(15 min.) Decay Scheme	255
gamma-rays emitted from low energy levels	208	⁸³ Sr(32 hr.)	257
⁷⁵ Br(96 min.)	211	⁸³ Sr(32 hr.) Decay Scheme	
⁷⁵ Br(96 min.) Decay Scheme	212	gamma-rays emitted from high energy levels	258
⁷⁶ Br(16 hr.)	214	gamma-rays emitted from low energy levels	259
⁷⁶ Br(16 hr.) Decay Scheme		^{85m} Sr(67 min.)	262
gamma-rays emitted from high energy levels	215	^{85m} Sr(67 min.) Decay Scheme	263
gamma-rays emitted from low energy levels	216	⁸⁵ Sr(64 day)	264
⁷⁷ Br(57 hr.)	220	⁸⁵ Sr(64 day) Decay Scheme	265
⁷⁷ Br(57 hr.) Decay Scheme	221	^{87m} Sr(2.8 hr.)	266
^{80m} Br(4.4 hr.) ⁸⁰ Br(17 min.)	223	^{87m} Sr(2.8 hr.) Decay Scheme	267
^{80m} Br(4.4 hr.) Decay Scheme	224	⁹¹ Sr(9.6 hr.)	268
⁸⁰ Br(17 min.) Decay Scheme	224	⁹¹ Sr(9.6 hr.) Decay Scheme	269
⁸² Br(35 hr.)	225	⁹² Sr(2.7 hr.)	271
⁸² Br(35 hr.) Decay Scheme	226	⁹² Sr(2.7 hr.) Decay Scheme	272
⁸³ Br(2.4 hr.)	228	^{87m} Y(13 hr.) ⁸⁷ Y(79 hr.)	273
⁸³ Br(2.4 hr.) Decay Scheme	229	⁸⁷ Y(79 hr.) Decay Scheme	274
⁸⁴ Br(31 min.)	230	^{87m} Y(13 hr.) Decay Scheme	274
⁸⁴ Br(31 min.) Decay Scheme	231	⁸⁸ Y(106 day)	275
⁸⁵ Kr(10 yr.)	233	⁸⁸ Y(106 day) Decay Scheme	276
⁸⁵ Kr(10 yr.) Decay Scheme	234		



^{90m} Y(3.1 hr.)	277	¹⁰¹ Mo(14 min.)	313
^{90m} Y(3.1 hr.) Decay Scheme	278	¹⁰¹ Mo(14 min.) Decay Scheme	
^{91m} Y(49 min.)	279	gamma-rays from high energy levels	314
^{91m} Y(49 min.) Decay Scheme	280	gamma-rays from medium energy levels	315
⁹² Y(3.5 hr.) ⁹³ Y(10 hr.)	281	gamma-rays from low energy levels	316
⁹² Y(3.5 hr.) Decay Scheme	282	^{94m} Tc(52 min) ⁹⁴ Tc(293 min.)	320
⁹³ Y(10 hr.) Decay Scheme	282	^{94m} Tc(52 min.) Decay Scheme	321
^{89m} Zr(4.1 min.)	284	⁹⁴ Tc(293 min.) Decay Scheme	321
^{89m} Zr(4.1 min.) Decay Scheme	285	⁹⁵ Tc(20 hr.)	323
⁸⁹ Zr(78 hr.)	286	⁹⁵ Tc(20 hr.) Decay Scheme	324
⁸⁹ Zr(78 hr.) Decay Scheme	287	^{95m} Tc(61 day)	325
⁹⁵ Zr(64 day)	288	^{95m} Tc(61 day) Decay Scheme	326
⁹⁵ Zr(64 day) Decay Scheme	289	^{99m} Tc(6.0 hr.)	327
⁹⁵ Zr(64 day) ⁹⁵ Nb(34 day)	290	^{99m} Tc(6.0 hr.) Decay Scheme	328
⁹⁵ Nb(34 day) Decay Scheme	291	¹⁰¹ Tc(14 min.)	329
⁹⁵ Zr(64 day) Decay Scheme	291	¹⁰¹ Tc(14 min.) Decay Scheme	330
⁹⁷ Zr(16 hr.) ⁹⁷ Nb(72 min.)	292	¹⁰⁴ Tc(18 min.)	332
⁹⁷ Zr(16 hr.) Decay Scheme	293	¹⁰⁴ Tc(18 min.) Decay Scheme	
⁹⁷ Nb(72 min.) Decay Scheme	293	gamma-rays emitted from high energy levels	333
^{92m} Nb(10 day)	295	gamma-rays emitted from low energy levels	334
^{92m} Nb(10 day) Decay Scheme	296	¹⁰³ Ru(39 day)	338
^{94m} Nb(6.2 min.)	297	¹⁰³ Ru(39 day) Decay Scheme	339
^{94m} Nb(6.2 min.) Decay Scheme	298	¹⁰⁵ Ru(4.4 hr.)	340
⁹⁴ Nb(2.0x10 ⁴ yr.)	299	¹⁰⁵ Ru(4.4 hr.) Decay Scheme	
⁹⁴ Nb(2.0x10 ⁴ yr.) Decay Scheme	300	gamma-rays emitted from high energy levels	341
⁹⁵ Nb(34 day)	301	gamma-rays emitted from low energy levels	342
⁹⁵ Nb(34 day) Decay Scheme	302	¹⁰⁶ Ru(373 day) ¹⁰⁶ Rh(29 sec.)	345
⁹⁶ Nb(23 hr.)	303	¹⁰⁶ Ru(373 day) ¹⁰⁶ Rh(29 sec.) Decay Scheme	
⁹⁶ Nb(23 hr.) Decay Scheme	304	gamma-rays emitted from high energy levels	346
⁹⁷ Nb(72 min.)	306	gamma-rays emitted from low energy levels	347
⁹⁷ Nb(72 min.) Decay Scheme	307	⁹⁹ Rh(16 day)	350
⁹³ Mo(4.0x10 ³ yr.)	308	⁹⁹ Rh(16 day) Decay Scheme	351
⁹³ Mo(4.0x10 ³ yr.) Decay Scheme	309	^{101m} Rh(4.3 day)	353
⁹⁹ Mo(65 hr.) ^{99m} Tc(6.0 hr.)	310	^{101m} Rh(4.3 day) Decay Scheme	354
⁹⁹ Mo(65 hr.) Decay Scheme	311	^{102m} Rh(2.9 yr.) ¹⁰² Rh(207 day)	355
^{99m} Tc(6.0 hr.) Decay Scheme	311	^{102m} Rh(2.9 yr.) Decay Scheme	356
		¹⁰² Rh(207 day) Decay Scheme	357



^{102m} Rh(2.9 yr.)	359	^{117m} Cd(3.3 hr.) ¹¹⁷ Cd(2.4 hr.)	399
^{102m} Rh(2.9 yr.) Decay Scheme	360	^{117m} Cd(3.3 hr.) Decay Scheme	
^{103m} Rh(56 min.)	361	gamma-rays emitted from high energy levels	400
^{103m} Rh(56 min.) Decay Scheme	362	gamma-rays emitted from low energy levels	401
¹⁰¹ Pd(8.4 hr.)	363	¹¹⁷ Cd(2.4 hr.) Decay Scheme	
¹⁰¹ Pd(8.4 hr.) Decay Scheme	364	gamma-rays emitted from high energy levels	402
¹⁰³ Pd(16 day)	366	gamma-rays emitted from low energy levels	403
¹⁰³ Pd(16 day) Decay Scheme	367	¹¹¹ In(2.8 day)	407
^{109m} Pd(4.6 min.)	368	¹¹¹ In(2.8 day) Decay Scheme	408
^{109m} Pd(4.6 min.) Decay Scheme	369	^{114m} In(49 day) ¹¹⁴ In(71 sec.)	409
¹⁰⁹ Pd(13 hr.)	370	^{114m} In(49 day) Decay Scheme	410
¹⁰⁹ Pd(13 hr.) Decay Scheme	371	¹¹⁴ In(71 sec.) Decay Scheme	410
¹⁰⁵ Ag(41 day) ^{106m} Ag(8.2 day)	373	^{116m} In(54 min.)	411
¹⁰⁵ Ag(41 day) Decay Scheme	374	^{116m} In(54 min.) Decay Scheme	412
^{106m} Ag(8.2 day) Decay Scheme	375	^{117m} In(116 min.) ¹¹⁷ In(43 min.)	414
¹⁰⁶ Ag(23 min.)	378	^{117m} In(116 min.) Decay Scheme	415
¹⁰⁶ Ag(23 min.) Decay Scheme	379	¹¹⁷ In(43 min.) Decay Scheme	415
^{108m} Ag(418 yr.)	380	¹¹³ Sn(115 day)	416
^{108m} Ag(418 yr.) Decay Scheme	381	¹¹³ Sn(115 day) Decay Scheme	417
¹⁰⁸ Ag(2.3 min.)	382	^{117m} Sn(13 day)	418
¹⁰⁸ Ag(2.3 min.) Decay Scheme	383	^{117m} Sn(13 day) Decay Scheme	419
^{110m} Ag(249 day)	384	^{123m} Sn(40 min.)	420
^{110m} Ag(249 day) Decay Scheme	385	^{123m} Sn(40 min.) Decay Scheme	421
¹¹¹ Ag(7.4 day)	387	¹²⁵ Sn(9.6 day)	422
¹¹¹ Ag(7.4 day) Decay Scheme	388	¹²⁵ Sn(9.6 day) Decay Scheme	423
¹⁰⁷ Cd(6.5 hr.) ^{107m} Ag(44 sec.)	389	^{116m} Sb(60 min.)	425
¹⁰⁷ Cd(6.5 hr.) Decay Scheme	390	^{116m} Sb(60 min.) Decay Scheme	426
^{107m} Ag(44 sec.) Decay Scheme	390	¹¹⁶ Sb(15 min.)	427
¹⁰⁹ Cd(462 day)	391	¹¹⁶ Sb(15 min.) Decay Scheme	428
¹⁰⁹ Cd(462 day) Decay Scheme	392	¹¹⁷ Sb(2.8 hr.)	430
^{111m} Cd(48 min.)	393	¹¹⁷ Sb(2.8 hr.) Decay Scheme	431
^{111m} Cd(48 min.) Decay Scheme	394	^{118m} Sb(3.6 min.)	432
^{115m} Cd(44 day)	395	^{118m} Sb(3.6 min.) Decay Scheme	433
^{115m} Cd(44 day) Decay Scheme	396	¹¹⁸ Sb(5.0 hr.)	434
¹¹⁵ Cd(53 hr.) ^{115m} In(4.4 hr.)	397	¹¹⁸ Sb(5.0 hr.) Decay Scheme	435
¹¹⁵ Cd(53 hr.) Decay Scheme	398	¹²⁰ Sb(5.7 day)	436
^{115m} In(4.4 hr.) Decay Scheme	398	¹²⁰ Sb(5.7 day) Decay Scheme	437



^{122}Sb (2.7 day)	438	^{132}I (2.2 hr.)	492
^{122}Sb (2.7 day) Decay Scheme	439	^{132}I (2.2 hr.) Decay Scheme	
^{124}Sb (60 day)	440	gamma-rays emitted from high energy levels	493
^{124}Sb (60 day) Decay Scheme	441	gamma-rays emitted from low energy levels	494
^{125}Sb (2.7 yr.)	443	^{133}I (20 hr.)	498
^{125}Sb (2.7 yr.) Decay Scheme	444	^{133}I (20 hr.) Decay Scheme	499
^{126}Sb (12 day)	446	^{134}I (52 min.)	501
^{126}Sb (12 day) Decay Scheme	447	^{134}I (52 min.) Decay Scheme	502
$^{119\text{m}}\text{Te}$ (4.7 day)	449	^{135}I (6.5 hr.)	505
$^{119\text{m}}\text{Te}$ (4.7 day) Decay Scheme	450	^{135}I (6.5 hr.) Decay Scheme	506
^{129}Te (69 min.)	452	$^{131\text{m}}\text{Xe}$ (11 day)	509
^{129}Te (69 min.) Decay Scheme	453	$^{131\text{m}}\text{Xe}$ (11 day) Decay Scheme	510
$^{131\text{m}}\text{Te}$ (30 hr.) ^{131}Te (25 min.)	455	^{133}Xe (5.2 day) $^{133\text{m}}\text{Xe}$ (2.1 day)	511
$^{131\text{m}}\text{Te}$ (30 hr.) Decay Scheme		$^{133\text{m}}\text{Xe}$ (2.1 day) Decay Scheme	512
gamma-rays emitted from high energy levels	456	^{133}Xe (5.2 day) Decay Scheme	512
gamma-rays emitted from medium energy levels	457	^{135}Xe (9.1 hr.)	513
gamma-rays emitted from low energy levels	458	^{135}Xe (9.1 hr.) Decay Scheme	514
^{131}Te (25 min.) Decay Scheme	462	^{132}Cs (6.4 day)	515
^{131}Te (25 min.)	465	^{132}Cs (6.4 day) Decay Scheme	516
^{131}Te (25 min.) Decay Scheme	466	$^{134\text{m}}\text{Cs}$ (2.9 hr.)	517
^{132}Te (3.2 day) ^{132}I (2.2 hr.)	469	$^{134\text{m}}\text{Cs}$ (2.9 hr.) Decay Scheme	518
^{132}Te (3.2 day) Decay Scheme	470	^{134}Cs (2.0 yr.)	519
^{132}I (2.2 hr.) Decay Scheme		^{134}Cs (2.0 yr.) Decay Scheme	520
gamma-rays emitted from high energy levels	471	^{137}Cs (30 yr.)	521
gamma-rays emitted from low energy levels	472	^{137}Cs (30 yr.) Decay Scheme	522
$^{133\text{m}}\text{Te}$ (55 min.) ^{133}Te (12 min.)	476	^{138}Cs (33 min.)	523
$^{133\text{m}}\text{Te}$ (55 min.) Decay Scheme		^{138}Cs (33 min.) Decay Scheme	
gamma-rays emitted from high energy levels	477	gamma-rays emitted from high energy levels	524
gamma-rays emitted from low energy levels	478	gamma-rays emitted from low energy levels	525
^{133}Te (12 min.) Decay Scheme	482	^{131}Ba (11 day)	528
^{126}I (13 day)	486	^{131}Ba (11 day) Decay Scheme	529
^{126}I (13 day) Decay Scheme	487	^{133}Ba (10 yr.)	531
^{128}I (24 min.)	488	^{133}Ba (10 yr.) Decay Scheme	532
^{128}I (24 min.) Decay Scheme	489	^{139}Ba (83 min.)	533
^{131}I (8.0 day)	490	^{139}Ba (83 min.) Decay Scheme	534
^{131}I (8.0 day) Decay Scheme	491	^{140}Ba (12 day)	535
		^{140}Ba (12 day) Decay Scheme	536



^{140}Ba (12 day) ^{140}La (1.6 day)	537	^{151}Nd (12 min.)	
^{140}Ba (12 day) Decay Scheme	538	low energy portion	583
^{140}La (1.6 day) Decay Scheme	539	high energy portion	584
^{141}Ba (18 min.)	541	^{151}Nd (12 min.) Decay Scheme	
^{141}Ba (18 min.) Decay Scheme		gamma-rays emitted from high energy levels	585
gamma-rays emitted from high energy levels	542	gamma-rays emitted from medium energy levels.....	586
gamma-rays emitted from low energy levels	543	gamma-rays emitted from low energy levels	587
^{142}Ba (10 min.)	547	^{145}Pm (17 yr.)	595
^{142}Ba (10 min.) Decay Scheme	548	^{145}Pm (17 yr.) Decay Scheme	596
^{140}La (1.6 day)	551	^{149}Pm (53 hr.)	597
^{140}La (1.6 day) Decay Scheme	552	^{149}Pm (53 hr.) Decay Scheme	598
^{142}La (91 min.)	554	^{151}Sm (90 yr.)	600
^{142}La (91 min.) Decay Scheme		^{151}Sm (90 yr.) Decay Scheme	601
gamma-rays emitted from high energy levels	555	^{153}Sm (46 hr.)	602
gamma-rays emitted from low energy levels	556	^{153}Sm (46 hr.) Decay Scheme	603
^{139}Ce (137 day)	560	^{146}Eu (4.6 day)	605
^{139}Ce (137 day) Decay Scheme	561	^{146}Eu (4.6 day) Decay Scheme	
^{141}Ce (32 day)	562	gamma-rays emitted from high energy levels	606
^{141}Ce (32 day) Decay Scheme	563	gamma-rays emitted from low energy levels	607
^{144}Ce (284 day) ^{144}Pr (17 min.)	564	^{147}Eu (24 day)	615
^{144}Ce (284 day) Decay Scheme	565	^{147}Eu (24 day) Decay Scheme	616
^{144}Pr (17 min.) Decay Scheme	565	^{149}Eu (93 day)	619
^{140}Pr (3.3 min.)	566	^{149}Eu (93 day) Decay Scheme	620
^{140}Pr (3.3 min.) Decay Scheme	567	$^{152\text{m}}\text{Eu}$ (9.3 hr.)	621
^{142}Pr (19 hr.)	568	$^{152\text{m}}\text{Eu}$ (9.3 hr.) Decay Scheme	622
^{142}Pr (19 hr.) Decay Scheme	569	^{152}Eu (13 yr.)	624
^{141}Nd (2.4 hr.)	570	^{152}Eu (13 yr.) Decay Scheme	
^{141}Nd (2.4 hr.) Decay Scheme	571	gamma-rays emitted from high energy levels	625
^{147}Nd (10 day)	572	gamma-rays emitted from low energy levels	626
^{147}Nd (10 day) Decay Scheme	573	^{154}Eu (8.5 yr.)	630
^{149}Nd (1.7 hr.)		^{154}Eu (8.5 yr.) Decay Scheme	631
low energy portion	574	^{155}Eu (4.7 yr.)	635
high energy portion	575	^{155}Eu (4.7 yr.) Decay Scheme	636
^{149}Nd (1.7 hr.) Decay Scheme		^{156}Eu (15 day)	637
gamma-rays emitted from high energy levels	576	^{156}Eu (15 day) Decay Scheme	638
gamma-rays emitted from medium energy levels.....	577	^{153}Gd (240 day)	641
gamma-rays emitted from low energy levels	578	^{153}Gd (240 day) Decay Scheme	642



¹⁵⁹ Gd(18 hr.)	643	¹⁷⁵ Yb(4.1 day)	696
¹⁵⁹ Gd(18 hr.) Decay Scheme	644	¹⁷⁵ Yb(4.1 day) Decay Scheme	697
¹⁵⁵ Tb(5.3 day)	645	¹⁷² Lu(6.7 day)	
¹⁵⁵ Tb(5.3 day) Decay Scheme		low energy portion	698
gamma-rays emitted from high energy levels	646	high energy portion	699
gamma-rays emitted from low energy levels	647	¹⁷² Lu(6.7 day) Decay Scheme	
¹⁵⁶ Tb(5.3 day)	650	gamma-rays emitted from high energy levels	700
¹⁵⁶ Tb(5.3 day) Decay Scheme		gamma-rays emitted from medium energy levels	701
gamma-rays emitted from high energy levels	651	gamma-rays emitted from low energy levels	702
gamma-rays emitted from low energy levels	652	¹⁷³ Lu(1.3 yr.)	706
¹⁶⁰ Tb(72 day)	655	¹⁷³ Lu(1.3 yr.) Decay Scheme	707
¹⁶⁰ Tb(72 day) Decay Scheme	656	^{176m} Lu(3.6 hr.)	708
¹⁶² Tb(7.6 min.)	658	^{176m} Lu(3.6 hr.) Decay Scheme	709
¹⁶² Tb(7.6 min.) Decay Scheme	659	^{177m} Lu(160 day)	710
¹⁶⁵ Dy(2.3 hr.)	661	^{177m} Lu(160 day) Decay Scheme	711
¹⁶⁵ Dy(2.3 hr.) Decay Scheme	662	¹⁷⁷ Lu(6.7 day)	713
¹⁶⁴ Ho(29 min.)	664	¹⁷⁷ Lu(6.7 day) Decay Scheme	714
¹⁶⁴ Ho(29 min.) Decay Scheme	665	^{180m} Hf(5.5 hr.)	715
^{166m} Ho(1200 yr.)	666	^{180m} Hf(5.5 hr.) Decay Scheme	716
^{166m} Ho(1200 yr.) Decay Scheme	667	¹⁸¹ Hf(42 day)	717
¹⁶⁶ Ho(26 hr.)	669	¹⁸¹ Hf(42 day) Decay Scheme	718
¹⁶⁶ Ho(26 hr.) Decay Scheme	670	¹⁸³ Hf(1.0 hr.)	719
¹⁷¹ Er(7.5 hr.)	671	¹⁸³ Hf(1.0 hr.) Decay Scheme	720
¹⁷¹ Er(7.5 hr.) Decay Scheme	672	^{180m} Ta(8.1 hr.)	722
¹⁶⁵ Tm(30 hr.)	674	^{180m} Ta(8.1 hr.) Decay Scheme	723
¹⁶⁵ Tm(30 hr.) Decay Scheme		^{182m} Ta(15 min.)	724
gamma-rays emitted from high energy levels	675	^{182m} Ta(15 min.) Decay Scheme	725
gamma-rays emitted from low energy levels	676	¹⁸² Ta(114 day)	726
¹⁶⁷ Tm(9.2 day)	680	¹⁸² Ta(114 day) Decay Scheme	727
¹⁶⁷ Tm(9.2 day) Decay Scheme	681	¹⁸⁵ W(75 day)	729
¹⁶⁸ Tm(93 day)	682	¹⁸⁵ W(75 day) Decay Scheme	730
¹⁶⁸ Tm(93 day) Decay Scheme	683	¹⁸⁷ W(23 hr.)	731
¹⁷⁰ Tm(128 day)	686	¹⁸⁷ W(23 hr.) Decay Scheme	732
¹⁷⁰ Tm(128 day) Decay Scheme	687	¹⁸³ Re(70 day)	735
¹⁶⁷ Yb(17 min.)	688	¹⁸³ Re(70 day) Decay Scheme	736
¹⁶⁷ Yb(17 min.) Decay Scheme	689	^{184m} Re(169 day) ¹⁸⁴ Re(38 day)	738
¹⁶⁹ Yb(32 day)	692	^{184m} Re(169 day) Decay Scheme	739
¹⁶⁹ Yb(32 day) Decay Scheme	693	¹⁸⁴ Re(38 day) Decay Scheme	740

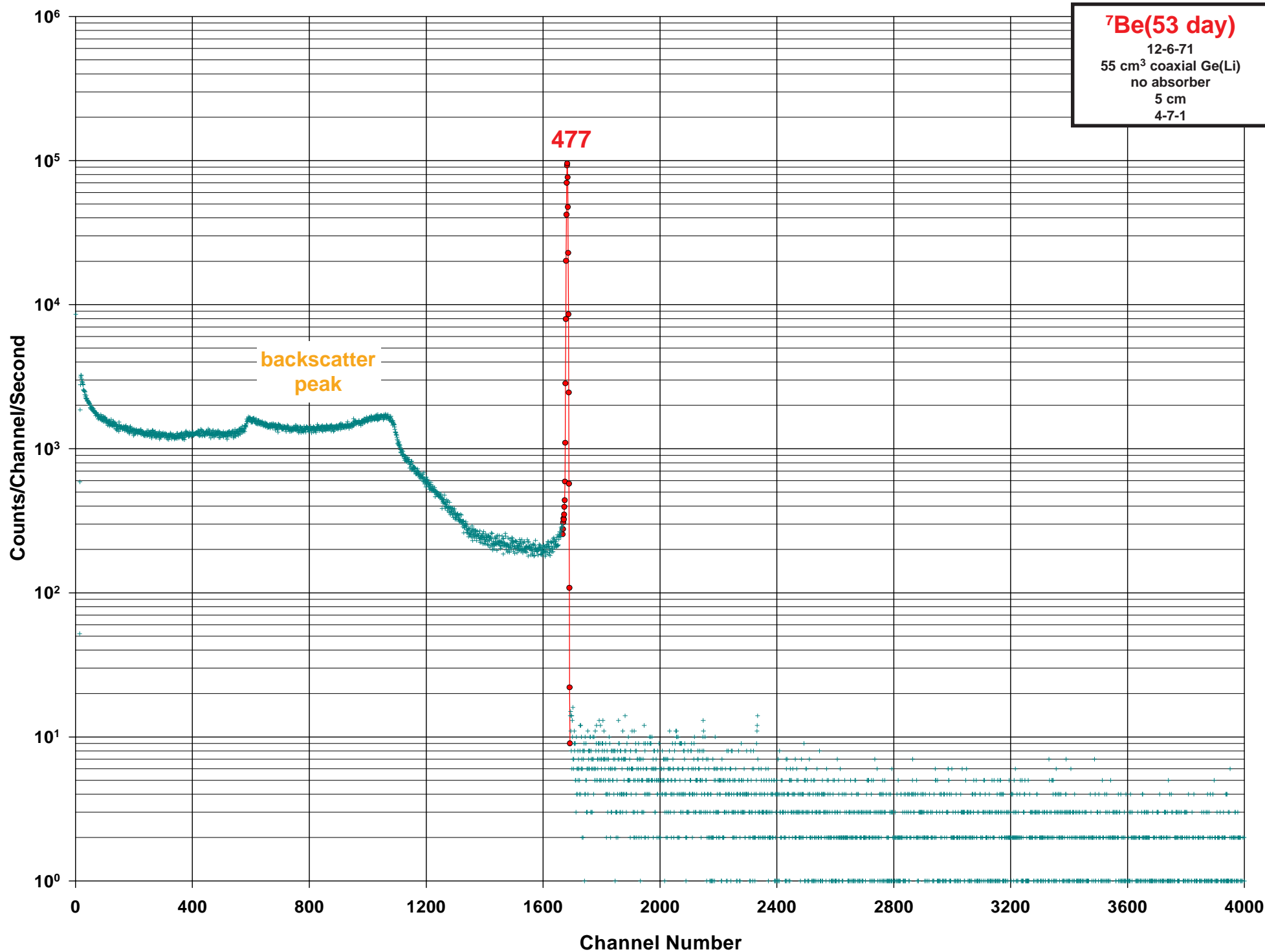


¹⁸⁸ Re(17 hr.)	742	²⁰³ Hg(46 day)	783
¹⁸⁸ Re(17 hr.) Decay Scheme	743	²⁰³ Hg(46 day) Decay Scheme	784
¹⁸⁵ Os(93 day)	745	²⁰³ Pb(51 hr.)	785
¹⁸⁵ Os(93 day) Decay Scheme	746	²⁰³ Pb(51 hr.) Decay Scheme	786
¹⁹¹ Os(15 day)	747	²¹⁰ Pb(22 yr.)	787
¹⁹¹ Os(15 day) Decay Scheme	748	²¹⁰ Pb(22 yr.) Decay Scheme	788
¹⁹² Ir(73 day)	749	²¹¹ Pb(36 min.) and daughters	789
¹⁹² Ir(73 day) Decay Scheme	750	²¹¹ Pb(36 min.) Decay Scheme	790
¹⁹⁴ Ir(19 hr.)	752	²⁰⁵ Bi(15 day)	792
¹⁹⁴ Ir(19 hr.) Decay Scheme	753	²⁰⁵ Bi(15 day) Decay Scheme	793
¹⁹¹ Pt(2.8 day) ^{195m} Pt(4.0 day) ¹⁹⁷ Pt(19 hr.)	756	²⁰⁷ Bi(31 yr.)	796
¹⁹¹ Pt(2.8 day) Decay Scheme	757	²⁰⁷ Bi(31 yr.) Decay Scheme	797
^{195m} Pt(4.0 day) Decay Scheme	757	²²⁶ Ra(1600 yr.) and daughters	
¹⁹⁷ Pt(19 hr.) Decay Scheme	757	low energy portion	798
¹⁹³ Pt(50 yr.)	760	high energy portion	799
¹⁹³ Pt(50 yr.) Decay Scheme	761	²²⁶ Ra(1600 yr.) Decay Scheme	800
¹⁹⁹ Pt(30 min.)	762	²²⁶Ra Decay Chain	800
¹⁹⁹ Pt(30 min.) Decay Scheme	763	²²⁷ Ac(21 yr.) and daughters	
¹⁹⁴ Au(38 hr.)	765	low energy portion	803
¹⁹⁴ Au(38 hr.) Decay Scheme		high energy portion	804
gamma-rays emitted from high energy levels	766	²²⁷ Ac(21 yr.) Decay Scheme	805
gamma-rays emitted from medium energy levels	766	²²⁷Ac Decay Chain	805
gamma-rays emitted from low energy levels	767	²²⁸ Th(1.9 yr.) in equilibrium with daughters	808
¹⁹⁵ Au(186 day)	771	²²⁸ Th(1.9 yr.) Decay Scheme	809
¹⁹⁵ Au(186 day) Decay Scheme	772	²²⁸Th Decay Chain	809
¹⁹⁶ Au(6.1 day)	773	Th Ore Sample (1.4x10 ¹⁰ yr.)	
¹⁹⁶ Au(6.1 day) Decay Scheme	774	low energy portion	811
¹⁹⁸ Au(2.6 day)	775	high energy portion	812
¹⁹⁸ Au(2.6 day) Decay Scheme	776	Th Ore Decay Chain	813
¹⁹⁹ Au(3.1 day)	777	²³² U(68 yr.) ²³⁴ U(2.4x10 ⁵ yr.)	815
¹⁹⁹ Au(3.1 day) Decay Scheme	778	²³² U(68 yr.) Decay Scheme	816
^{197m} Hg(23 hr.) ¹⁹⁷ Hg(64 hr.)	779	²³⁴ U(2.4x10 ⁵ yr.) Decay Scheme	816
¹⁹⁷ Hg(64 hr.) Decay Scheme	780	²³²U Decay Chain	816
^{197m} Hg(23 hr.) Decay Scheme	780	²³⁴U Decay Chain	816
^{199m} Hg(42 min.) ²⁰⁵ Hg(5.2 min.)	781		
^{199m} Hg(42 min.) Decay Scheme	782		
²⁰⁵ Hg(5.2 min.) Decay Scheme	782		

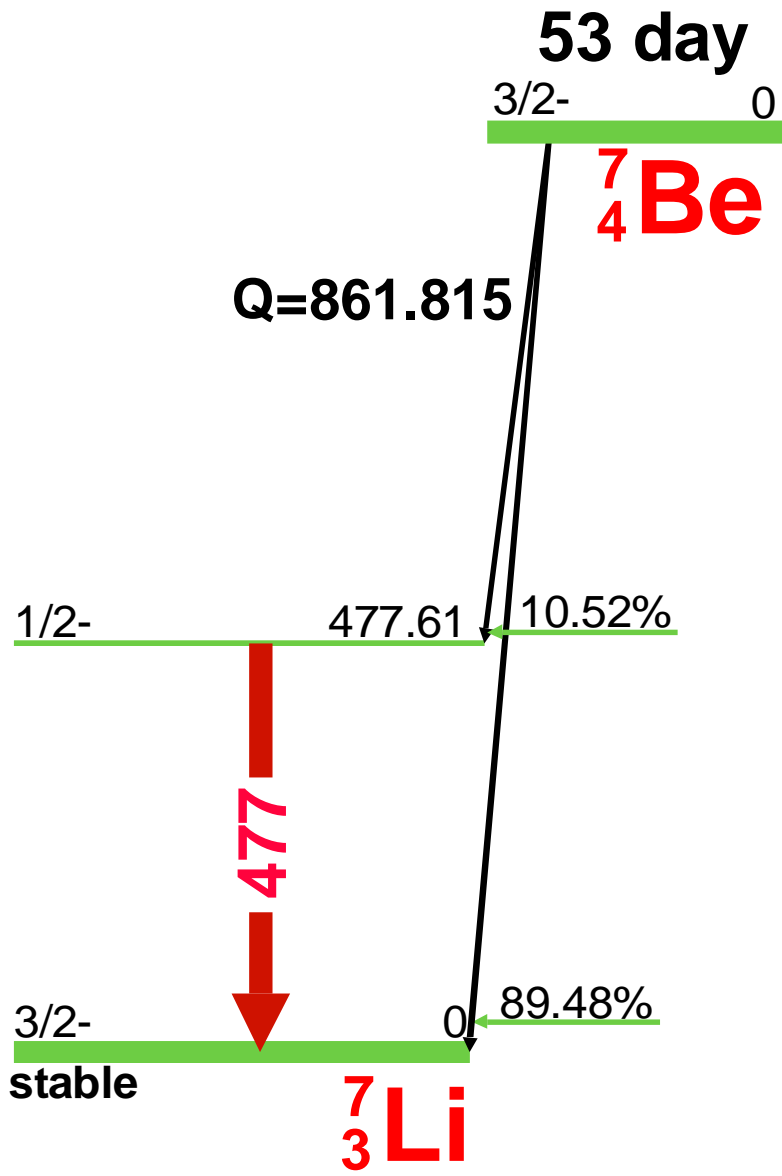


²³³ U(1.5x10 ⁵ yr.)		²³⁹ U(23 min.)	842
low energy portion	818	²³⁹ U(23 min.) Decay Scheme	843
high energy portion	819	²³⁷ Np(2.1x10 ⁶ yr.) with ²³³ Pa daughter	
²³³ U(1.5x10 ⁵ yr.) Decay Scheme		low energy portion	846
gamma-rays emitted from high energy levels	820	high energy portion	847
gamma-rays emitted from low energy levels	821	²³⁷ Np(2.1x10 ⁶ yr.) Decay Scheme	848
²³⁵ U(7.0x10 ⁶ yr.)	825	²³⁹ Np(2.3 day)	851
²³⁵ U(7.0x10 ⁶ yr.) with ²³¹ Th daughter	826	²³⁹ Np(2.3 day) Decay Scheme	852
²³⁵ U(7.0x10 ⁶ yr.) Decay Scheme	827	²³⁸ Pu(87 yr.)	854
²³⁵U Decay Chain	827	²³⁸ Pu(87 yr.) Decay Scheme	855
²³⁷ U(6.7 day)	830	²⁴⁰ Pu(6564 yr.)	856
²³⁷ U(6.7 day) Decay Scheme	831	²⁴⁰ Pu(6564 yr.) Decay Scheme	857
²³⁸ U(4.4x10 ⁹ yr.) with Th & Pa daughters		²⁴¹ Am(432 yr.)	858
low energy portion	832	²⁴¹ Am(432 yr.) Decay Scheme	
high energy portion	833	gamma-rays emitted from high energy levels	860
²³⁸ U(4.4x10 ⁹ yr.) Decay Scheme	834	gamma-rays emitted from low energy levels	861
²³⁸U Decay Chain	834	²⁵⁰ Bk(3.2 hr.)	865
U Ore - ²³⁸ U(4.4x10 ⁹ yr.)+ ²³⁵ U(7.0x10 ⁶ yr.) with daughters		²⁵⁰ Bk(3.2 hr.) Decay Scheme	866
low energy portion	837		
high energy portion	838		
²³⁵U Decay Chain	839		
²³⁸U Decay Chain	839		





⁷Be(53 day) Decay Scheme



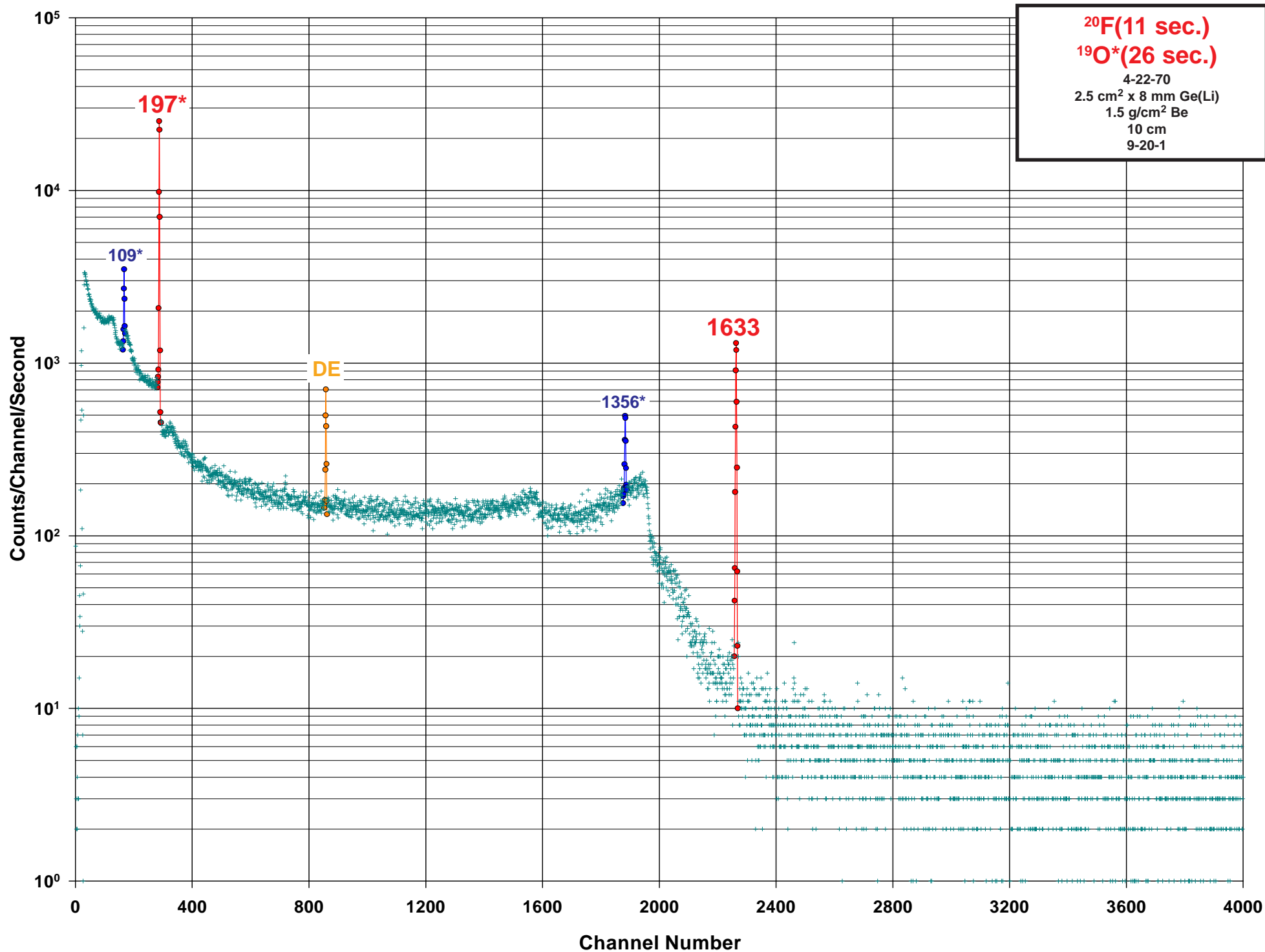
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷Be Half Life: 53.29 (7) day
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: Li(p,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
477.606	0.002	100	10.52	0.06	1

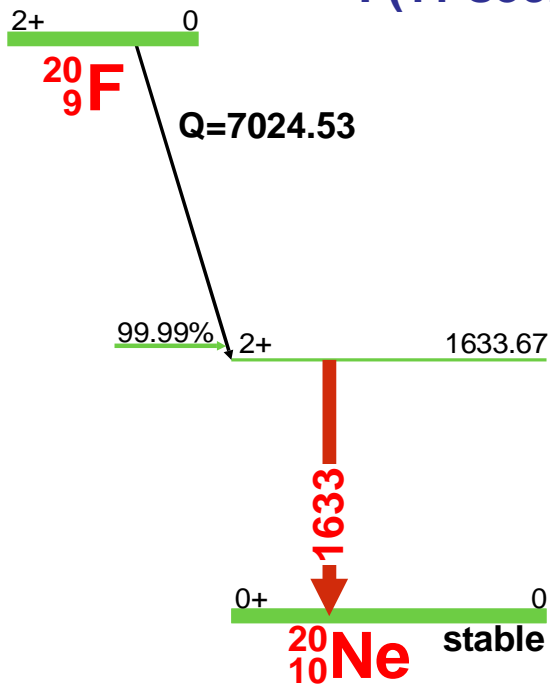
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





11 Sec

²⁰F(11 sec.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

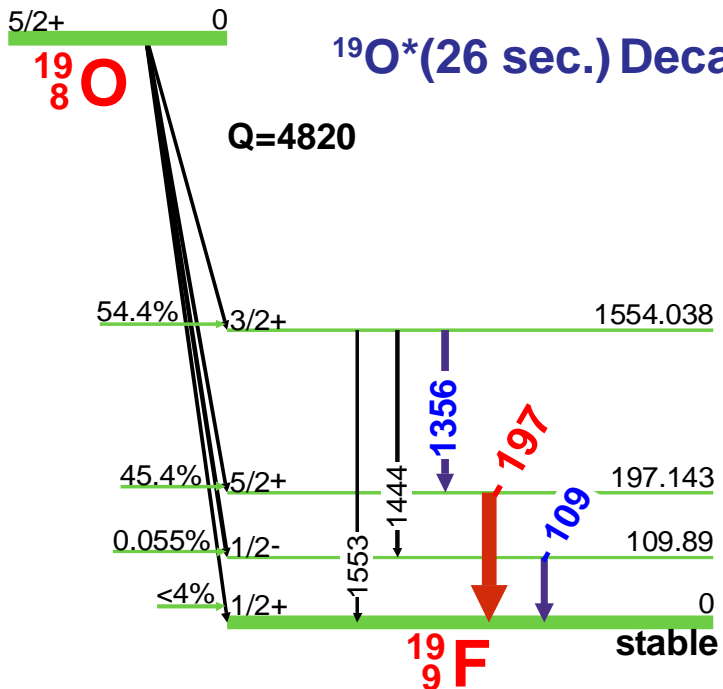
Nuclide: ²⁰F - ¹⁹O* Half Life: 11.163(8) sec. - 26.91(8) sec.*
 Detector: 2.5 cm² x 8 mm Ge (Li) Method of Production: F (n,γ)

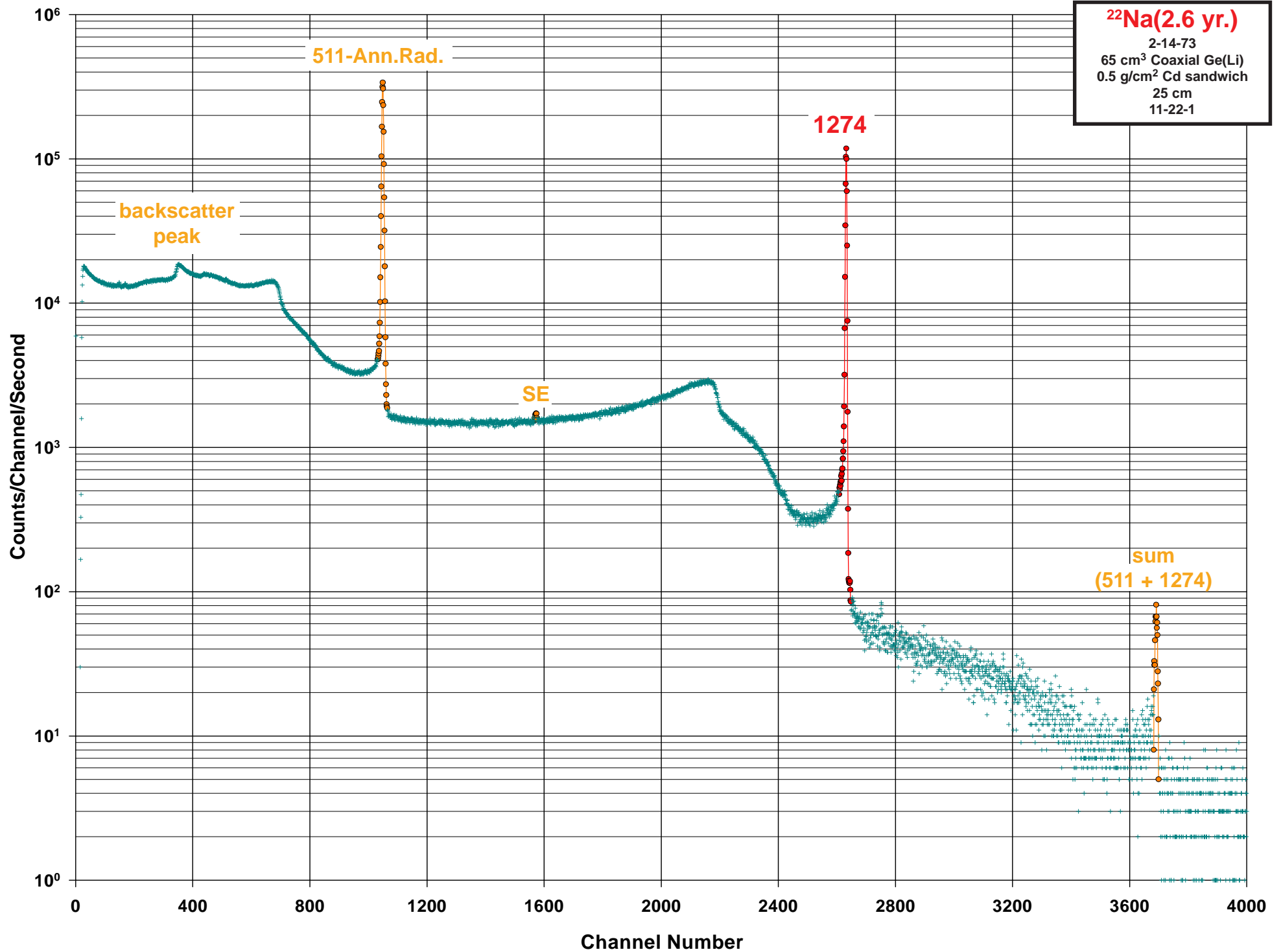
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
*	109.894	0.005		2.54	0.10	3
*	197.142	0.004		95.9	2.1	1
*	1149.			0.0005		
*	1236.			0.017	0.002	
*	1356.843	0.008		50.4	1.1	3
*	1444.085	0.010		2.64	0.06	4
*	1553.970	0.008		1.39	0.03	4
	1633.602	0.015	100	100.0		1
*	2353.98	0.26		0.00181	0.00023	
*	2582.517	0.33		0.0189	0.0005	
*	3332.54	0.20		0.0082	0.0006	4
*	3710.64	0.20		0.00110	0.00015	
*	3797.87	0.20		0.00133	0.00014	
*	3907.74	0.20		0.00384	0.00017	
*	4180.063	0.041		0.0792	0.0017	
	4965.85	0.20				4

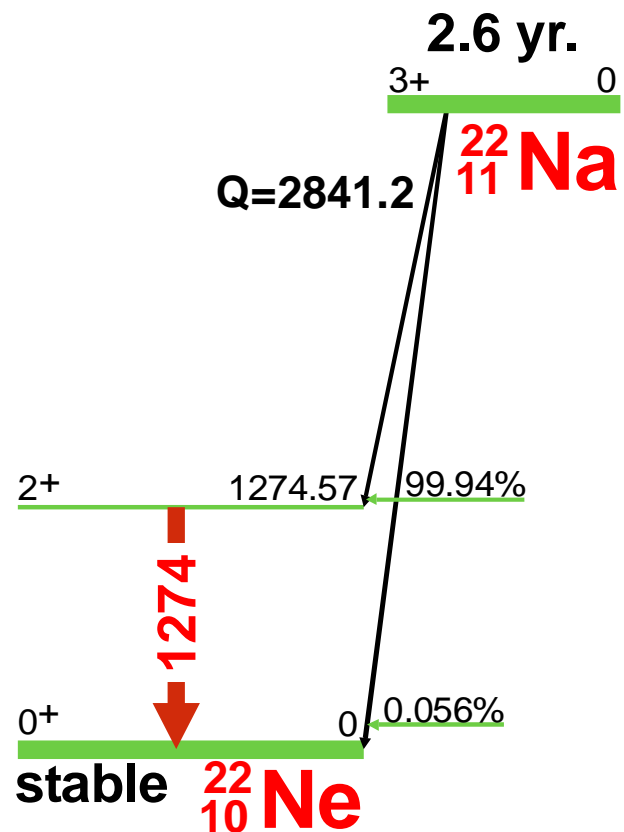
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

26 sec.

¹⁹O*(26 sec.) Decay Scheme





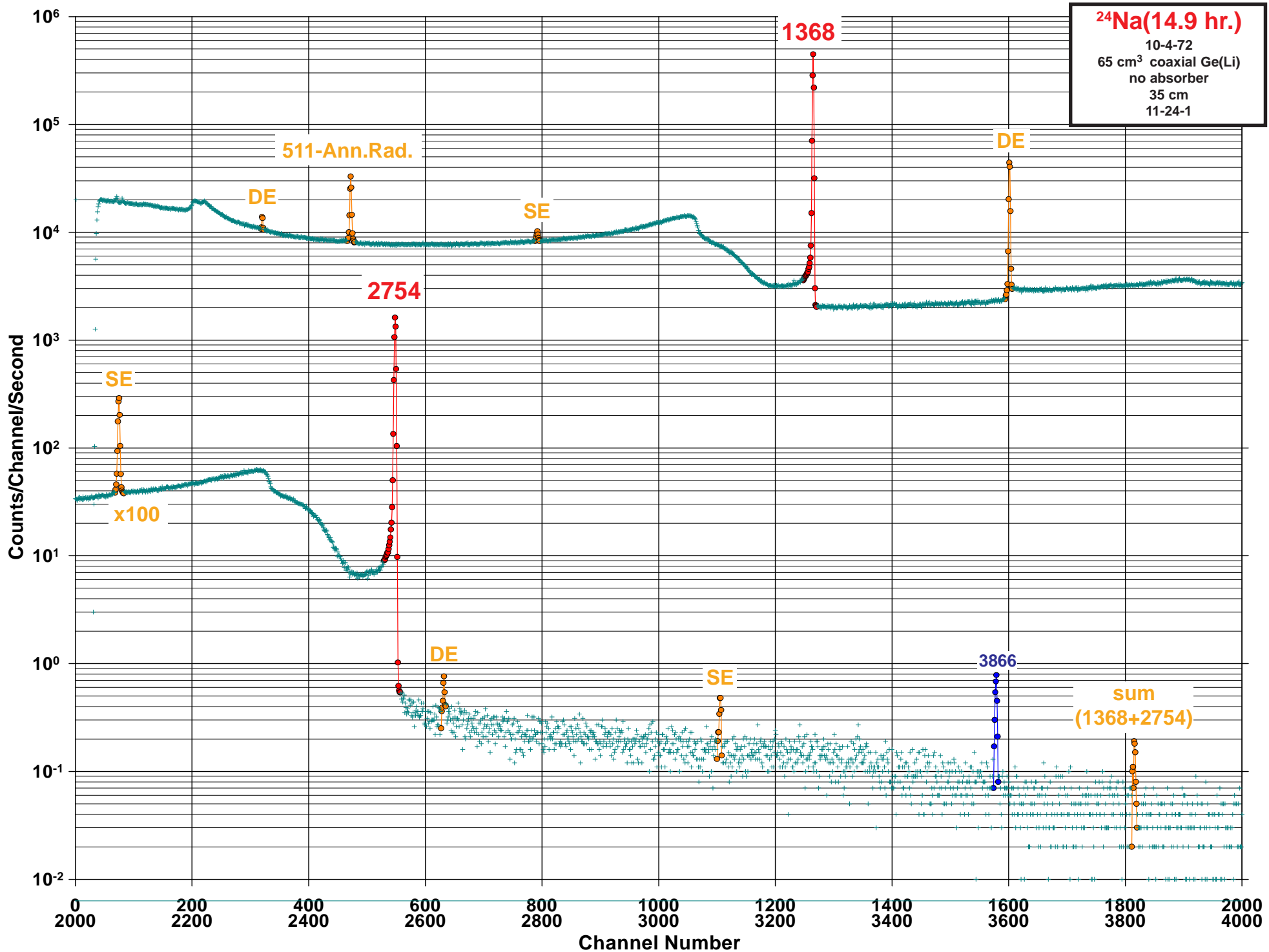
^{22}Na (2.6 yr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{22}Na

Half Life: 2.6019(4) yr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: Ne(³He,p)

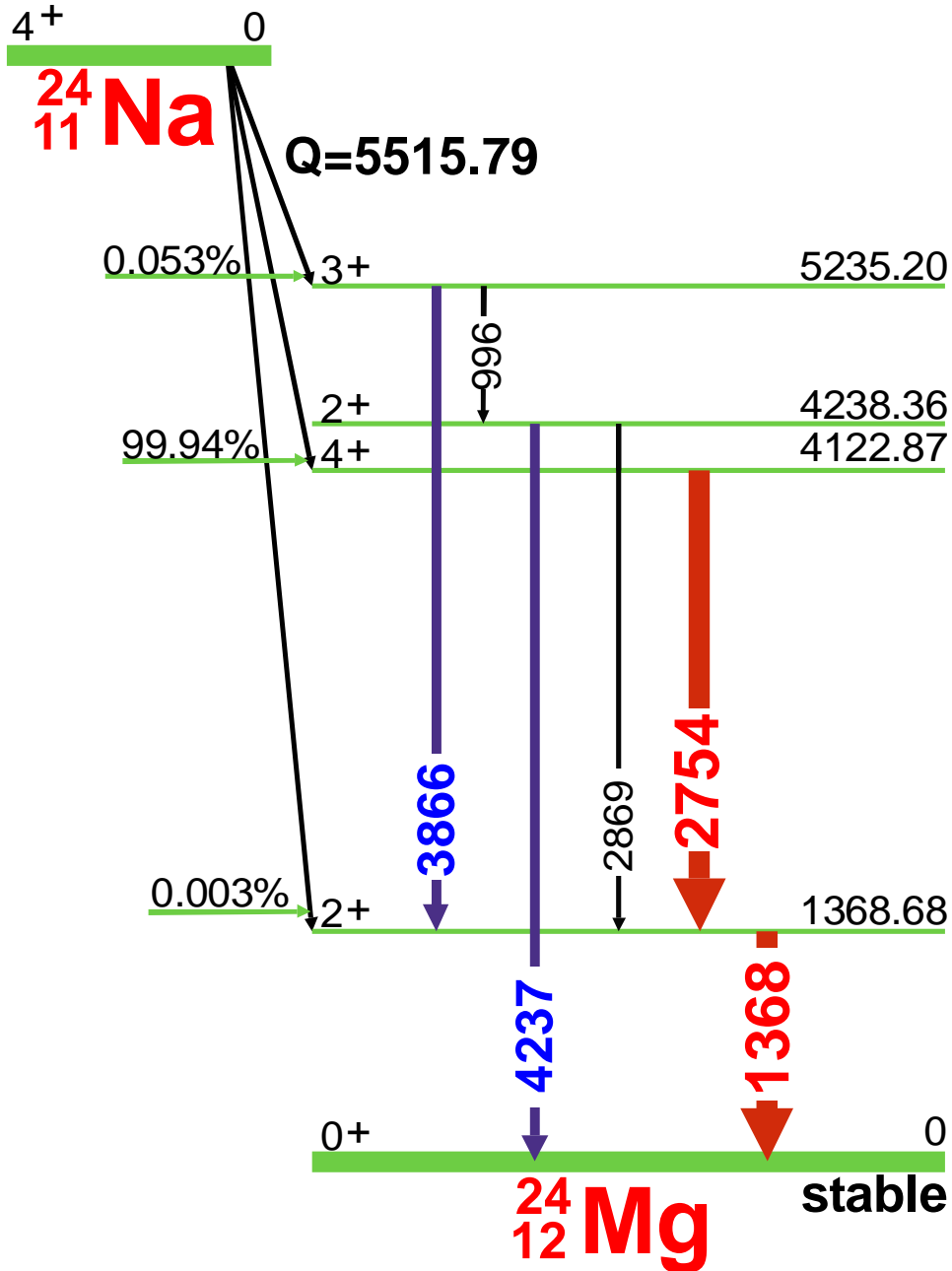
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
Ann.	511.006		100	178.0	0.6	1
	1274.53	0.02	62.2	99.944	0.014	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



²⁴Na(14.9 hr.) Decay Scheme

14.9 hr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁴Na

Half Life: 14.9590(12) hr.

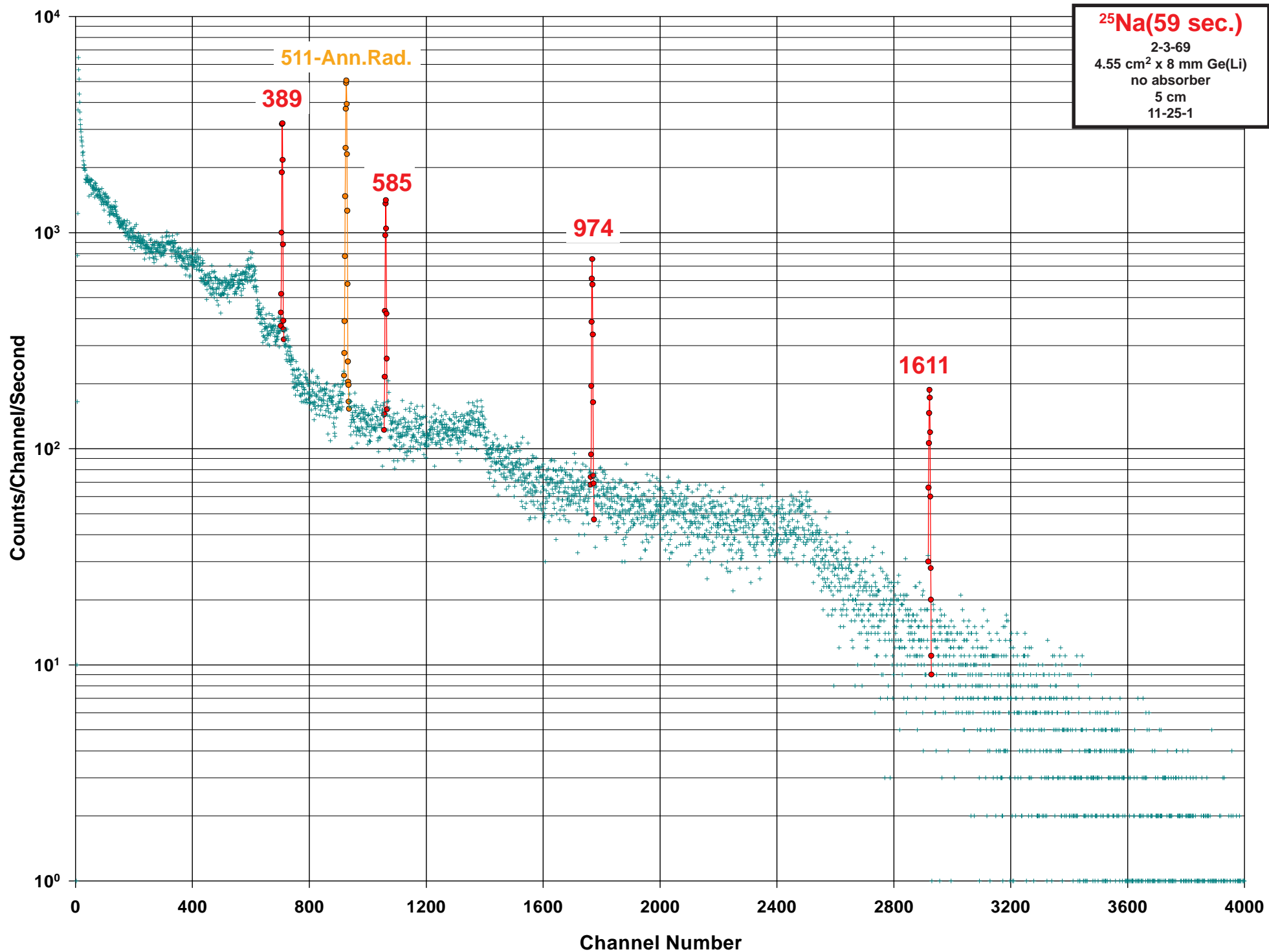
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ²³Na (n,γ)

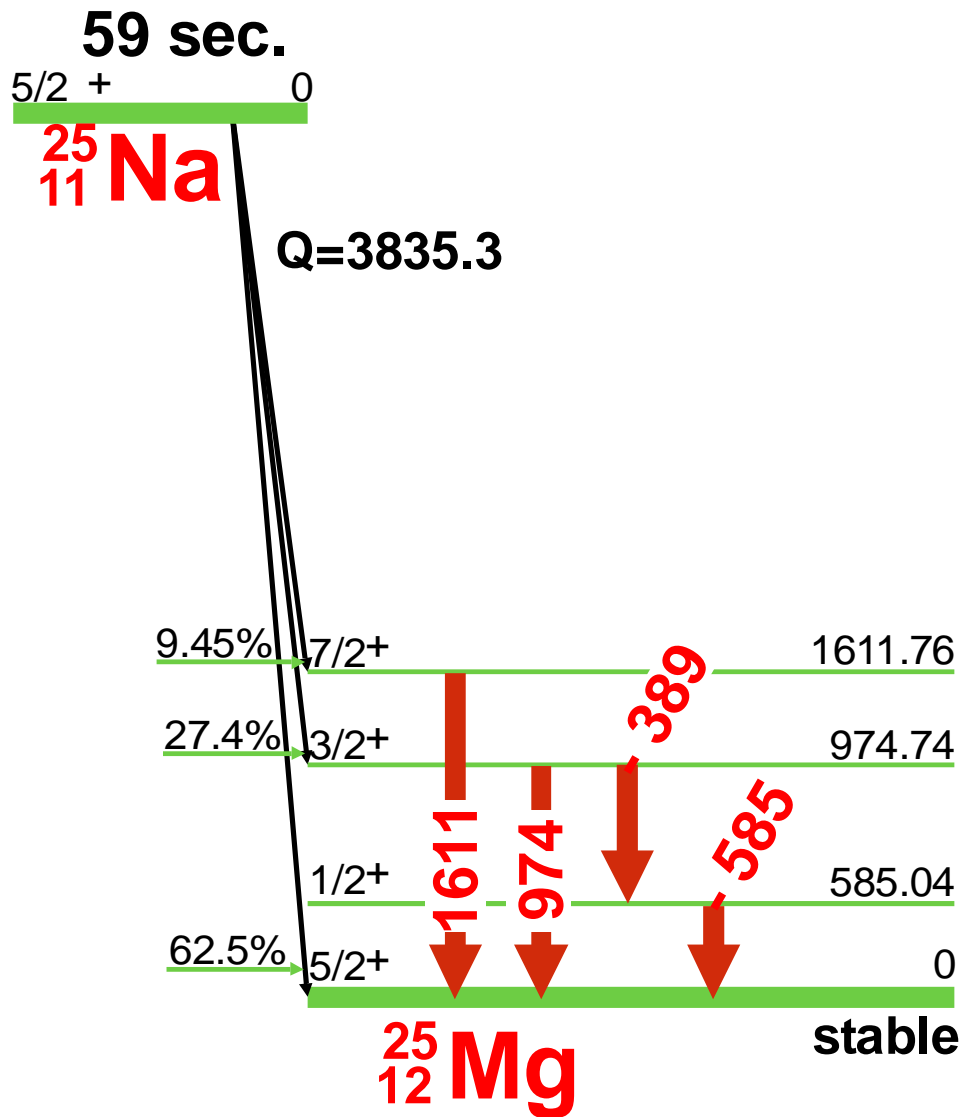
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
996.82			0.0014	0.0002	4
1368.633		100	100.0		1
2754.028		98.6	99.944	0.004	1
2869.5			0.0003	0.0001	4
3866.19		0.076	0.052	0.004	2
4237.96			0.0011	0.0002	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





²⁵Na(59 sec.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁵Na

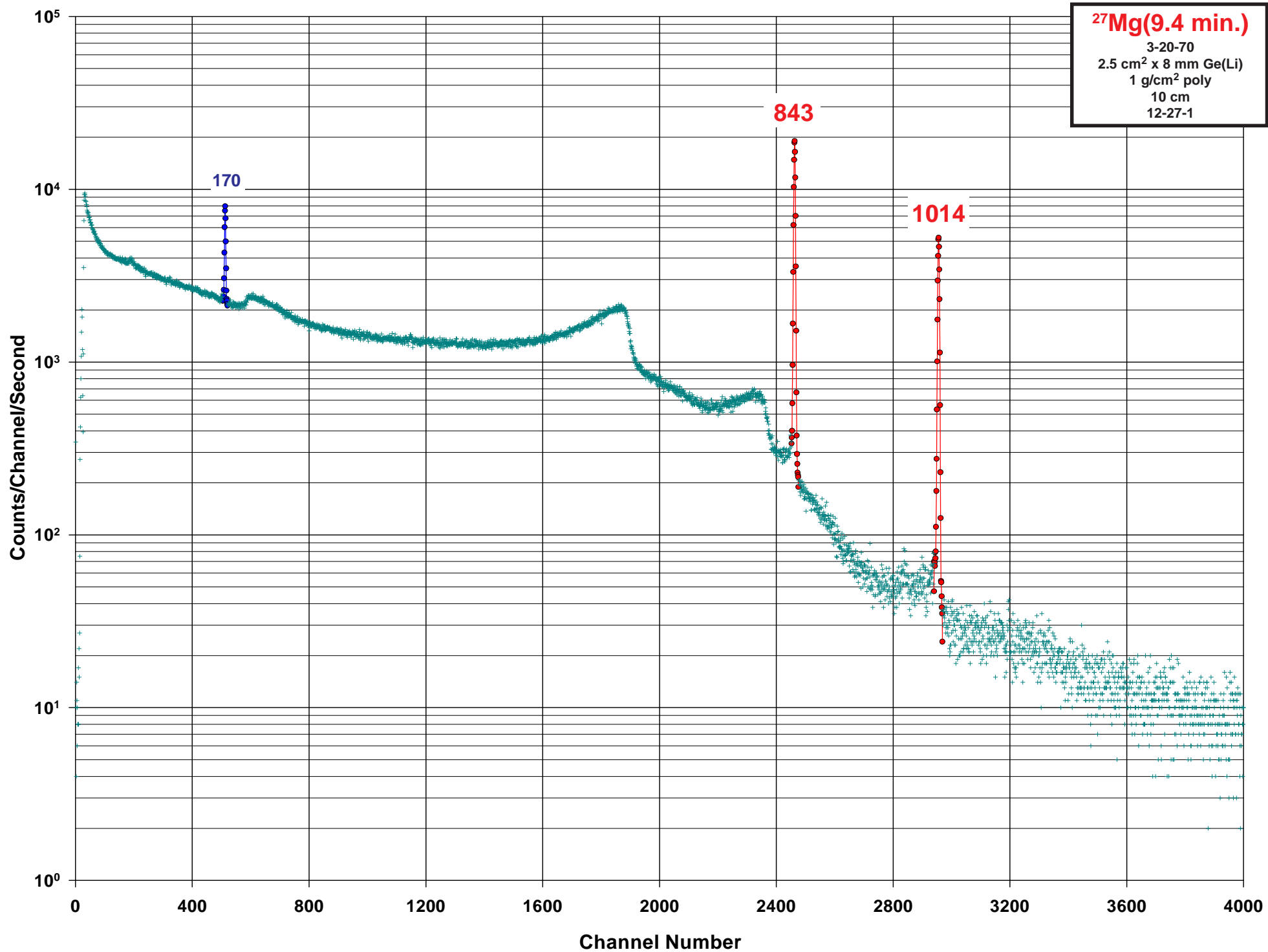
Half Life: 59.1(6) sec.

Detector: 4.55 cm² x 8 mm Ge (Li) Method of Production: ²⁵Mg(n,p)

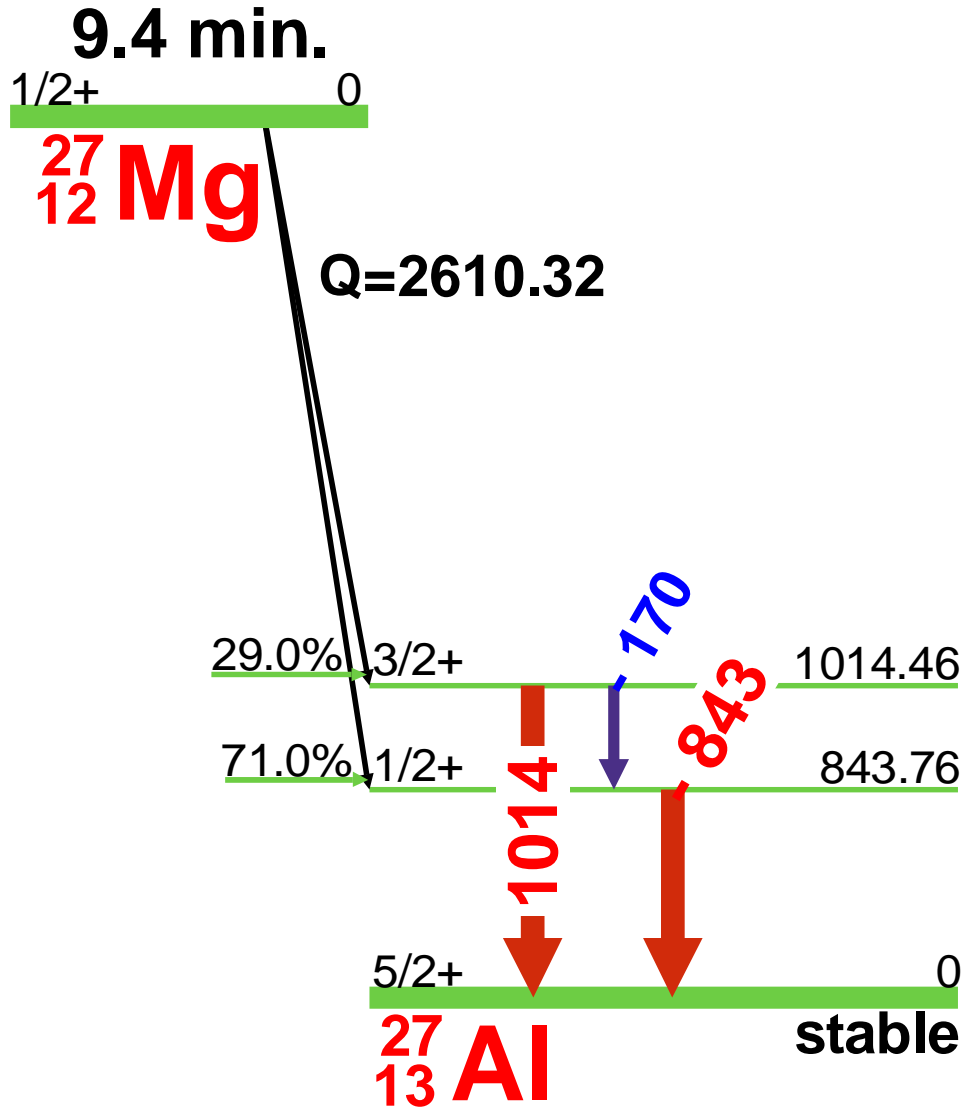
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
389.7		83	12.8	0.7	1
585.03		85	13.0	0.7	1
836.84			0.104	0.006	4
974.72		100	15.0	0.8	1
989.85			0.166	0.010	4
1379.53			0.231	0.014	4
1611.711		67	9.5	0.5	1
1964.53			0.147	0.008	4
2216.32			0.094	0.005	4
2801.3			0.049	0.003	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





²⁷Mg(9.4 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁷Mg

Half Life: 9.46(1) min.

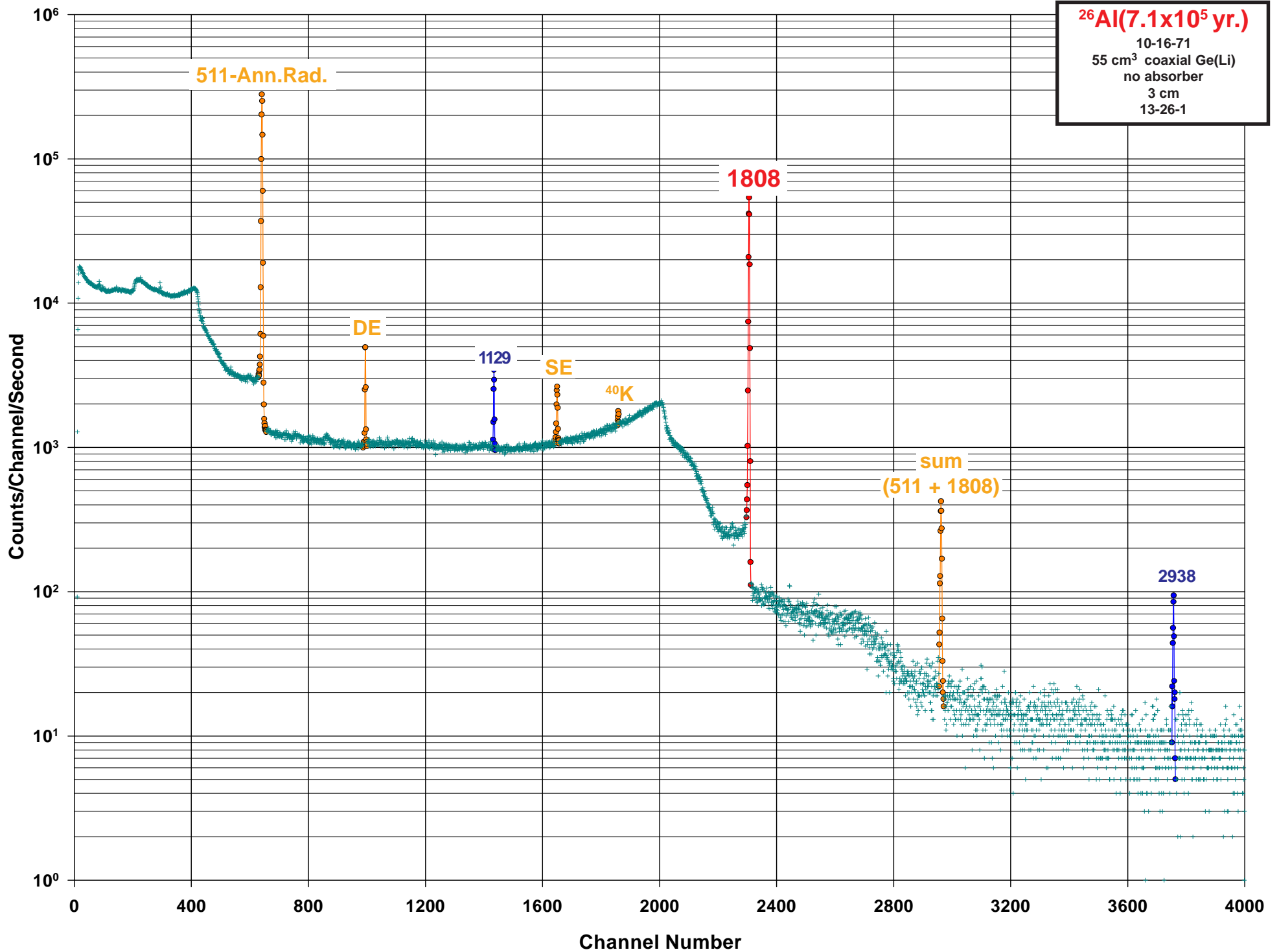
Detector: 2.5 cm² x 8 mm Ge(Li)

Method of Production: ²⁶Mg (n,γ)

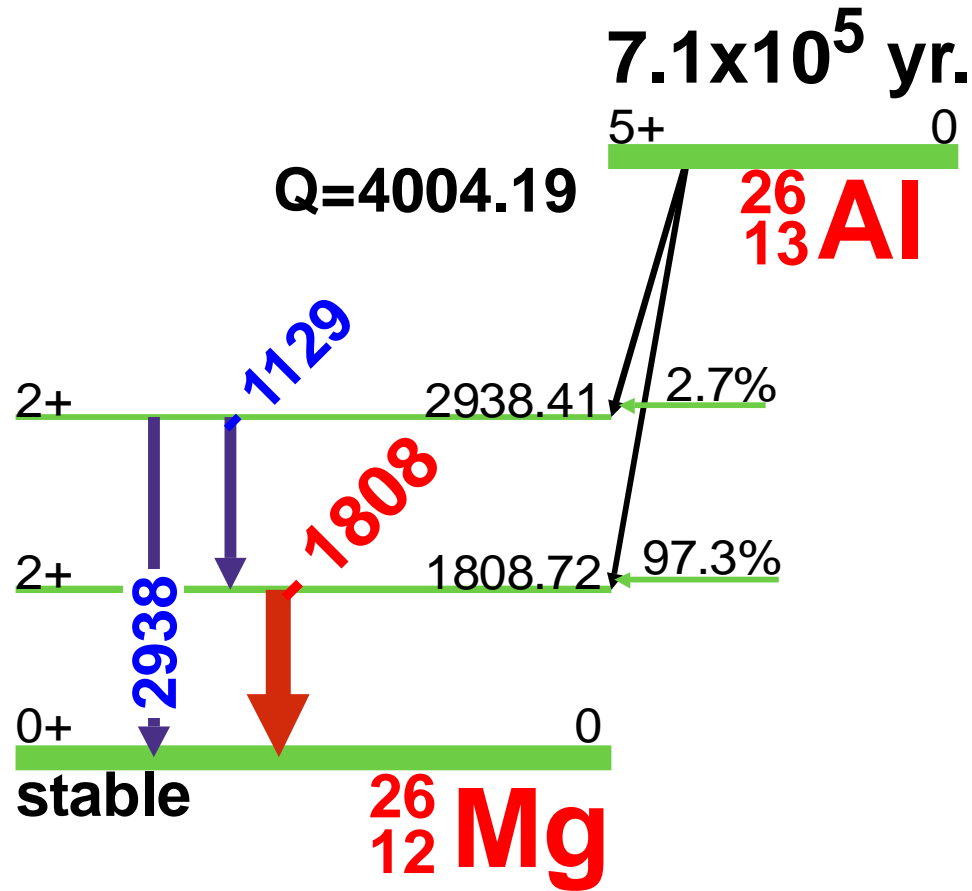
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
170.686	0.015	1.1	0.80	0.10	3
843.76	0.03	100	71.8	0.4	1
1014.44	0.04	39	28.0	0.4	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





²⁶Al (7.1x10⁵ yr.) Decay Scheme



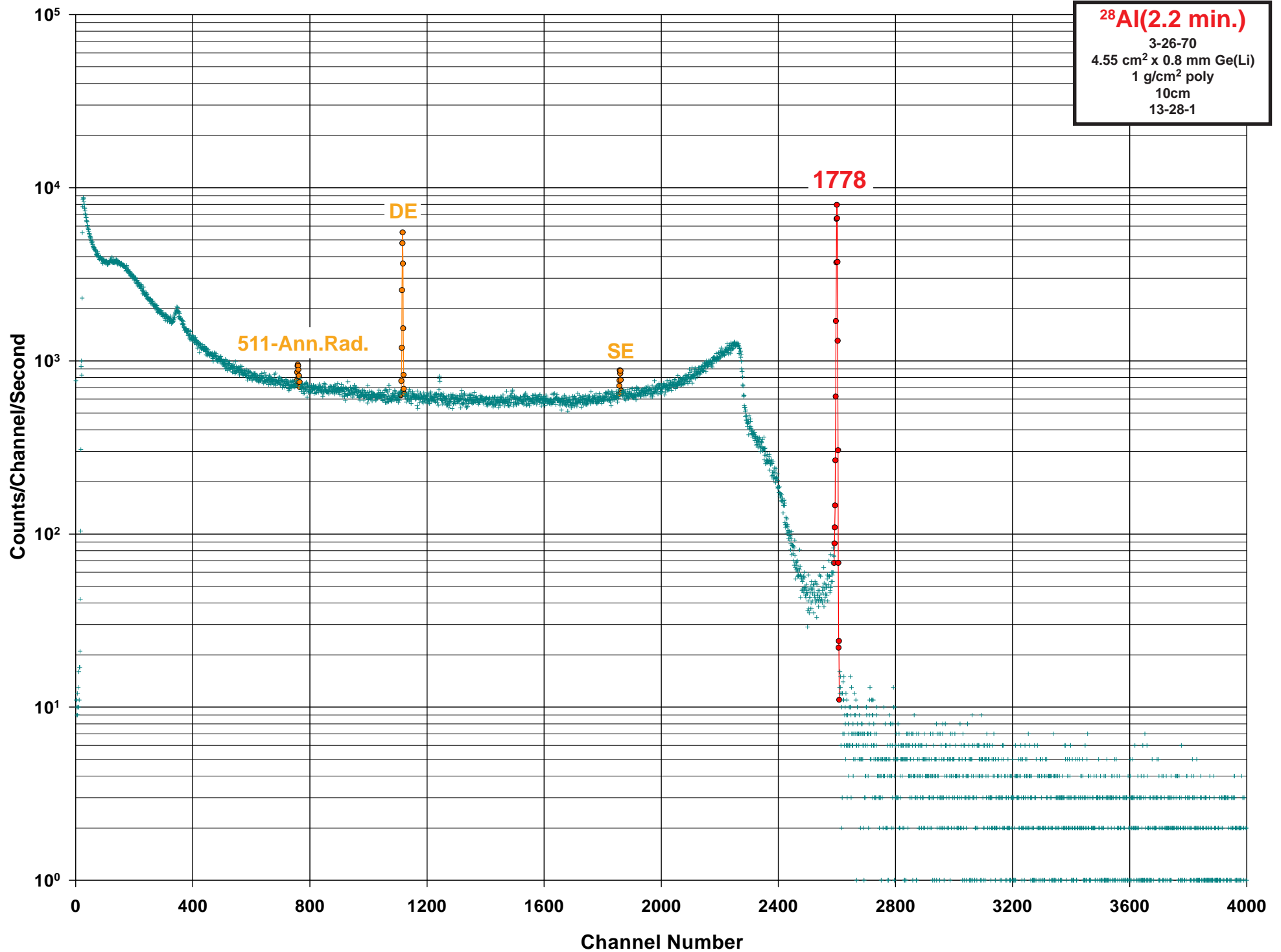
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁶Al Half Life: 7.17(24) x 10⁵ yr.
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: ²⁶Mg(p,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006		100	161.9	0.6	1
	1129.67	0.10	1.5	2.50	0.20	3
	1808.65	0.07	63.3	99.76	0.04	1
	2938.		0.20	0.24	0.04	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





²⁸Al(2.2 min.) Decay Scheme

2.2 min.

3+ 0

²⁸₁₃Al

Q=4642.25

100% → 2+ 1778.91

1778

0+ 0

²⁸₁₄Si stable

GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁸Al

Half Life: 2.241(1) min.

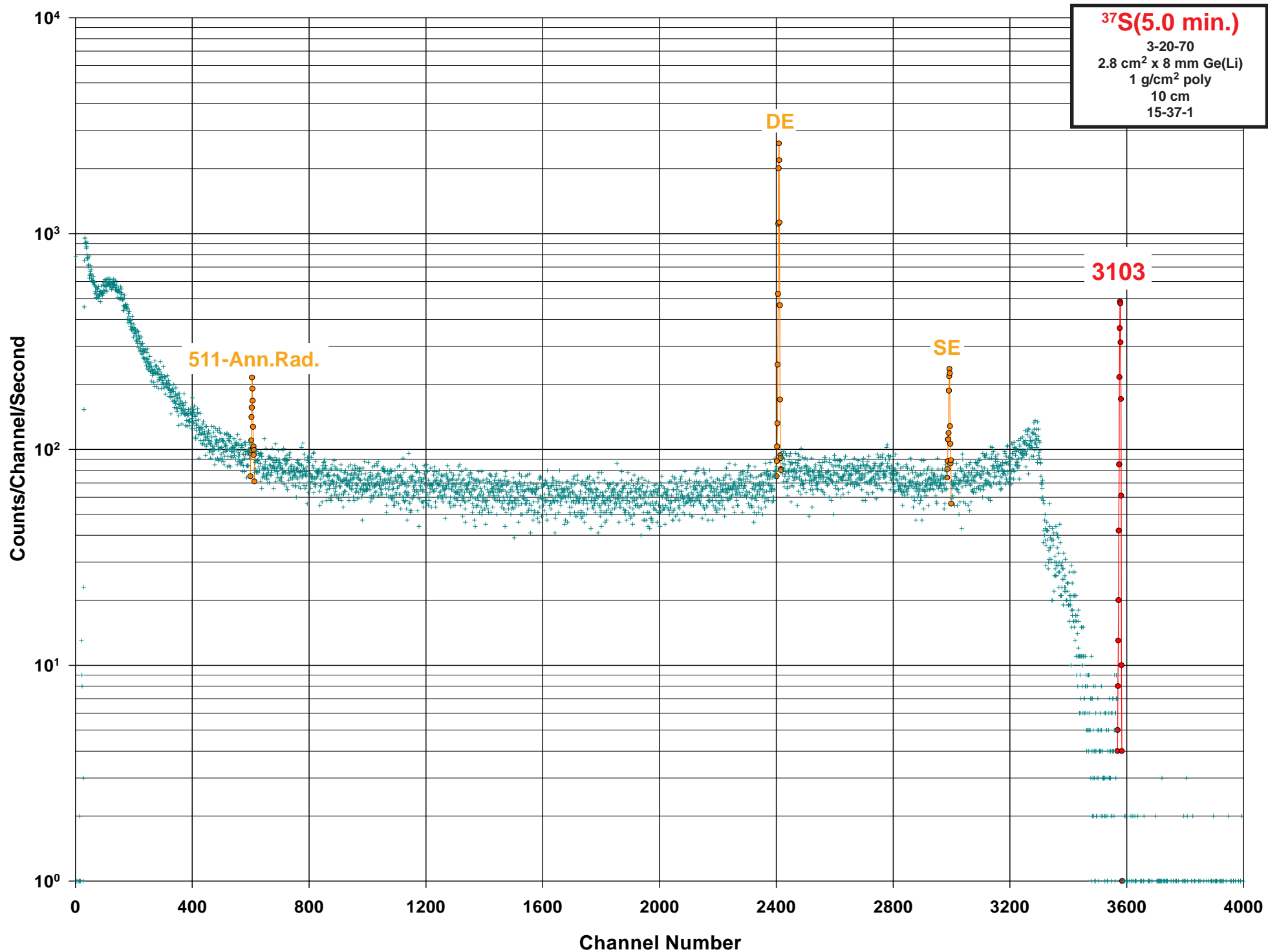
Detector: 4.55 cm² x 8 mm. Ge(Li)

Method of Production: ²⁷Al(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
1778.85	0.03	100	100	1	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





³⁷S(5.0 min.) Decay Scheme

5.0 min.

^{7/2-} 0

³⁷₁₆ S

Q=4865.30

0.267% → ^{3/2+} 3741.22

94.0% → ^{7/2-} 3103.50

5.6% → ^{3/2+} 0

³⁷₁₇ Cl stable

3741

3103

GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ³⁷S

Half Life: 5.05(2) min.

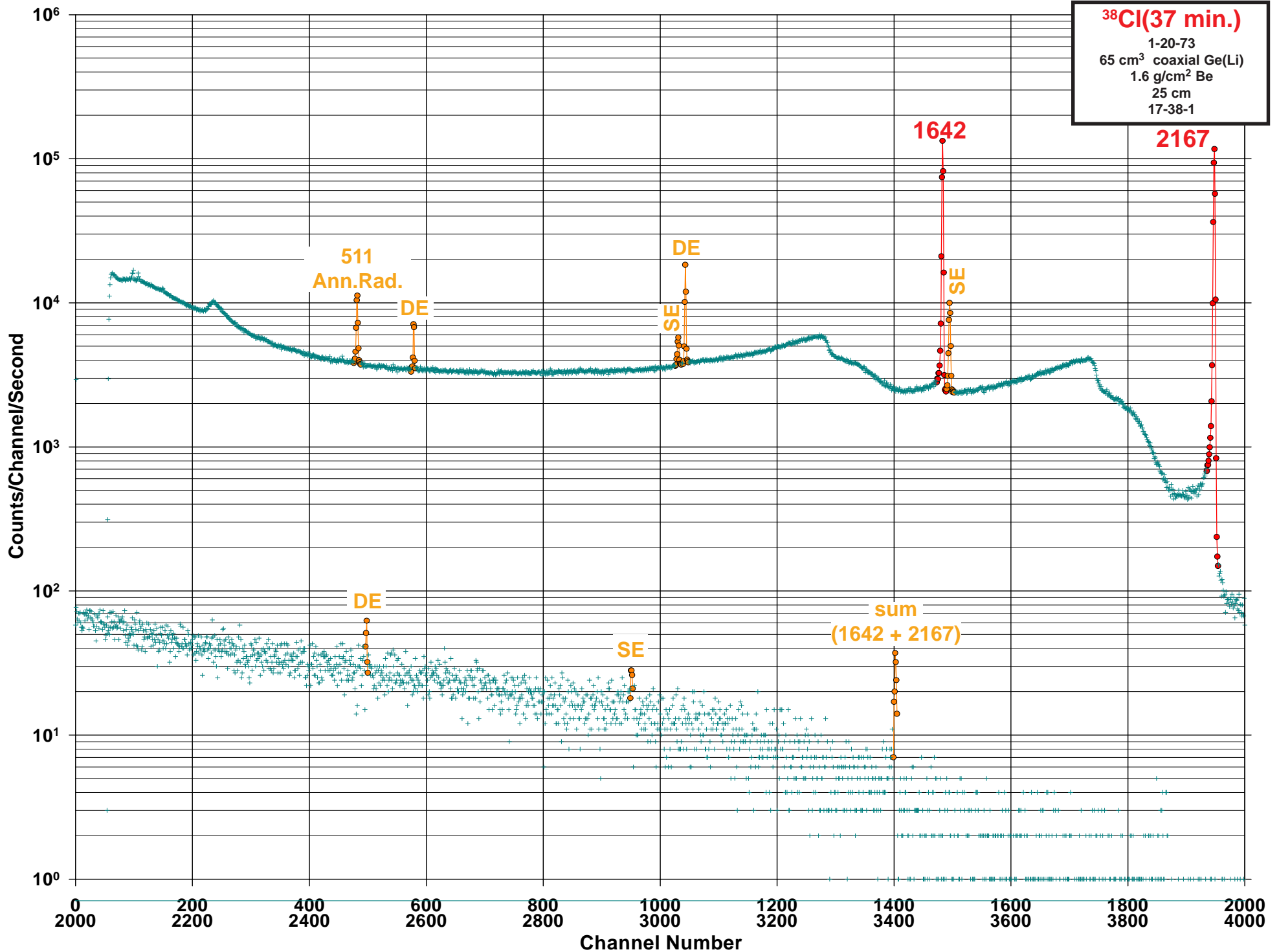
Detector: 2.8 cm² x 8 mm Ge(Li)

Method of Production: ³⁶S(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
906.36			0.054	0.007	4
1169.07			0.034	0.007	4
3086.			0.062	0.021	4
3103.36		100	94.0	0.6	1
3741.02			0.263	0.028	4
4009.64			0.027	0.010	4
4396.			0.0038	0.0019	4

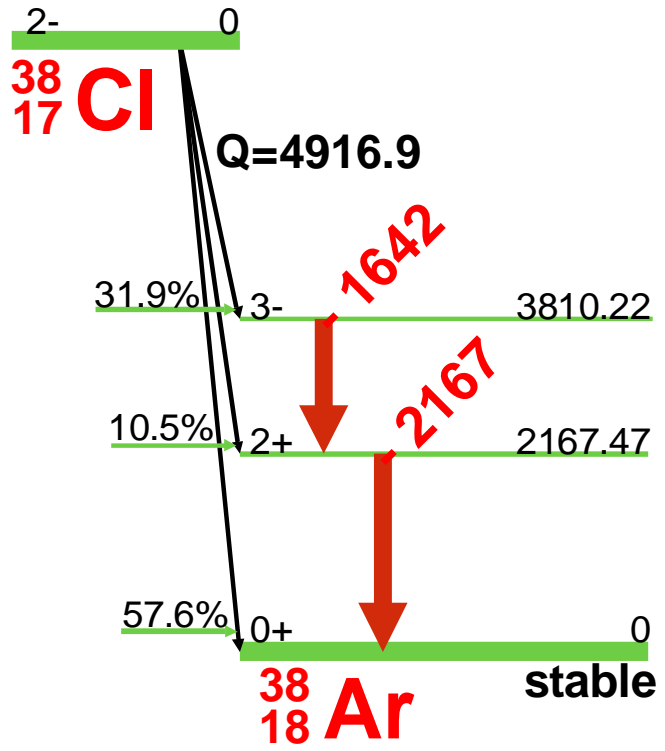
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





³⁸Cl(37 min.) Decay Scheme

37 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ³⁸Cl

Half Life: 37.24(5) min.

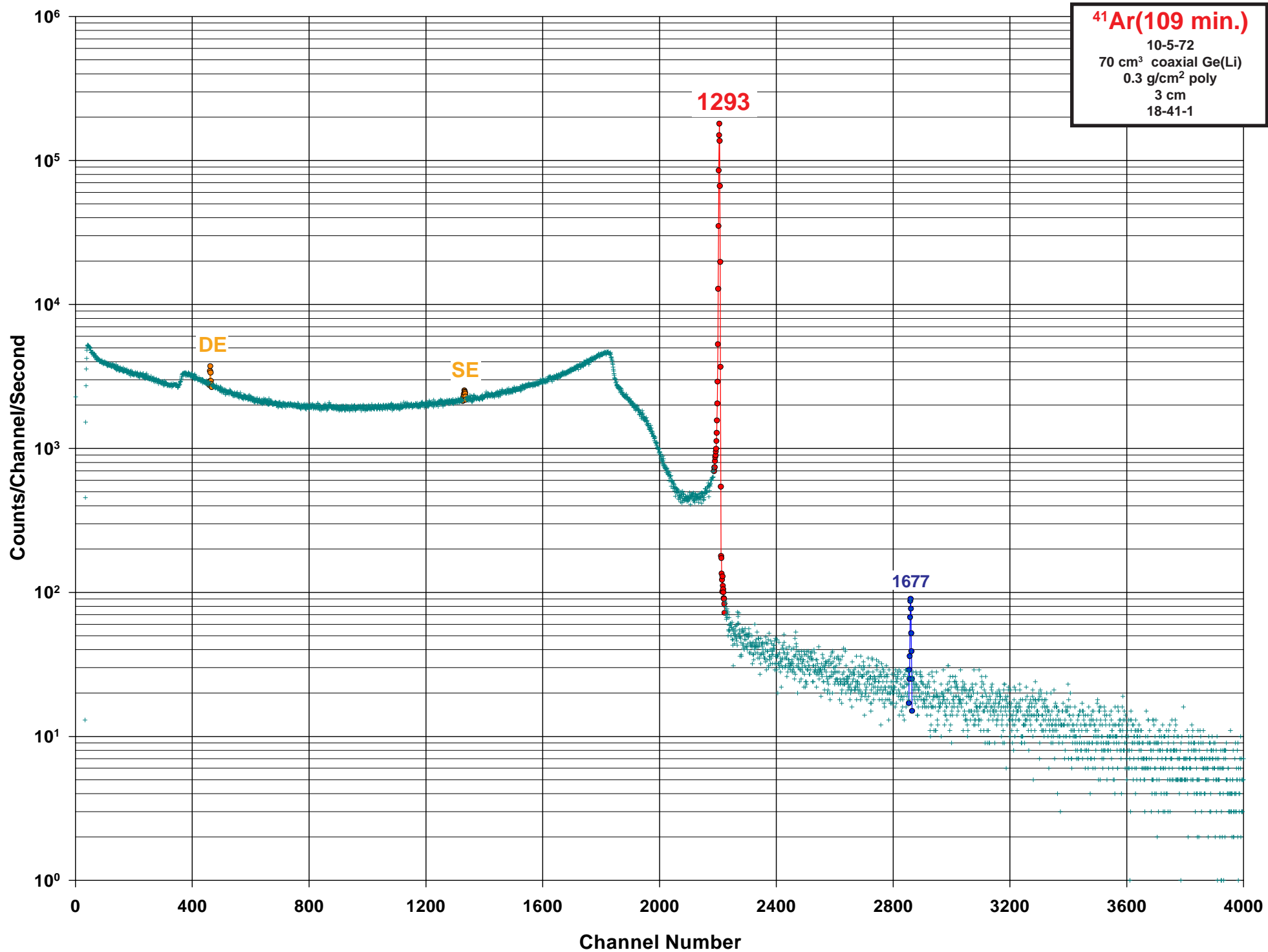
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ³⁸Cl(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
1642.714		76	31.9	1.0	1
2167.405		100	42.4	1.1	1

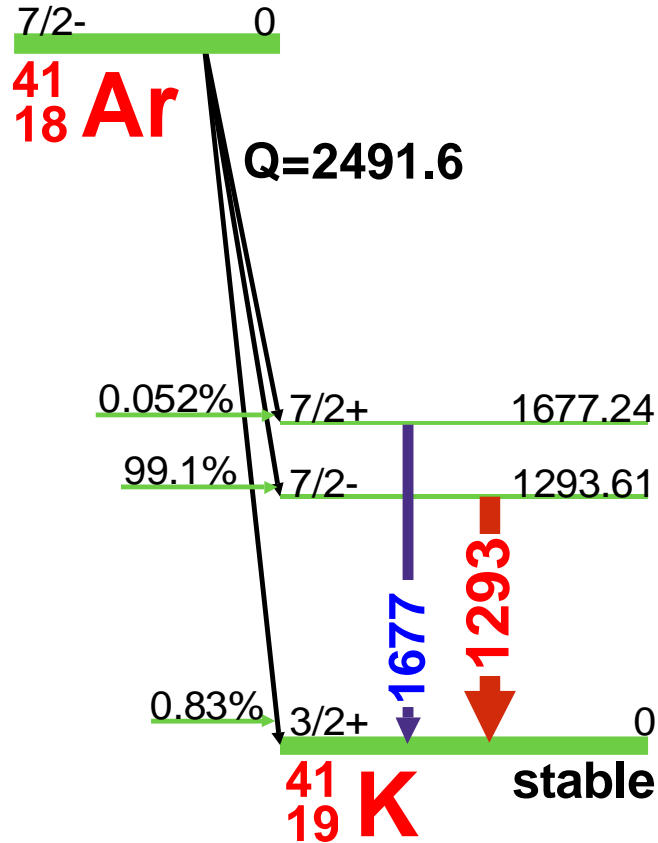
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴¹Ar(109 min.) Decay Scheme

109 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴¹Ar

Half Life: 109.3(1) min.

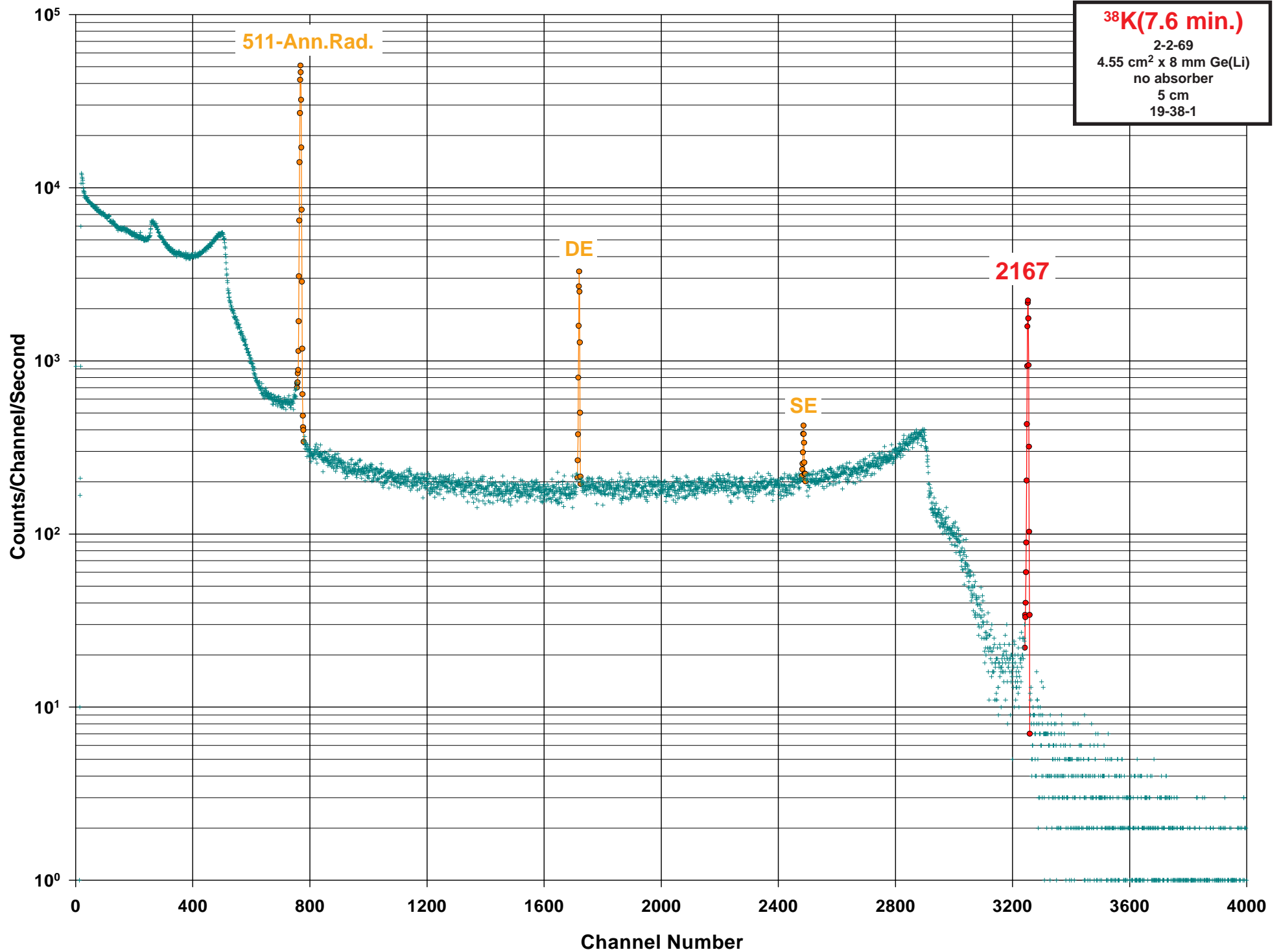
Detector: 70 cm³ coaxial Ge(Li)

Method of Production: ⁴⁰Ar(n,γ)

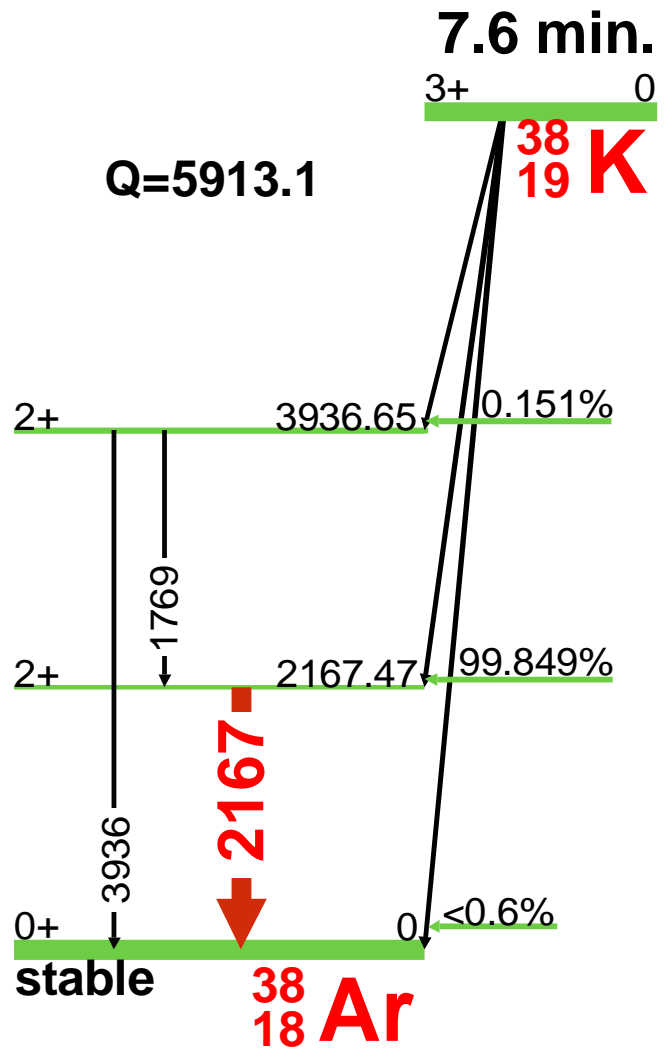
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1293.587	0.008	100	99.1		1
1677.198	0.008	0.045	0.052	0.020	3

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





³⁸K(7.6 min.) Decay Scheme



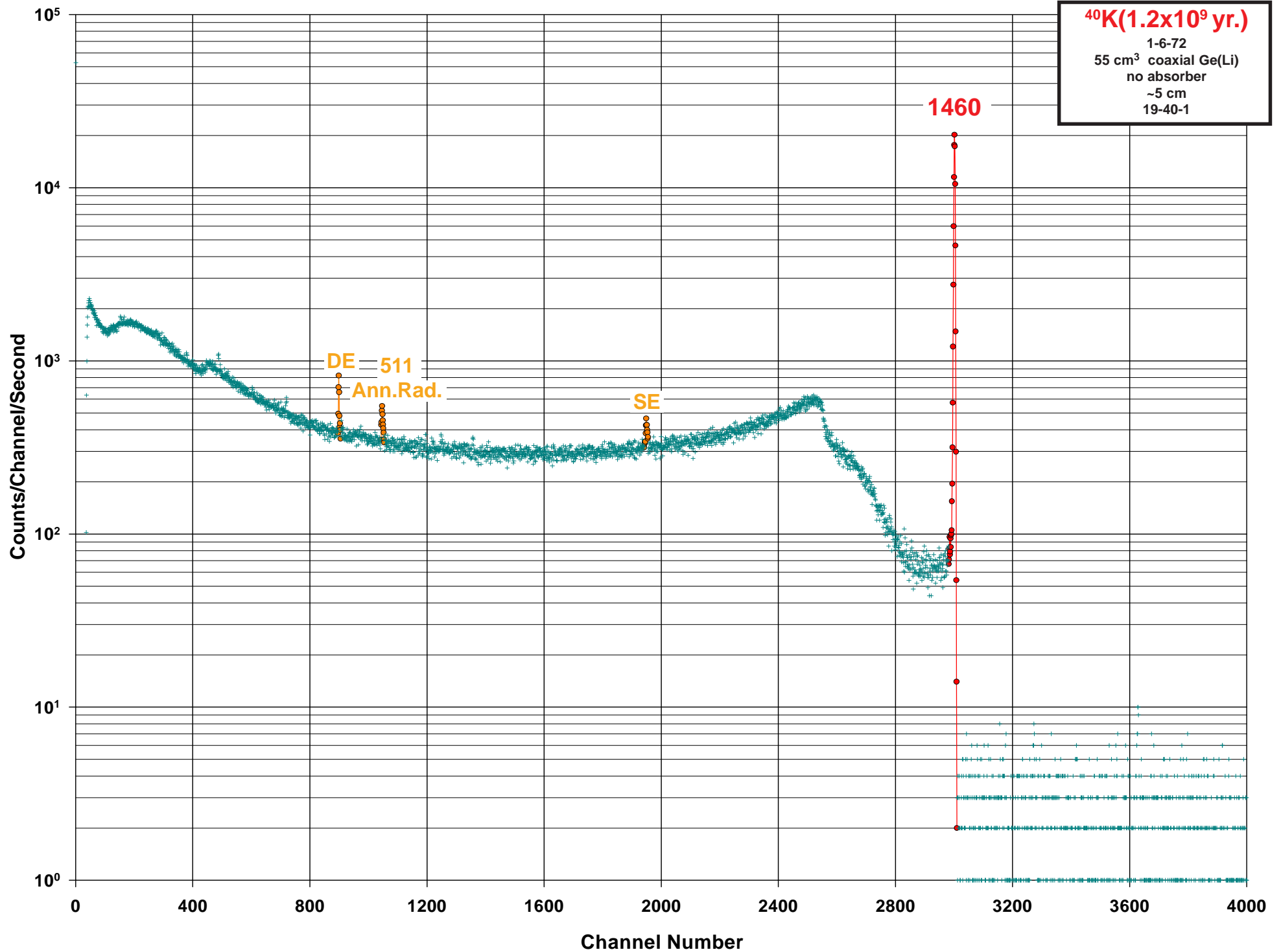
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ³⁸K Half Life: 7.64(2) min.
 Detector: 4.55 cm² x 8 mm Ge(Li) Method of Production: ³⁹K(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			197.0	0.8	1
	1769.13			0.0094	0.0013	4
	2167.405		100	99.858	0.013	1
	3936.43			0.142	0.011	4

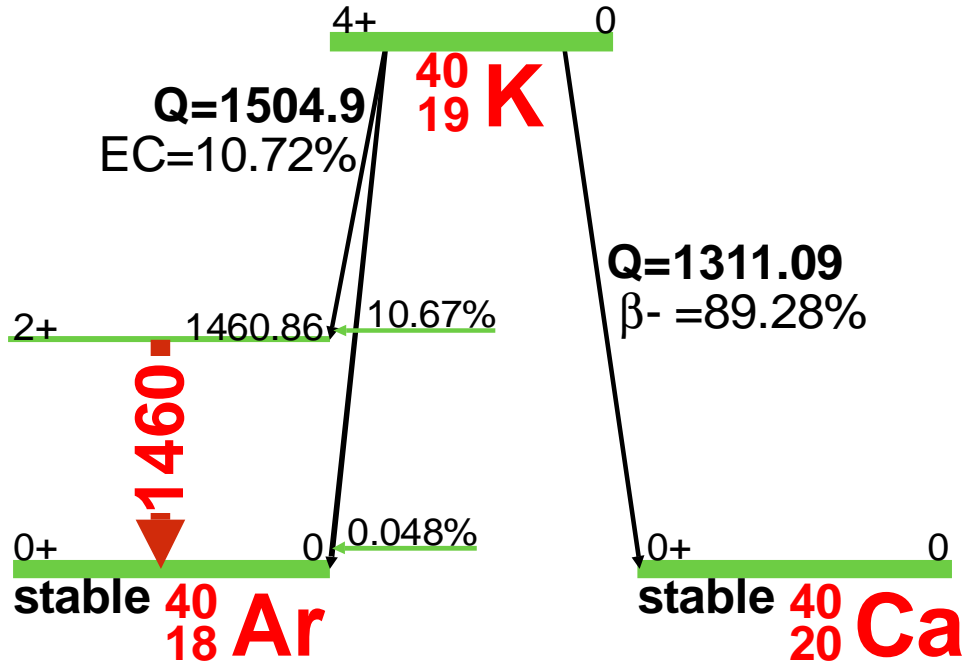
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴⁰K(1.2x10⁹ yr.) Decay Scheme

1.2x10⁹ yr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁰K

Half Life: 1.277(8) x 10⁹ yr.

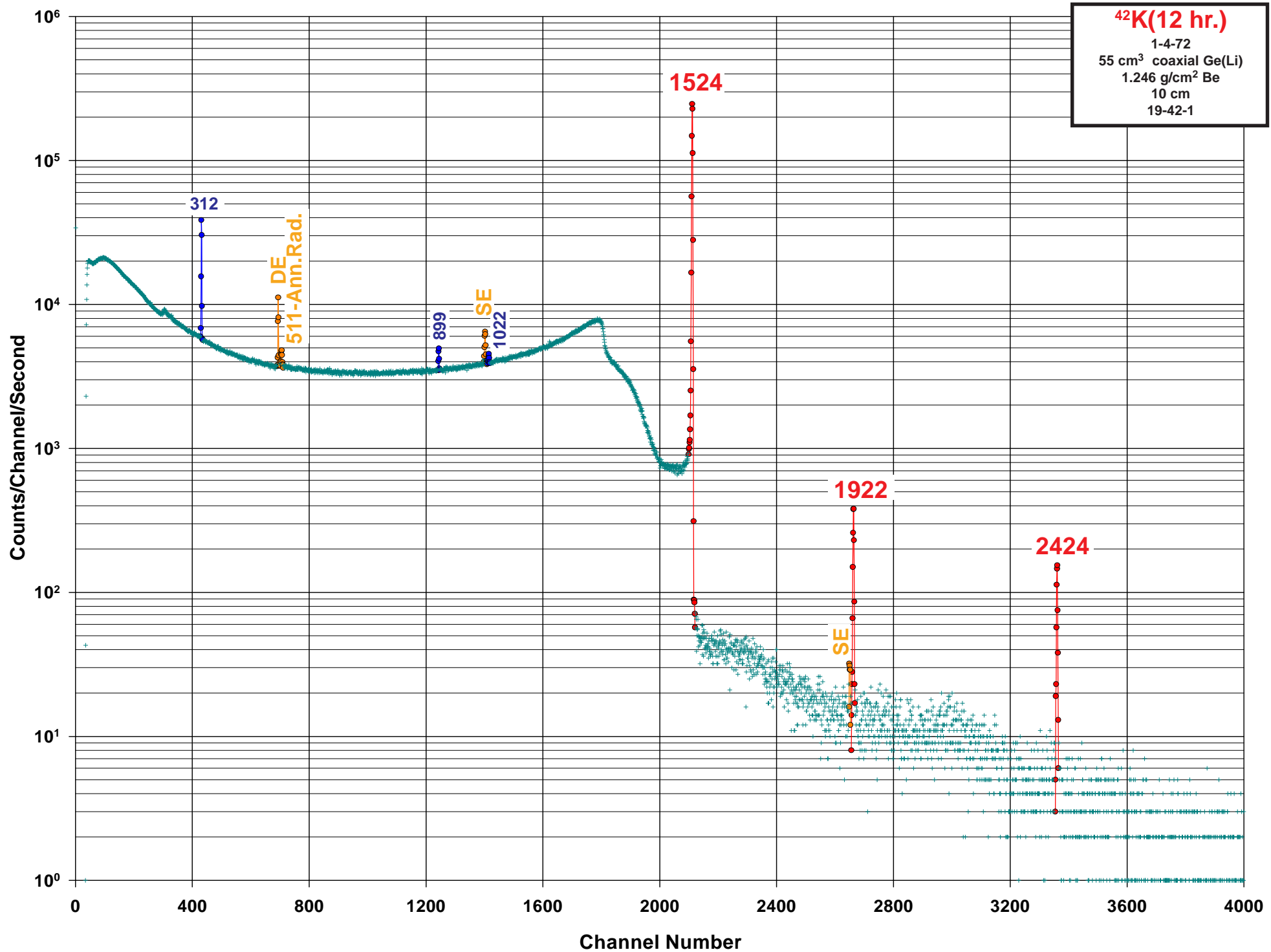
Detector: 55 cm³ coaxial Ge(Li)

Method of Production: Natural

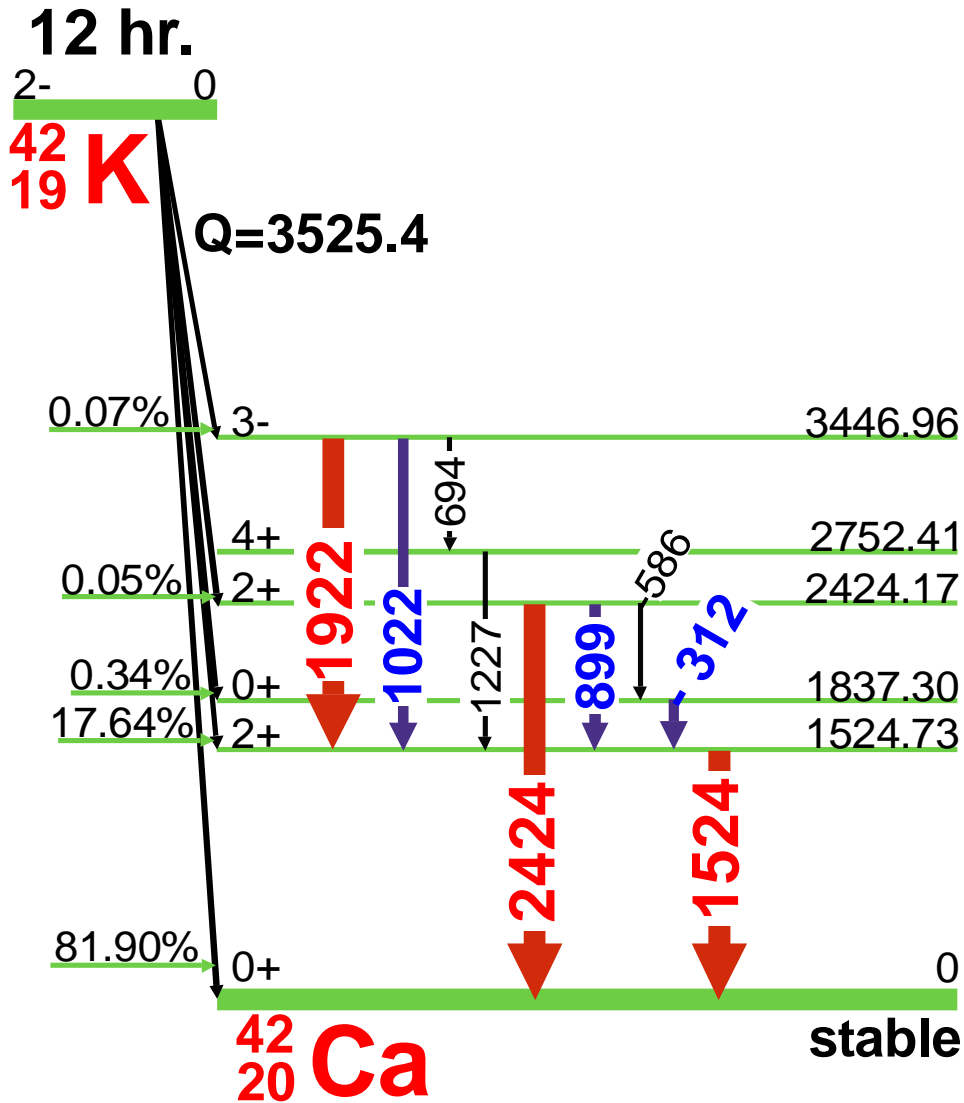
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			0.002		4
	1460.83		100	10.67	0.13	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴²K(12 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴²K

Half Life: 12.360(3) hr.

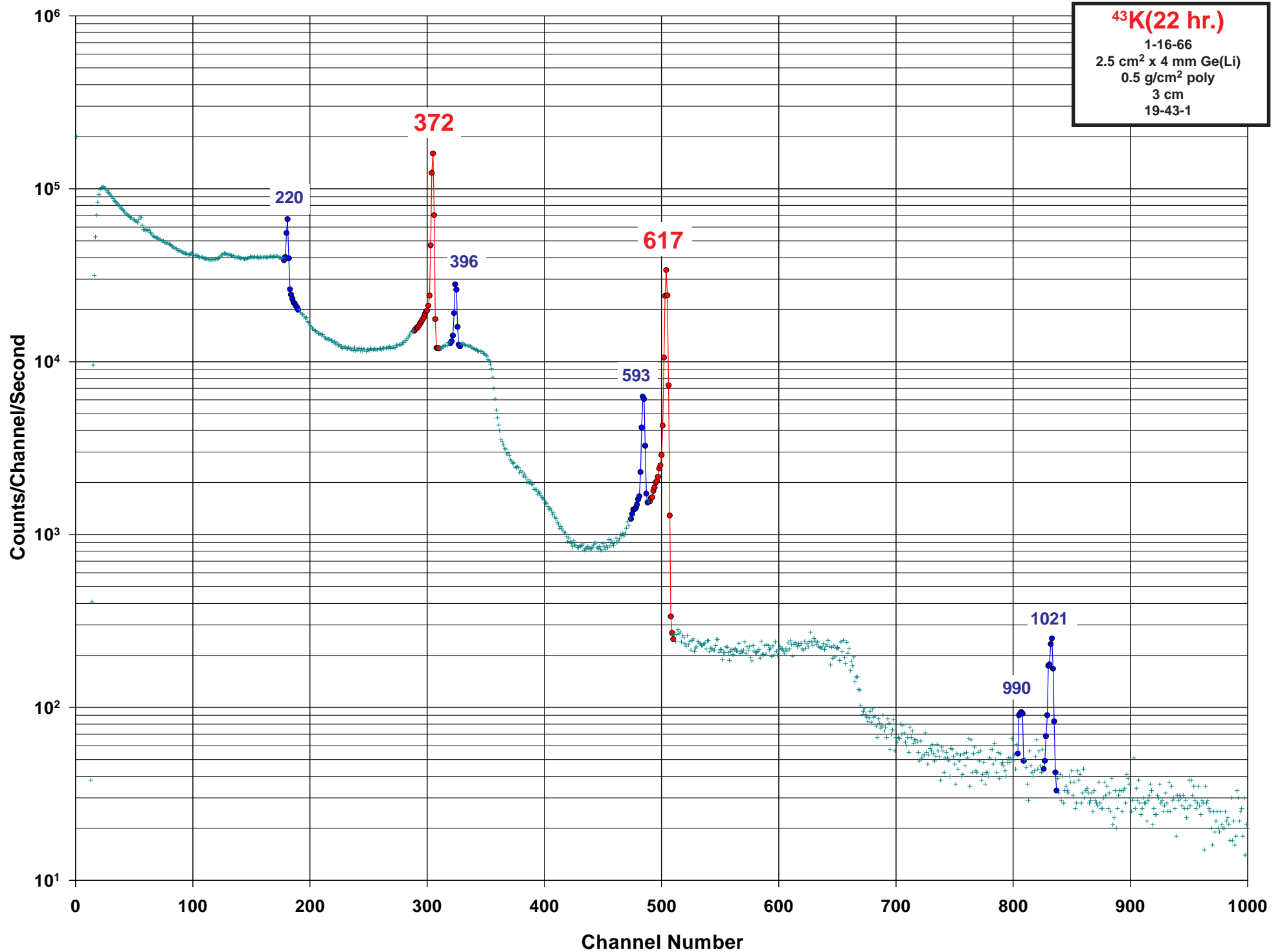
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁴¹K(n, γ)

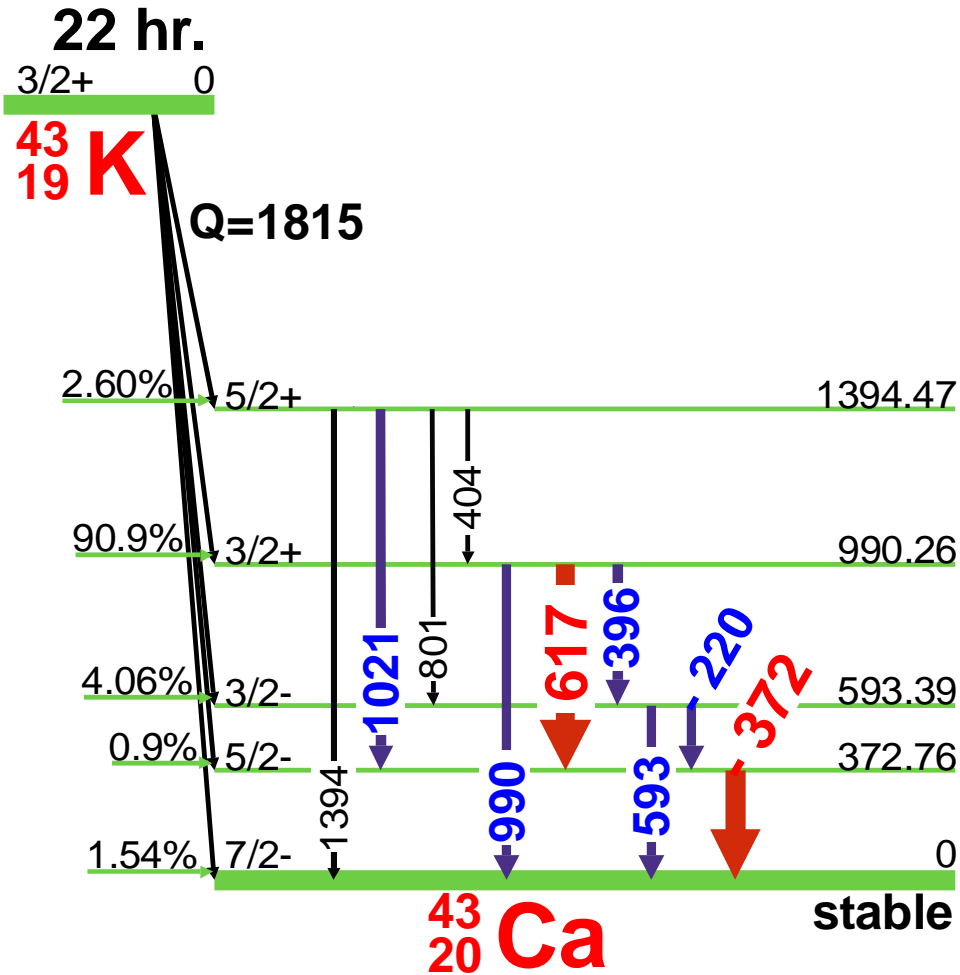
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
312.6		1.68	0.336	0.020	2
586.87			0.0004		4
694.54			0.0033	0.0007	4
899.43		0.304	0.0515	0.0025	3
1022.78		0.162	0.0201	0.0014	4
1227.66			0.0024	0.0011	4
1524.7		100	18.08	0.09	1
1922.18		0.232	0.041	0.004	1
2424.09		0.122	0.0199	0.0029	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁴³K(22 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴³K

Half Life: 22.3(1) hr.

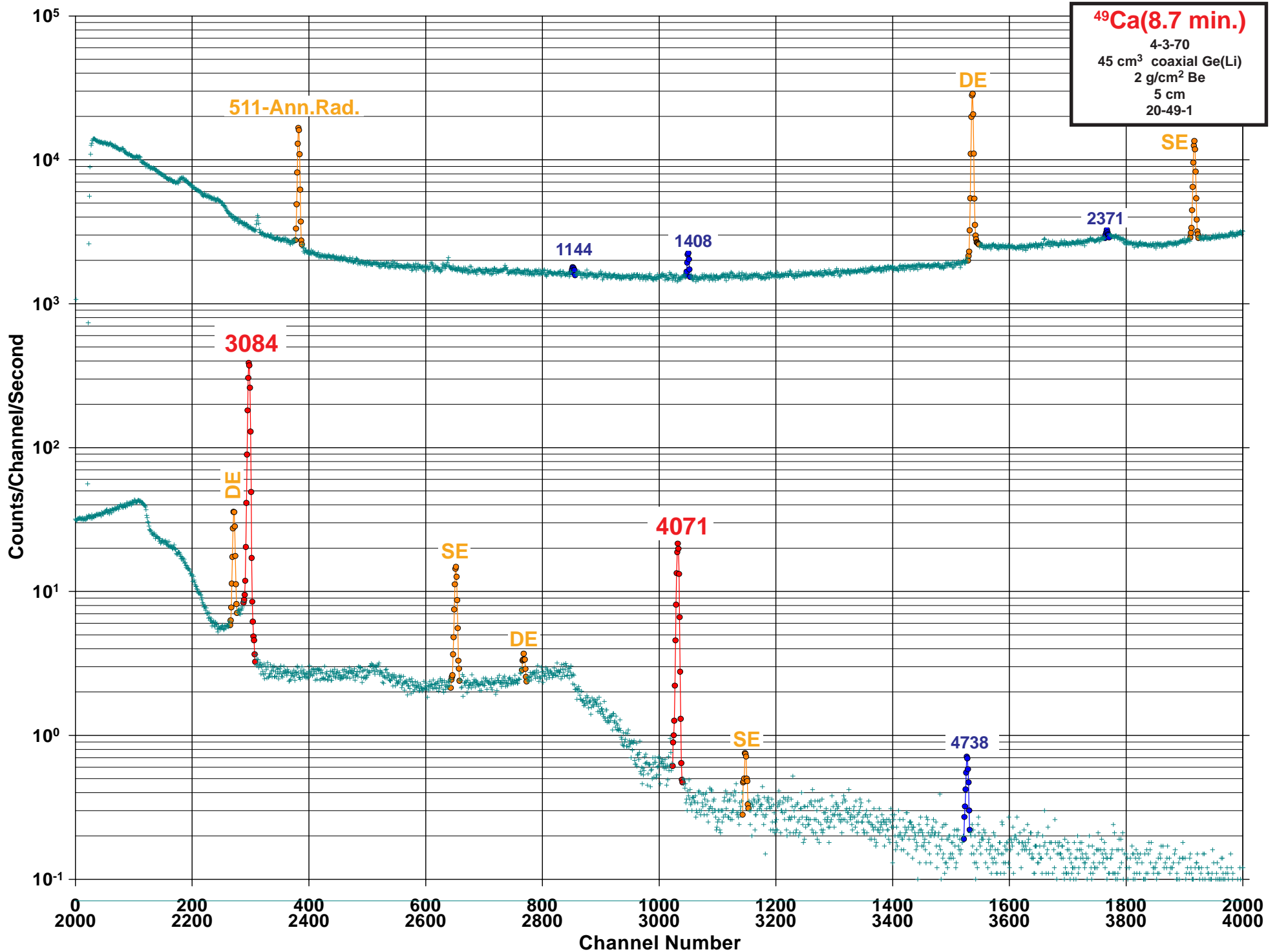
Detector: 2.5cm² x 4 mm Ge(Li)

Method of Production: ⁴⁴Ca (γ,p)

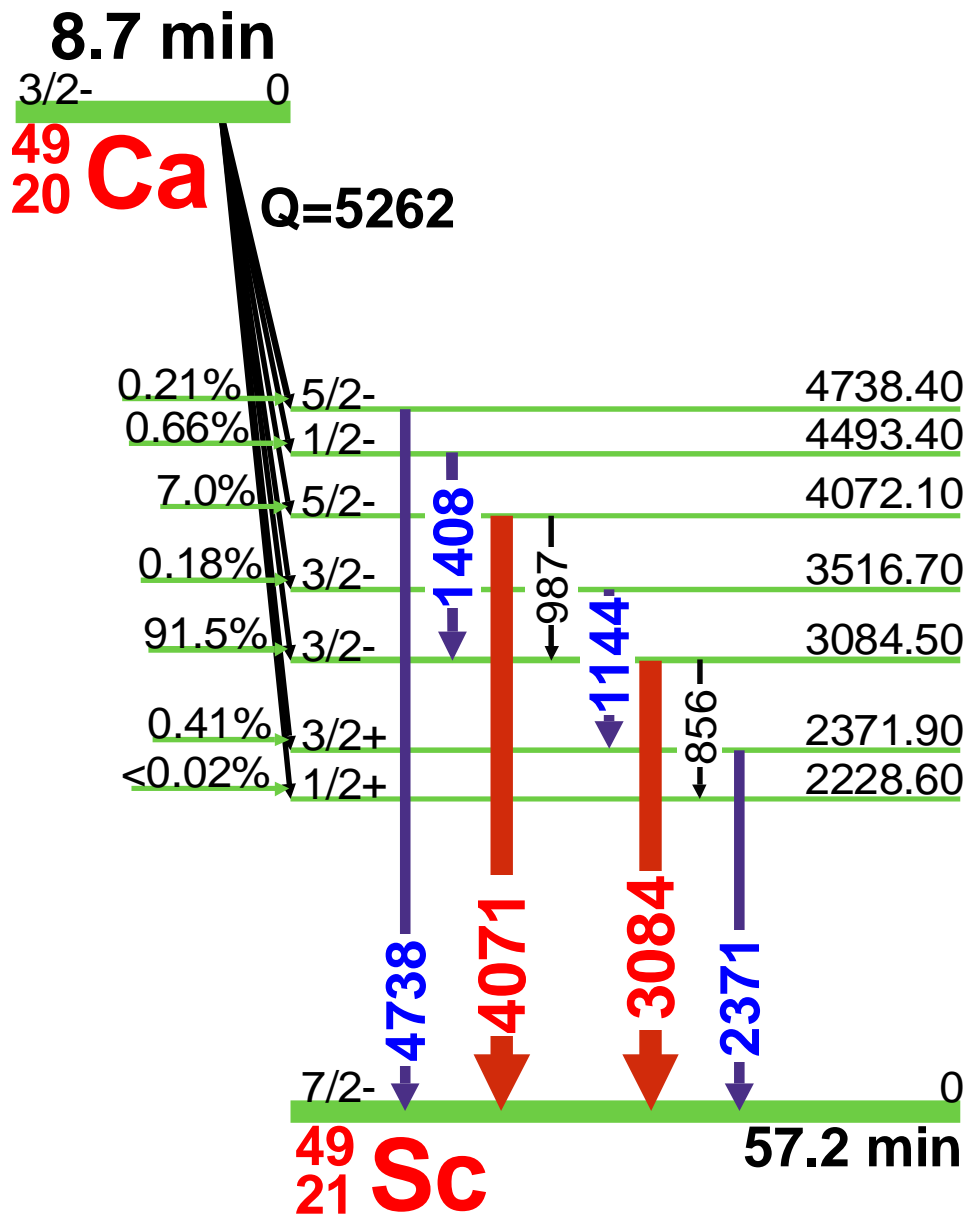
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
220.631		4.0	4.8000	0.0618	3
372.76		100	86.80	0.20	1
396.861		13.7	11.85	0.08	2
404.214			0.365	0.013	4
593.39		14.0	11.26	0.08	3
617.49		94.3	79.2	0.6	1
801.071			0.148	0.013	4
990.245		1.0	0.29	0.03	3
1021.698		2.9	1.962	0.026	2
1394.449			0.131	0.008	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴⁹Ca(8.7 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁹Ca

Half Life: 8.718(6) min.

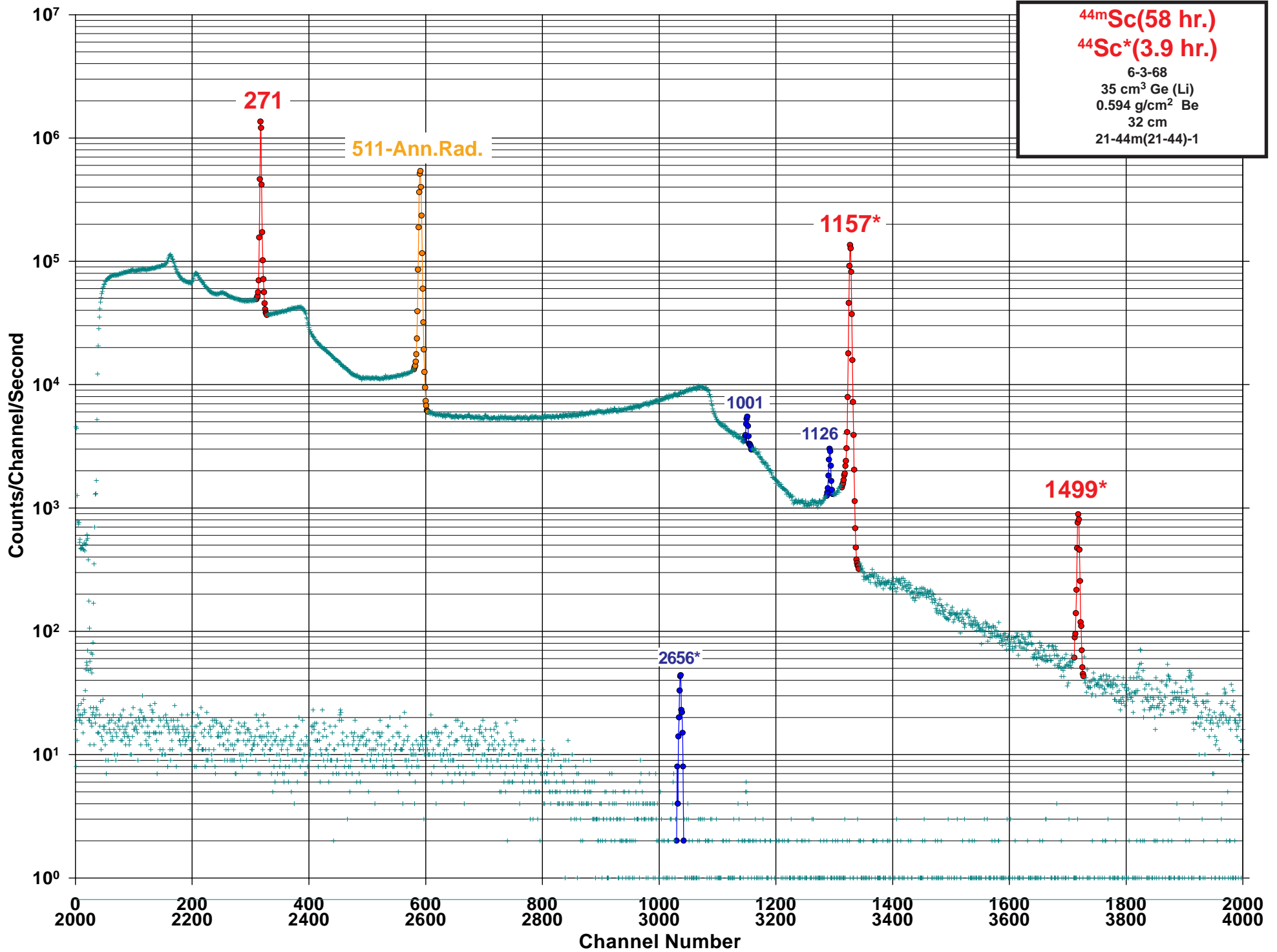
Detector: 45 cm³ coaxial Ge (Li)

Method of Production: ⁴⁸Ca(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
143.20	0.20		0.035	0.009	4
856.1	0.5		0.129	0.028	4
987.3	0.5		0.076	0.028	4
1144.5	0.5		0.110	0.028	4
1288.4	0.5		0.074	0.028	4
1408.9	0.2		0.63	0.06	3
2228.9	0.5		0.19	0.05	4
2371.7	0.5		0.49	0.09	4
3084.40	0.10	100	92.1	1.0	1
4071.90	0.10	8.68	7.0	0.7	1
4493.			0.0645	0.0007	4
4738.20	0.20		0.21	0.06	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{44m}\text{Sc} - ^{44}\text{Sc}^*$

Half Life: 58.6(1) hr., 3.927(8) hr.*

Detector: 35 cm³ Ge (Li)

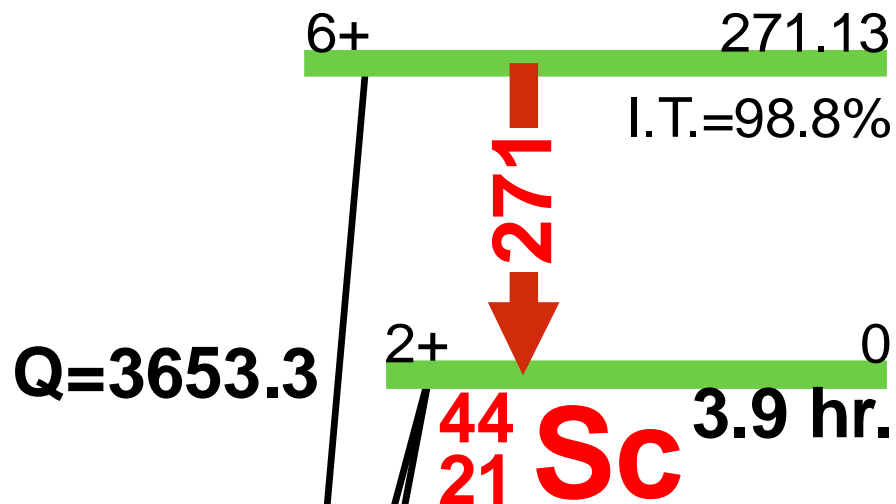
Method of Production: $^{45}\text{Sc}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	271.13		77.9	86.7	0.3	1
Ann.	511.006			186.8	0.6	1
	1001.85		1.14	1.20	0.07	4
	1126.08		1.08	1.20	0.07	3
D	1157.031		100	1,20	0.07	1
*	1157.031			99.9		
*	1499.43		0.90	0.912	0.015	1
	2144.2			0.0069	0.0015	4
*	2656.41		0.14	0.115	0.006	2
	3301.2			0.0031	0.0015	4

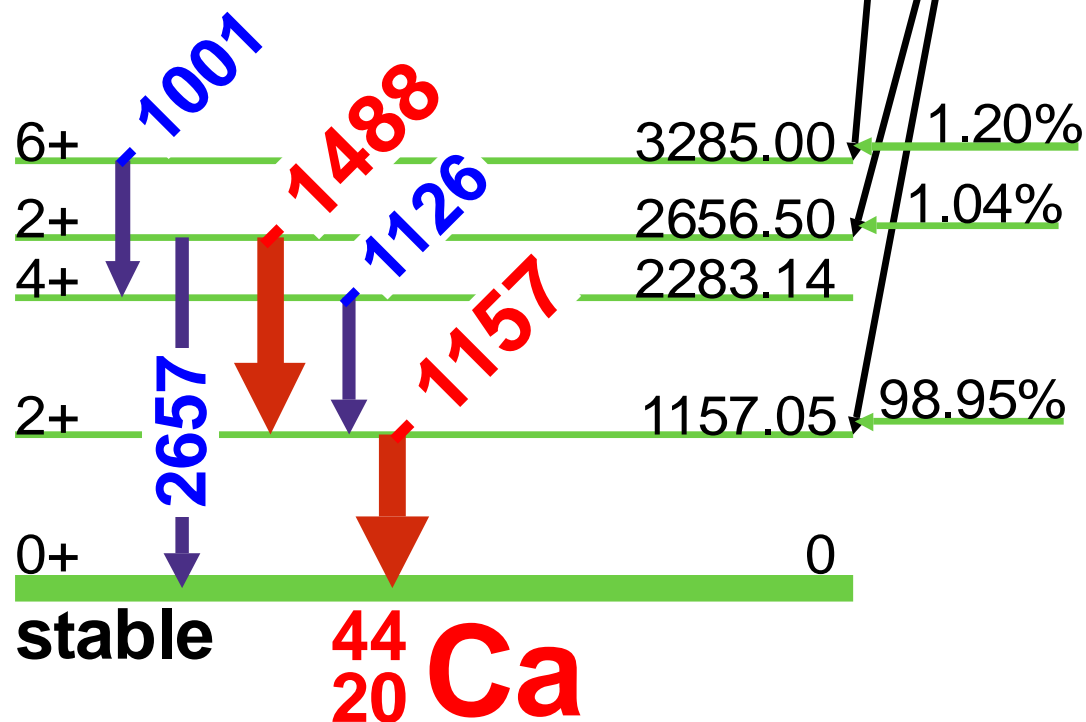
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

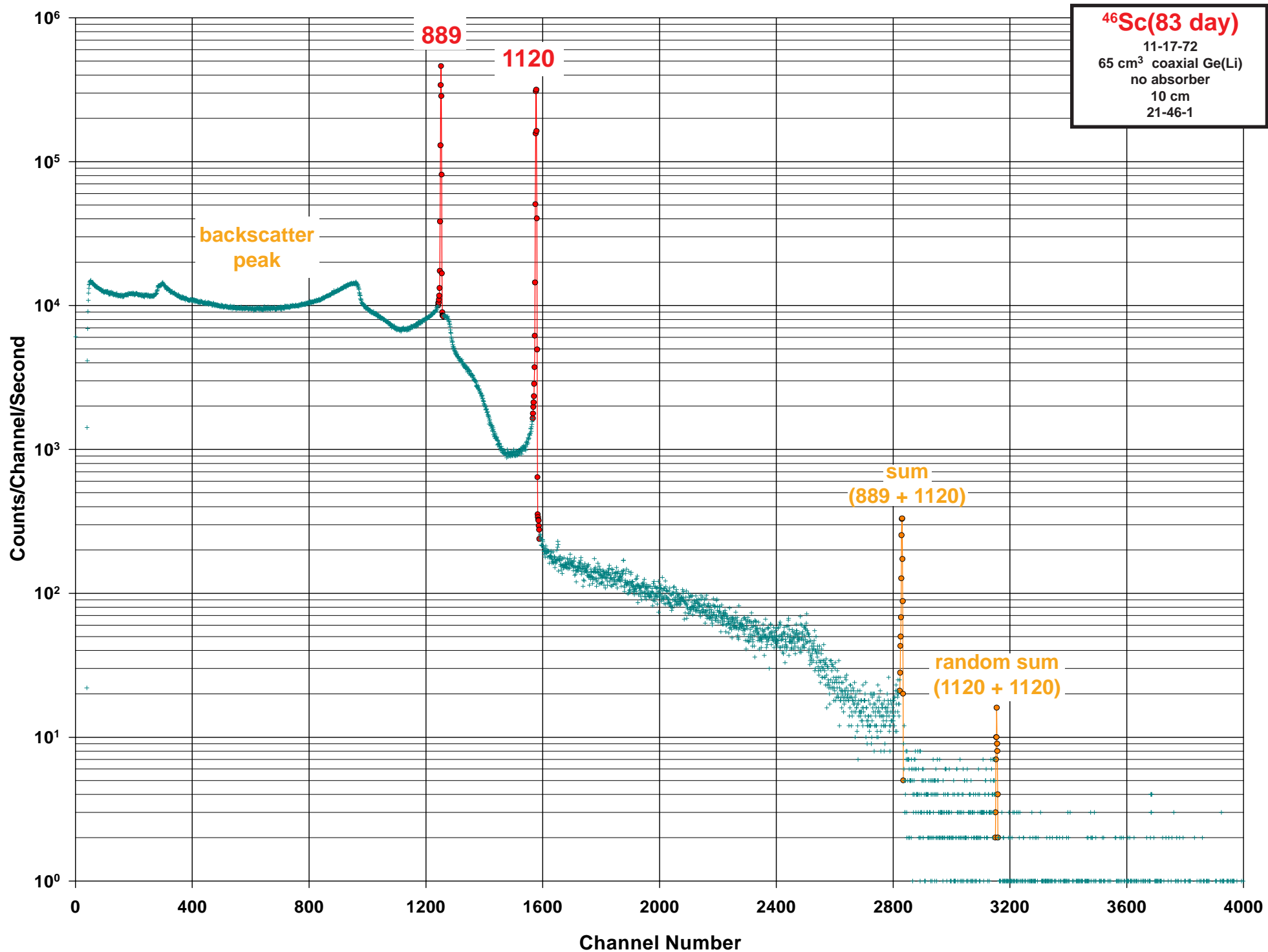
$^{44m}\text{Sc}(58 \text{ hr.})$ Decay Scheme

58 hr.



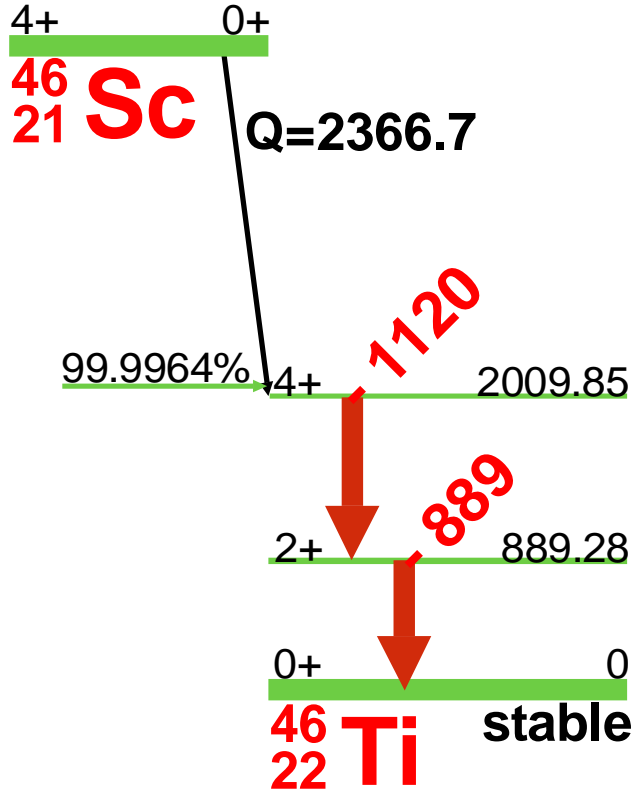
$^{44}\text{Sc}(3.9 \text{ hr.})$ Decay Scheme





⁴⁶Sc(83 day) Decay Scheme

83 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁶Sc

Half Life: 83.79(4) day

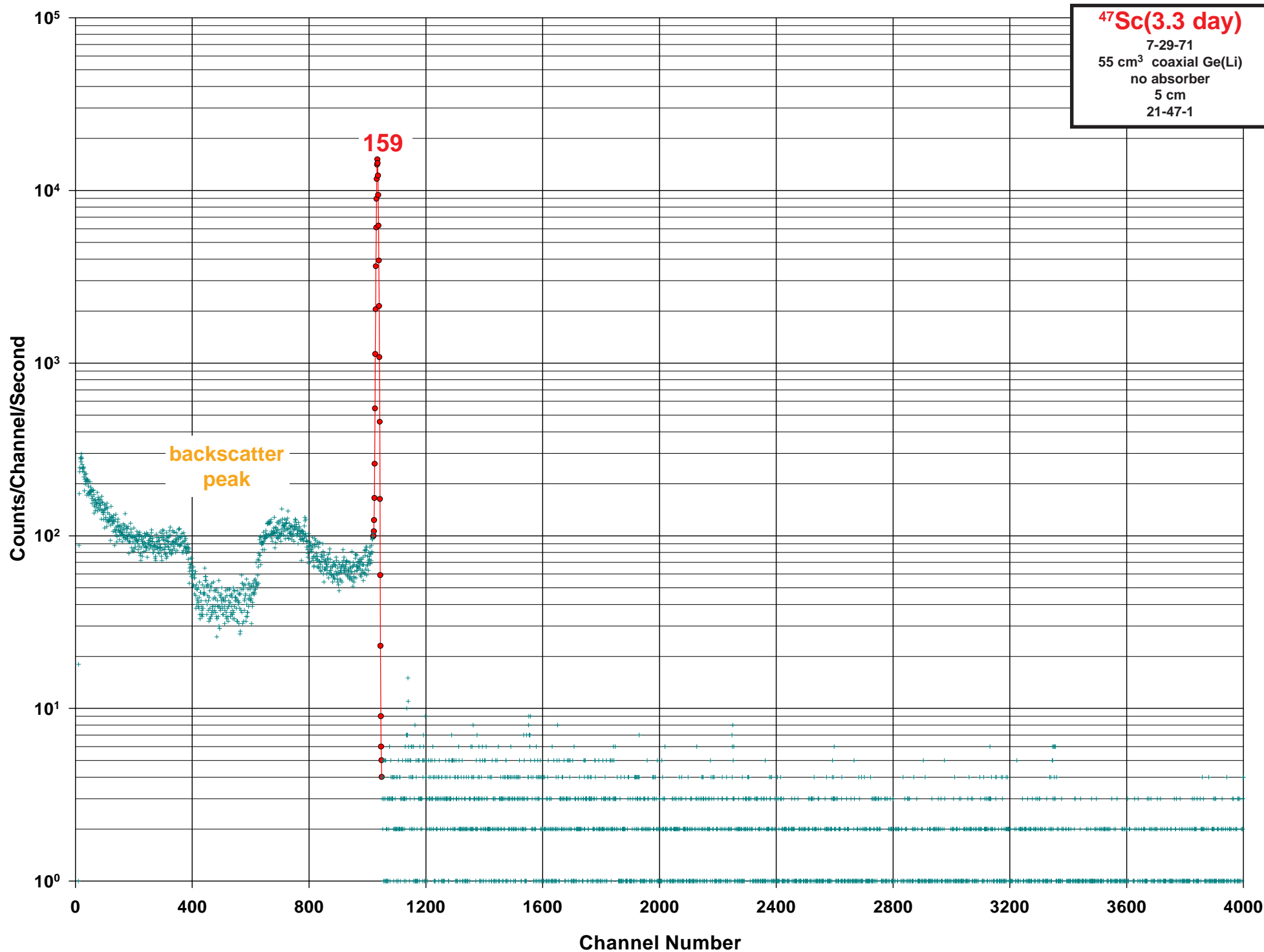
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ⁴⁵Sc(n,γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
889.277	0.003	100	99.984	0.0010	1
1120.545	0.004	100	99.9870	0.0010	1
2010.					

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁴⁷Sc(3.3 day) Decay Scheme

3.3 day

7/2- 0

**47
21 Sc**

Q=600.1

68.4% 7/2- 159.38

31.6% 5/2- 0

**47
22 Ti** stable



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁷Sc

Half Life: 3.3492(6) day

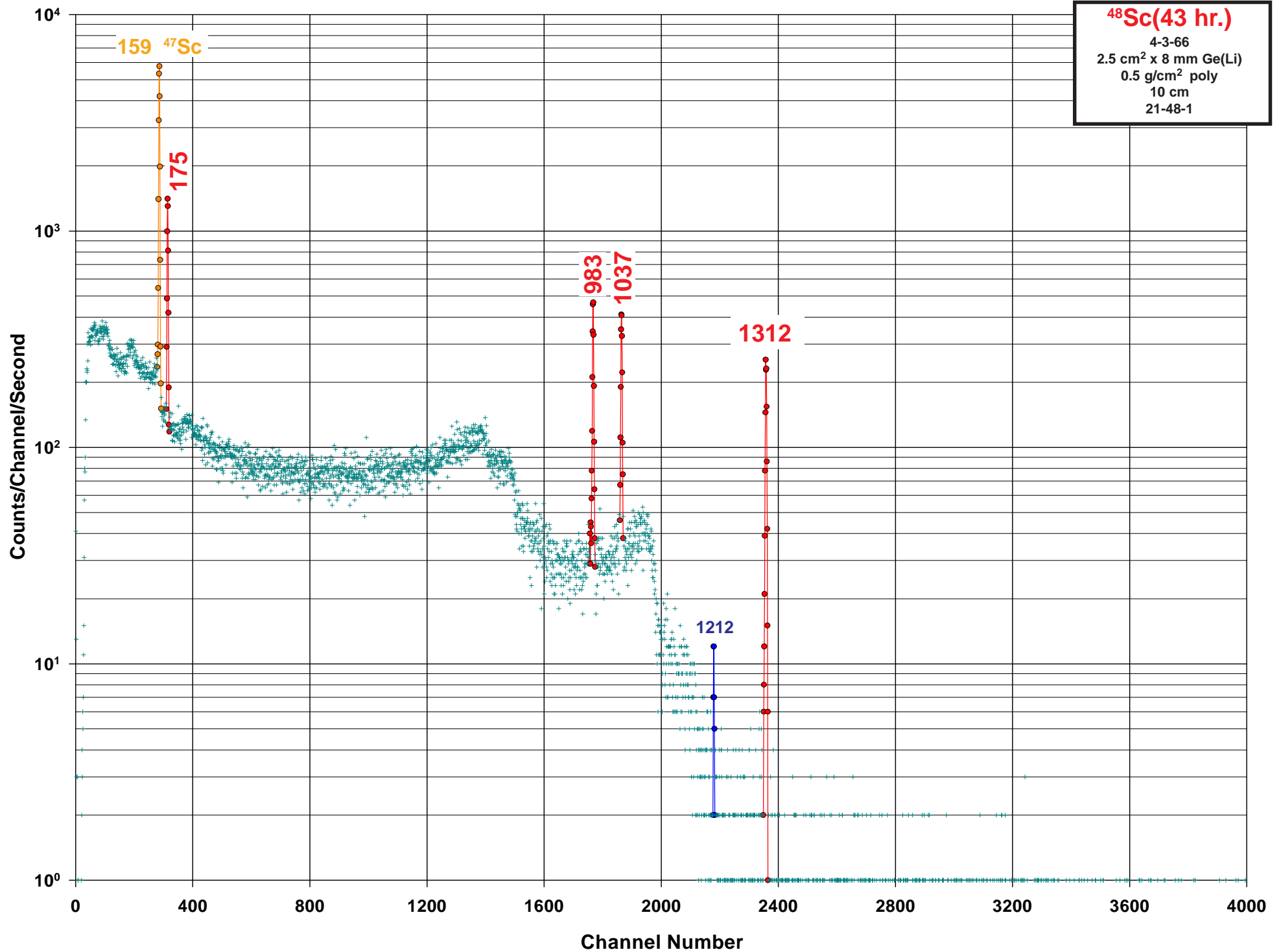
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁴⁸Ti(γ,p)

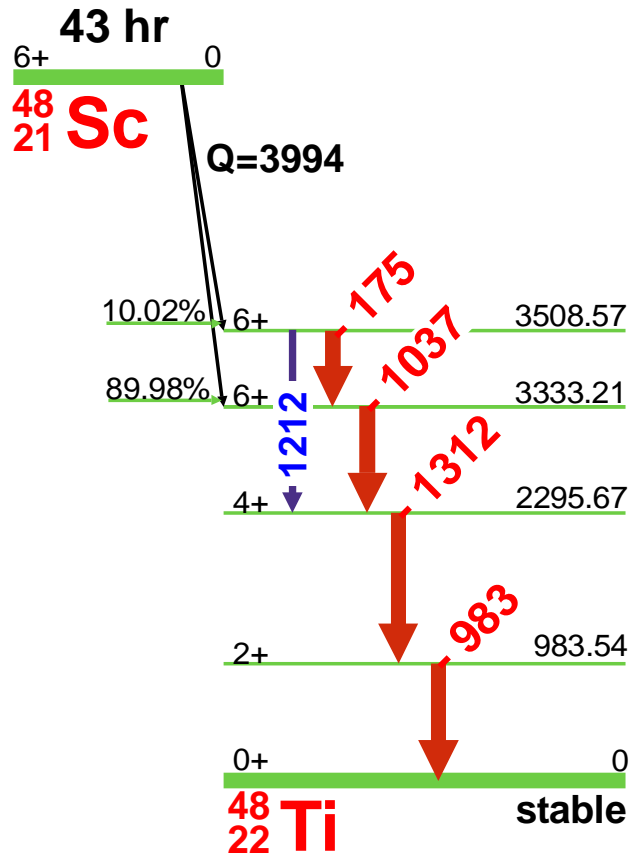
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
159.381	0.015	100	68.3	0.4	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴⁸Sc(43 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁸Sc

Half Life: 43.67(9) hr.

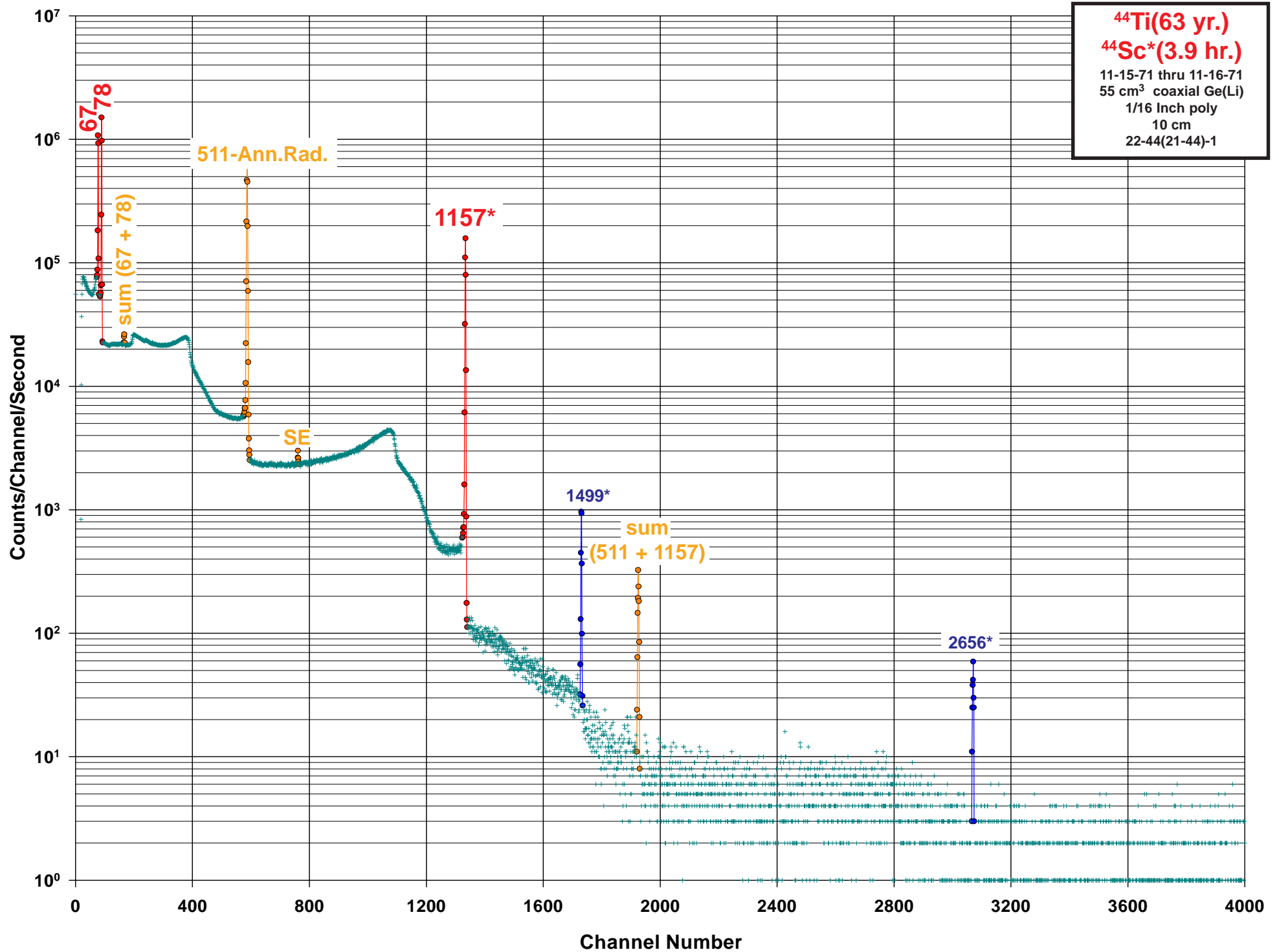
Detector: 2.5 cm² X 8 mm Ge (Li)

Method of Production: ⁴⁹Ti (γ,p)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
175.361	0.005	7.69	7.48	0.10	1
983.526	0.012	99	100.1	0.6	1
1037.522	0.012	100	97.6	0.7	1
1212.880	0.012		2.38	0.04	4
1312.120	0.012	98	100.1	0.7	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{44}\text{Ti} - ^{44}\text{Sc}^*$

Half Life: 63(3) yr. - 3.927(8) hr.*

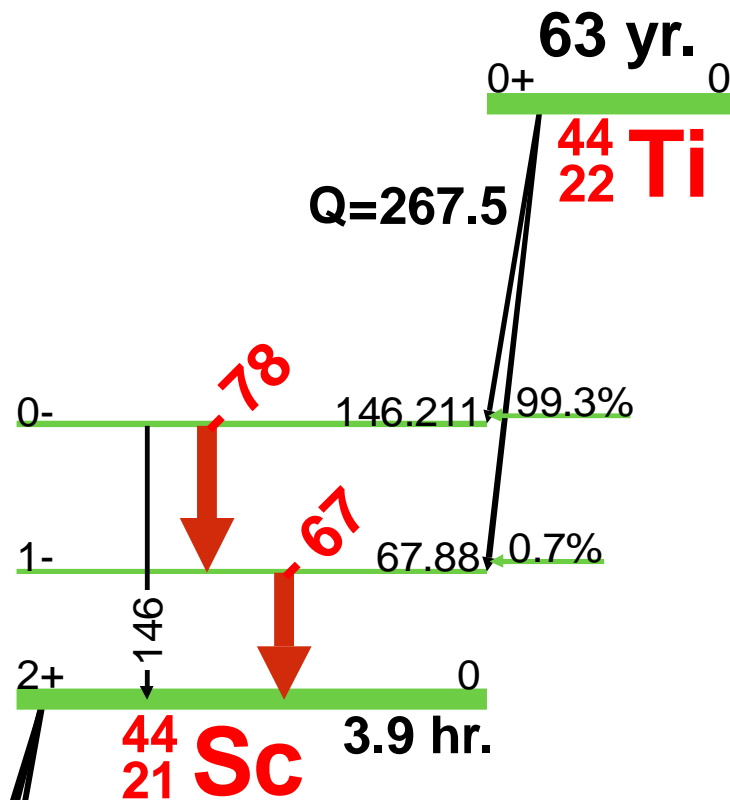
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: $^{45}\text{Sc}(p,2n)$

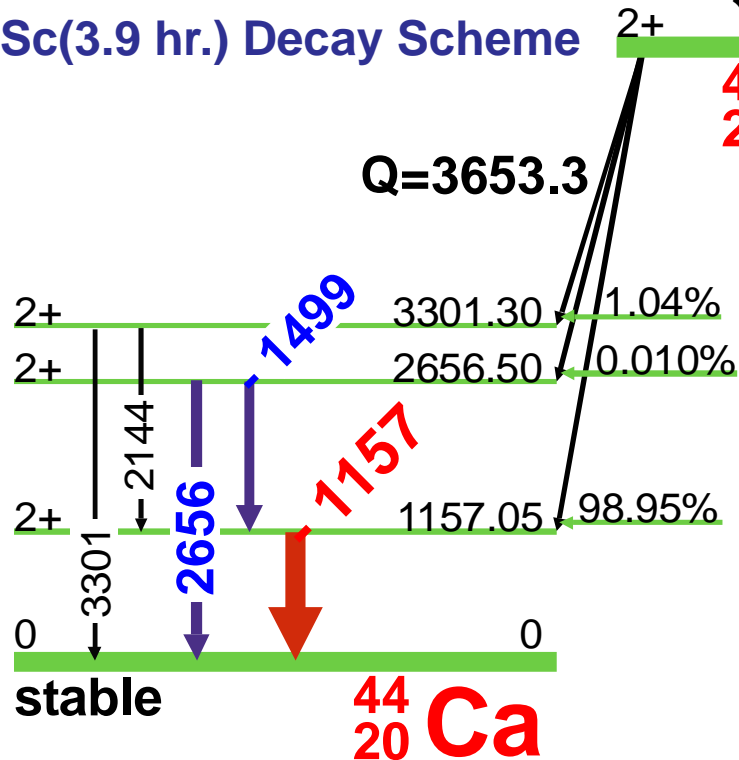
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	67.875	0.005	90.14	94.4	1.5	1
	78.337	0.003	95.18	96.2	0.3	1
	146.212	0.005		0.090	0.006	4
Ann.	511.006			186.8	0.6	1
*	1157.031		100	99.9		1
*	1499.43		0.90	0.912	0.015	2
*	2144.2			0.0069	0.0015	4
*	2656.41		0.14	0.115	0.006	2
*	3301.2			0.0031	0.0015	4

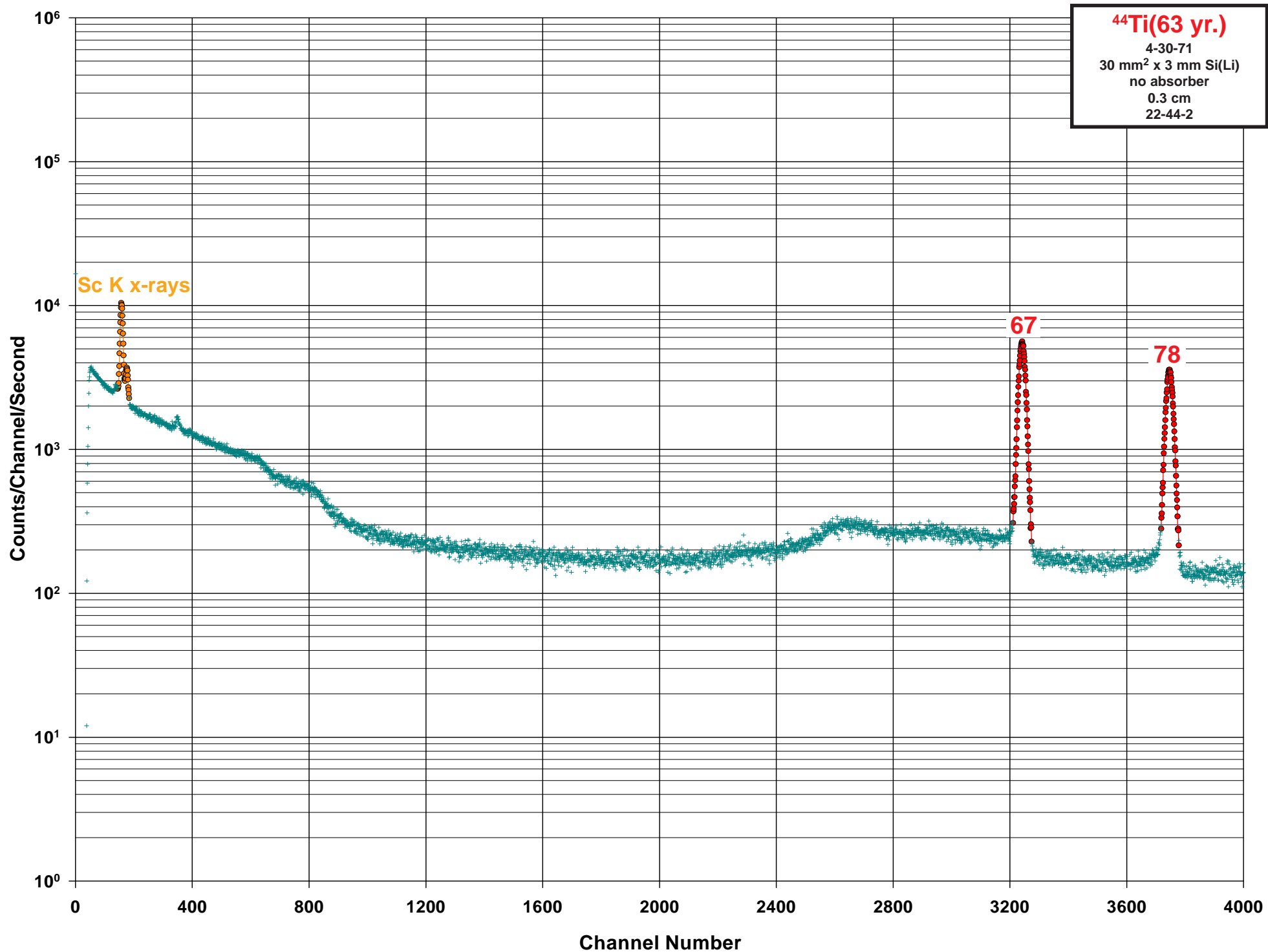
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

^{44}Ti (49 yr.) Decay Scheme

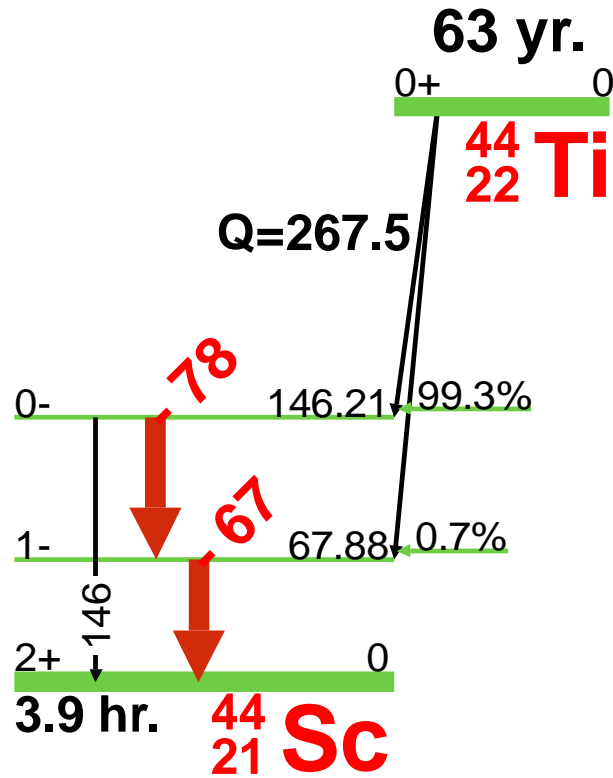


^{44}Sc (3.9 hr.) Decay Scheme





⁴⁴Ti(49 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁴Ti

Half Life: 63(3) yr.

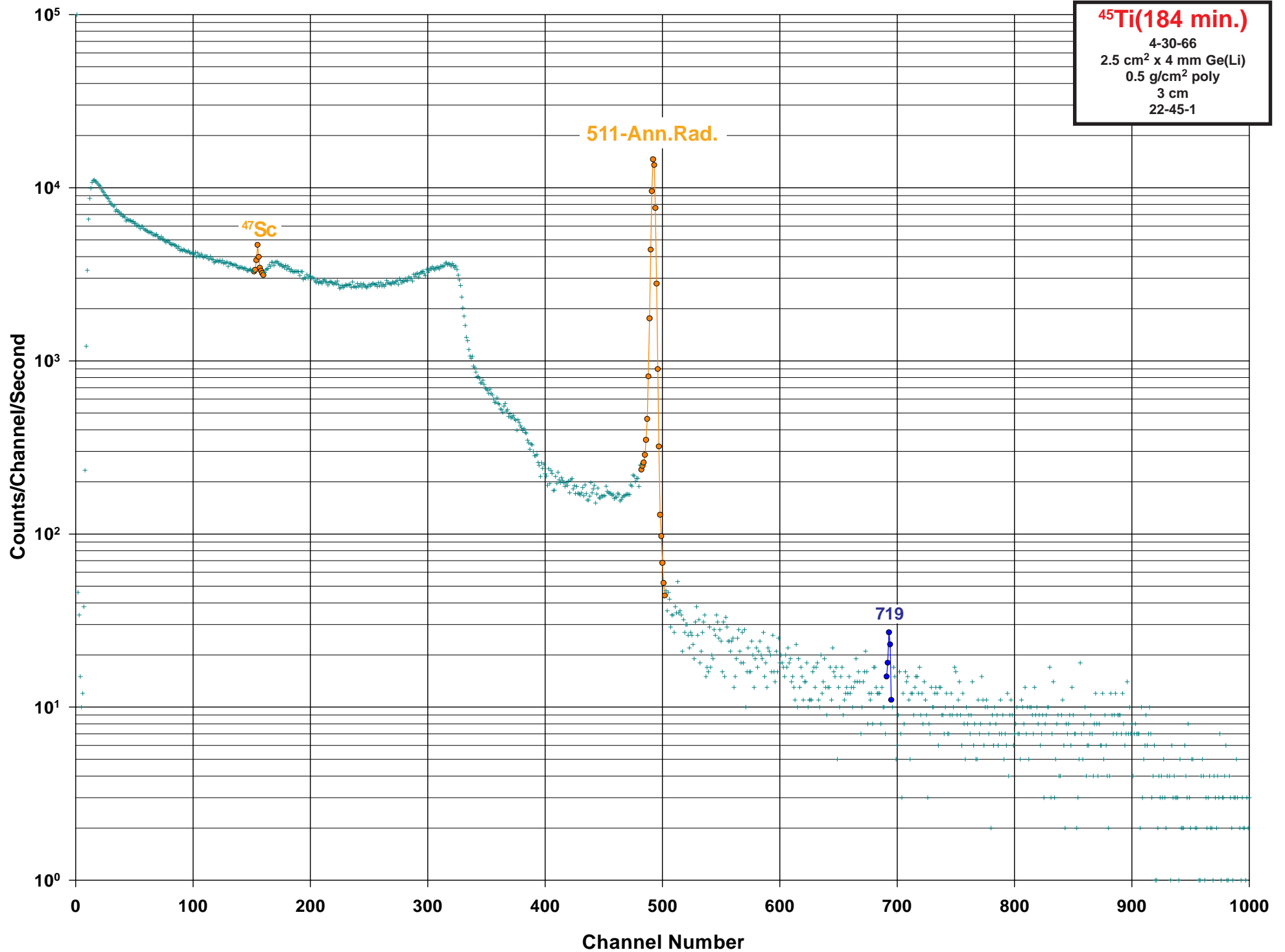
Detector: 30 mm² x 3 mm Si(Li)

Method of Production: ⁴⁵Sc(p,2n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
67.875	0.005	94	94.4	1.5	1
78.337	0.003	100	96.2	0.3	1
146.212	0.005		0.090	0.006	4

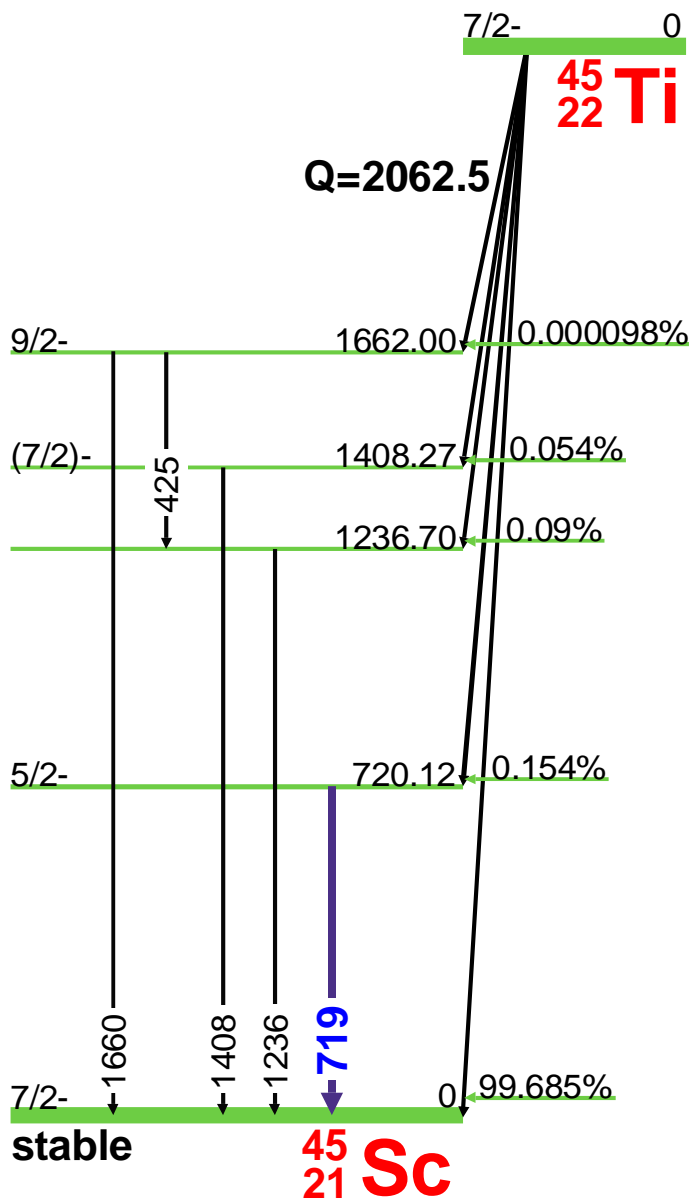
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁴⁵Ti(184 min.) Decay Scheme

184 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁵Ti

Half Life: 184.8(5) hr.

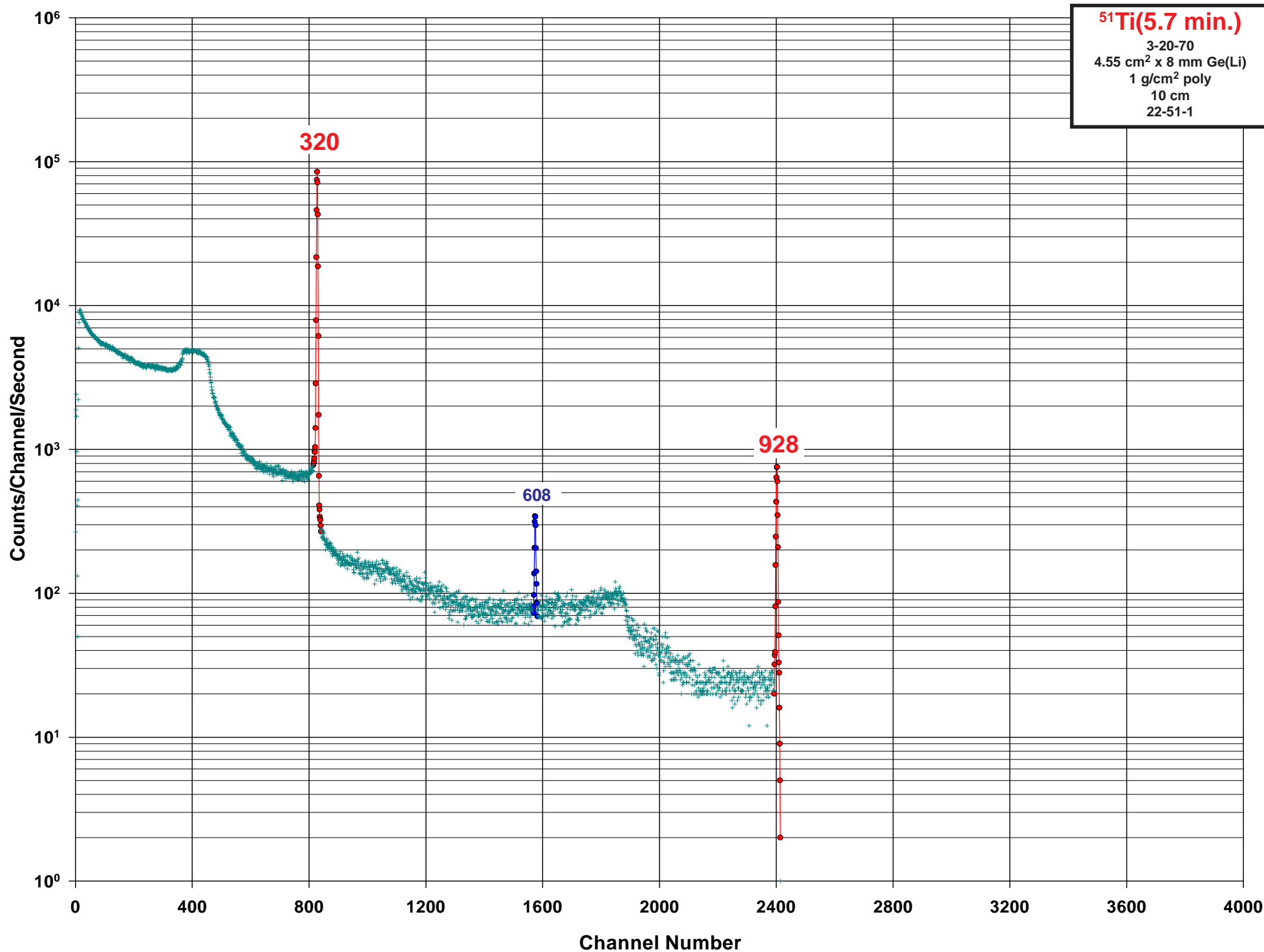
Detector: 2.5 cm² x 4 mm. Ge(Li)

Method of Production: ⁴⁶Ti(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	364.0	1.0		0.0057	0.0013	4
	425.0	1.0		0.0137	0.0020	4
	432.0	0.0		0.0014	0.0008	4
Ann.	511.006		100	168.0	0.6	1
	530.0	1.0		0.0011	0.0004	4
	543.0	1.0		0.0009	0.0004	4
	719.6	0.3		0.154	0.012	3
	961.6	0.6		0.0030	0.0004	4
	974.0	0.5		0.0058	0.0007	4
	1032.1	0.5		0.0048	0.0006	4
	1236.5	0.5		0.0118	0.0013	4
	1408.1	0.3		0.085	0.009	4
	1660.9	0.3		0.041	0.004	4
	1789.			0.0001		4
	1801.					4

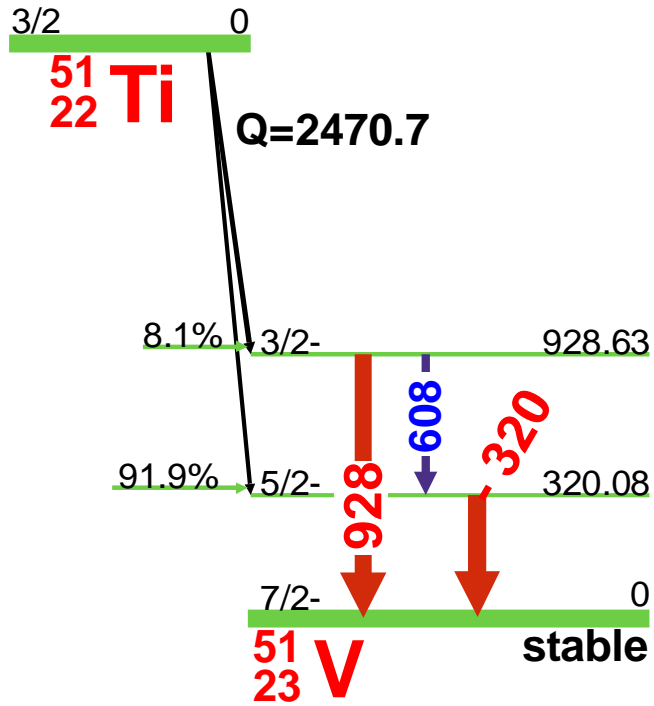
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵¹Ti(5.7 min.) Decay Scheme

5.7 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵¹Ti

Half Life: 5.76(1) min.

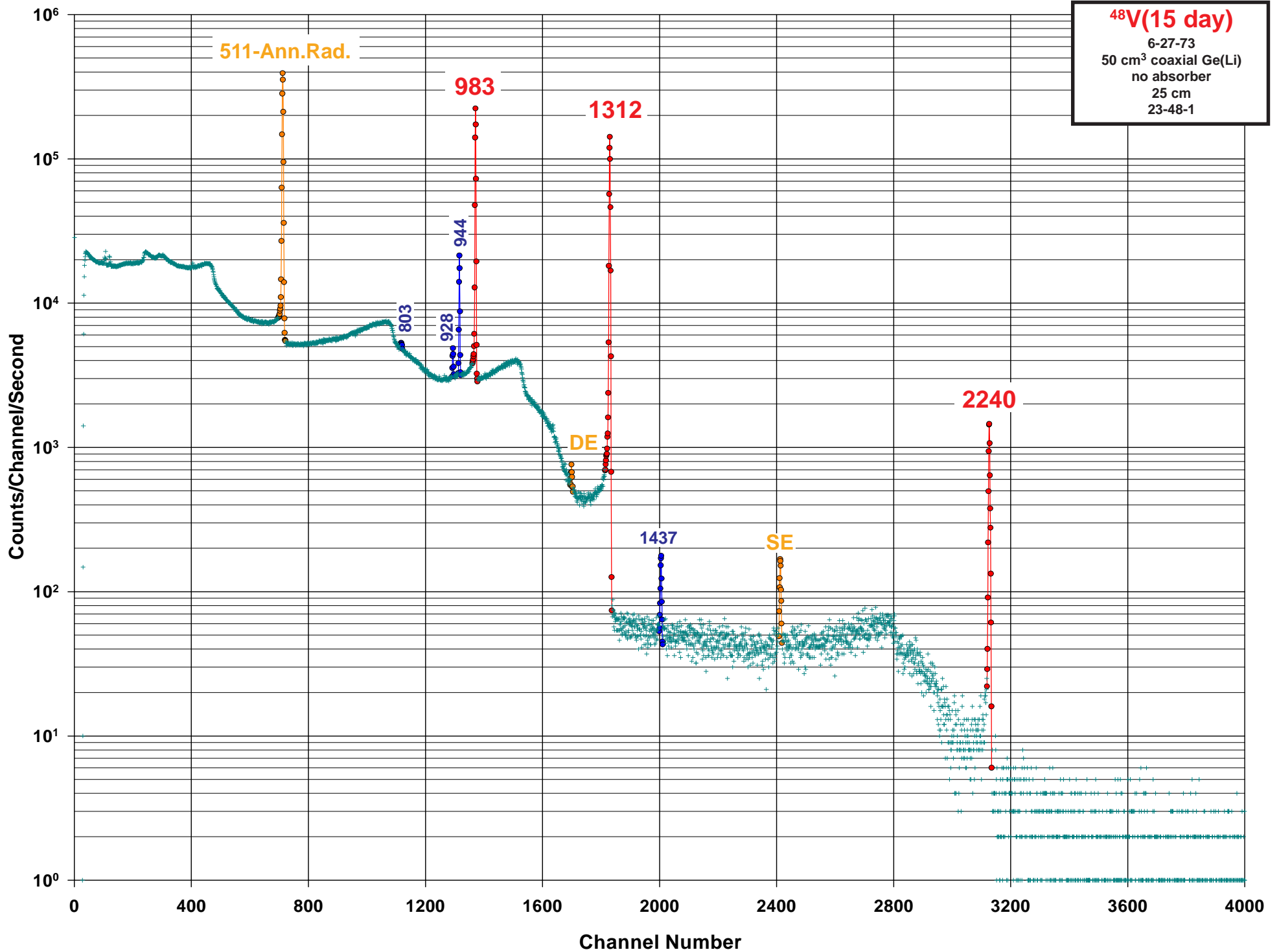
Detector: 4.55 cm² x 8 mm Ge(Li)

Method of Production: ⁵⁰Ti(n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
320.076	0.006	100	93.1	0.4	1
608.55	0.05	1.27	1.18	0.09	3
928.63	0.06	7.41	6.9	0.4	1

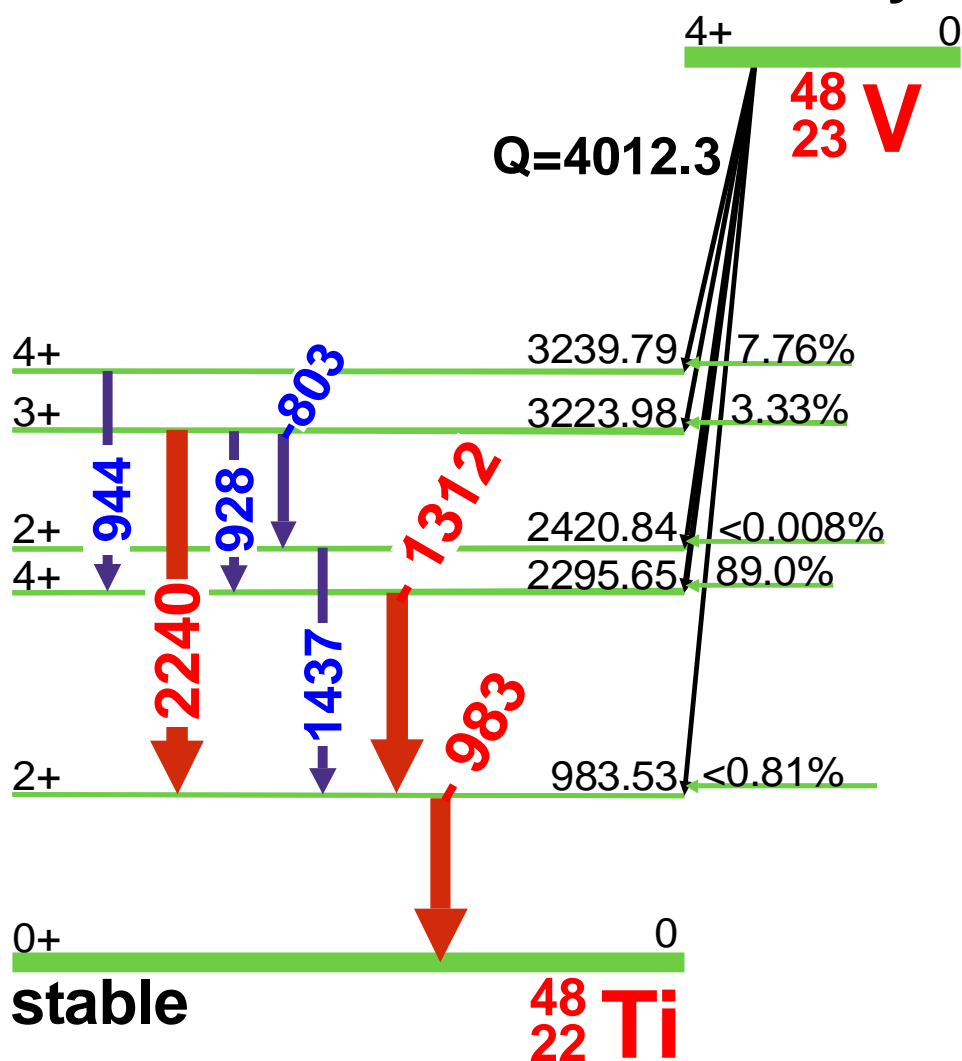
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁴⁸V(15 day) Decay Scheme

15 day



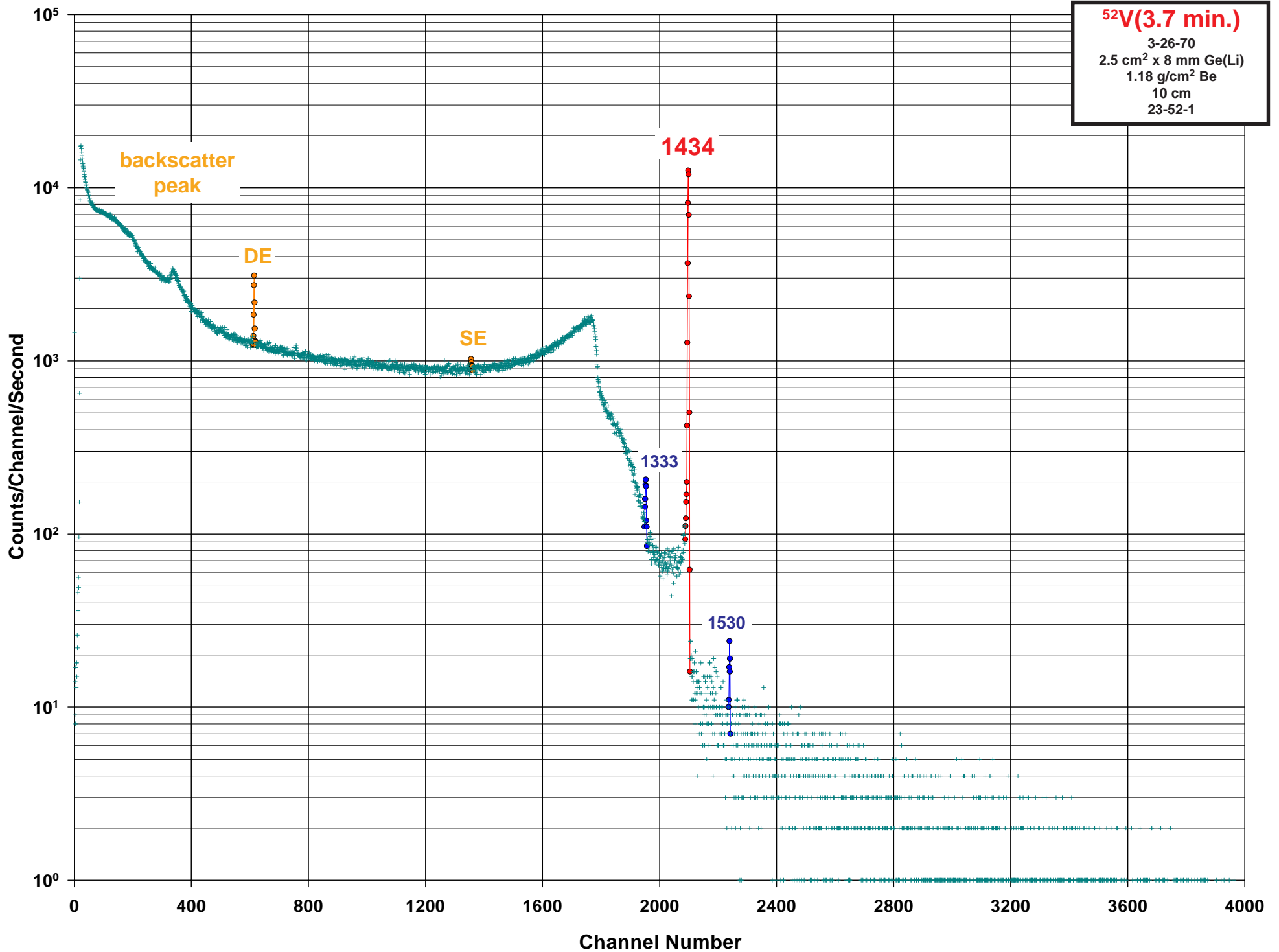
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁸V Half Life: 15.9735(2) day
 Detector: 50 cm³ coaxial Ge (Li) Method of Production: ⁴⁸Ti(p,n)

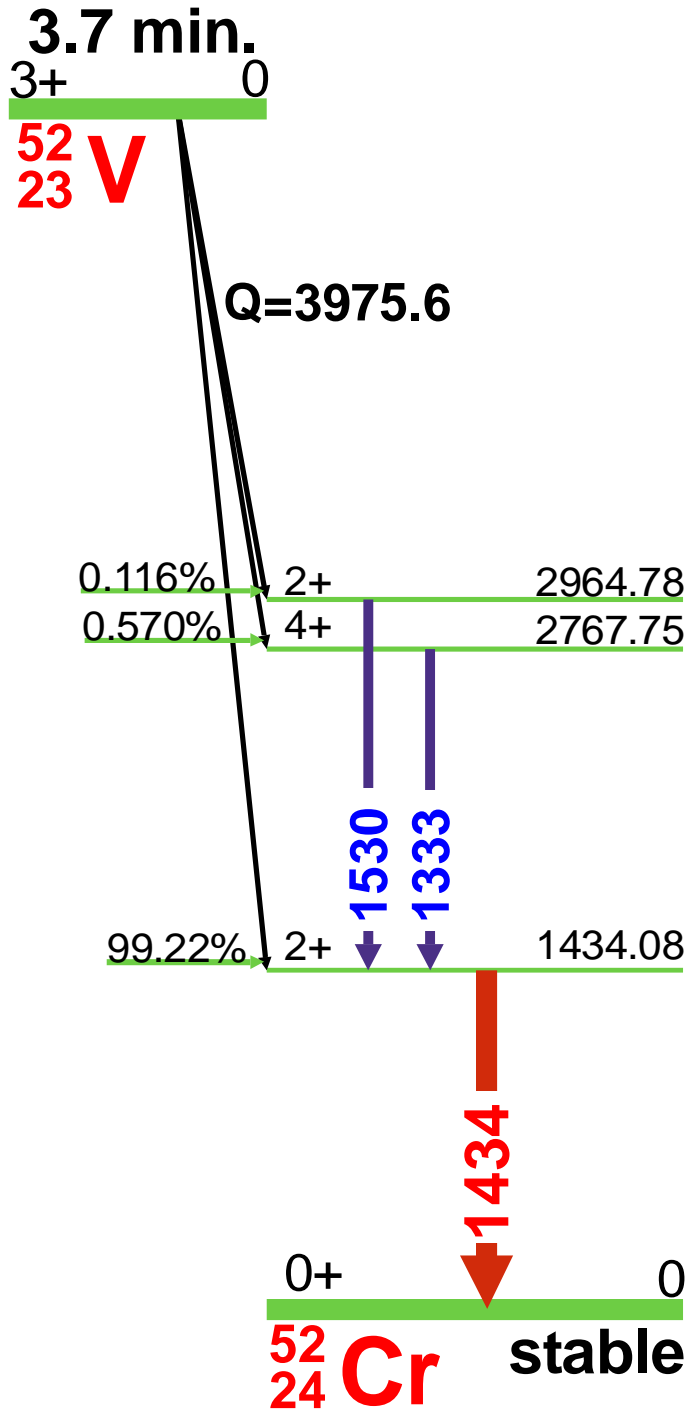
Ann.	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	511.006			99.6	1.6	1
	803.25	0.08		0.150	0.020	4
	928.327	0.005	0.762	0.77	0.05	3
	938.			0.0008	0.0005	4
	944.132	0.005	7.75	7.76	0.09	2
	983.521	0.007	100	99.98	0.28	1
	1063.90	0.10		0.0050	0.0010	4
	1312.096	0.006	99.9	97.5	0.8	1
	1437.35	0.07		0.120	0.020	3
	2240.395	0.008	2.39	2.41	0.04	1
	2375.1	0.5		0.010	0.005	4
	2421.8	0.5		0.010	0.005	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵²V(3.7 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵²V

Half Life: 3.743(5) min.

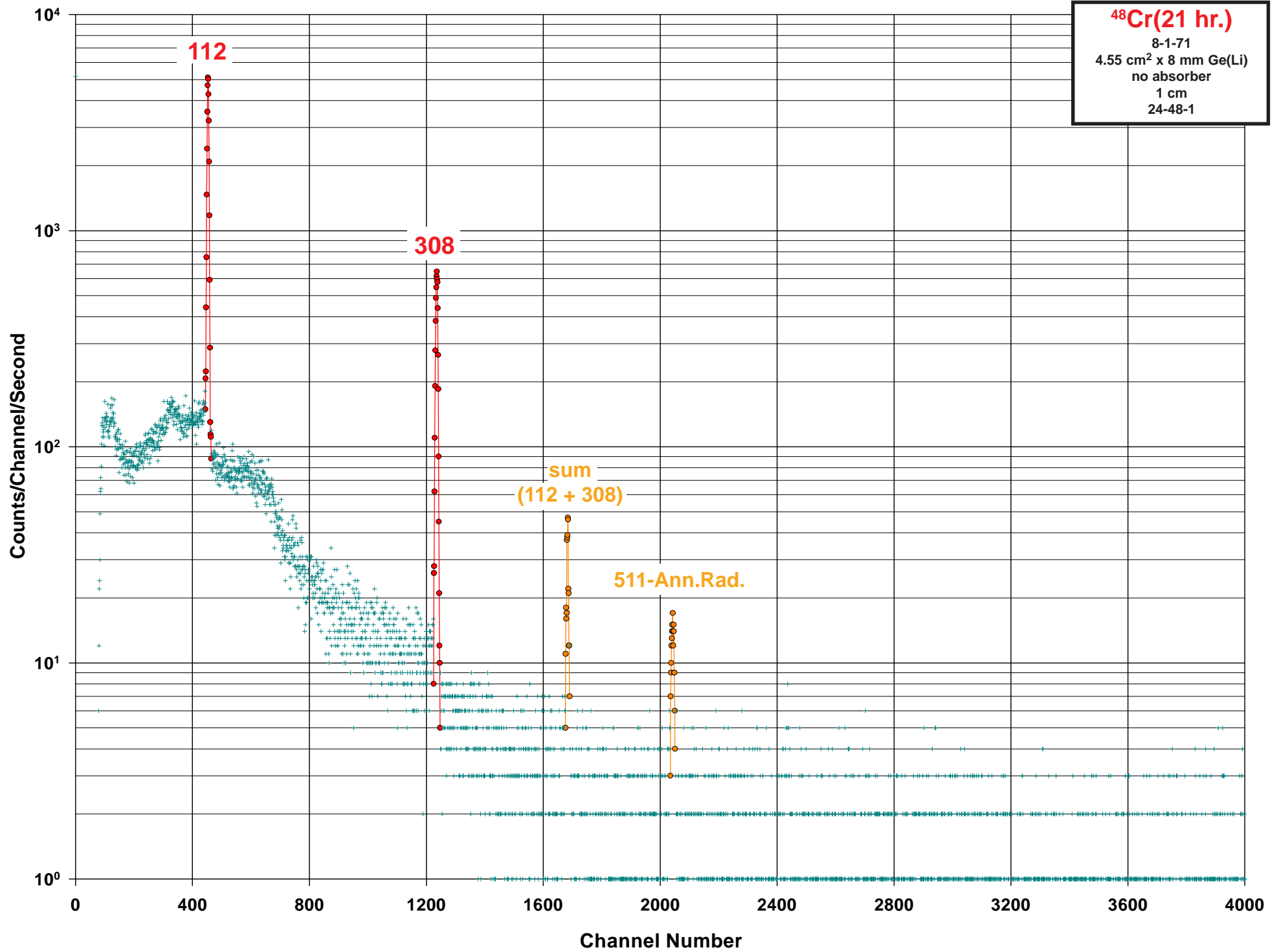
Detector: 2.5 cm² x 8 mm Ge(Li)

Method of Production: ⁵¹V(n,γ)

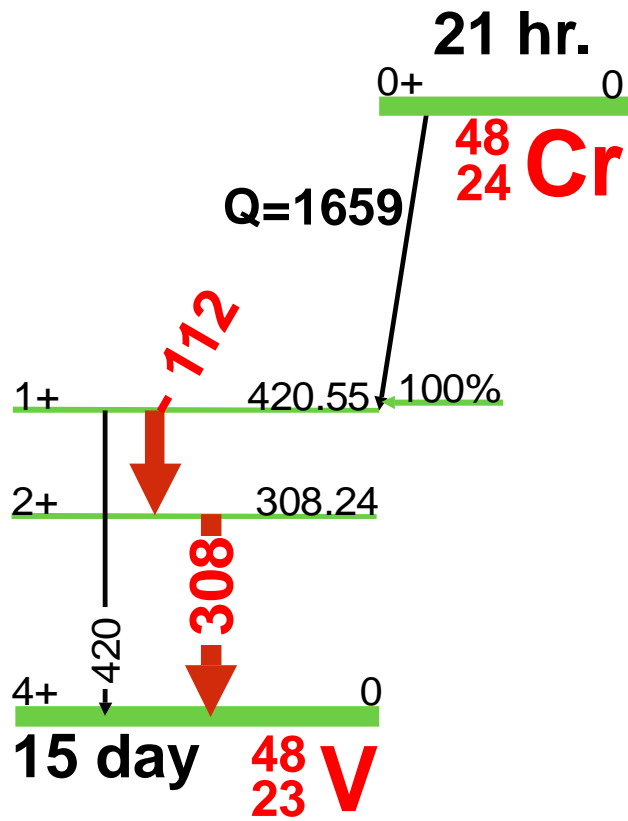
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
398.08	0.09		0.0080	0.0010	4
647.45	0.02		0.0240	0.0020	4
704.6	0.3		0.0018	0.0009	4
766.0	1.0				4
935.520	0.020		0.061	0.003	4
1045.72	0.05		0.0100	0.0001	4
1212.9					4
1333.62	0.03	0.6	0.5880	0.012	3
1434.060	0.010	100	100.0	1.4	1
1530.670	0.010	0.2	0.1160	0.0023	3
1727.52	0.15		0.0070	0.0010	4
1981.1	0.4		0.0050	0.0010	4
2337.7	0.5		0.0015	0.0009	4
2965.0	1.0		0.0005	0.0002	4
3161.7	0.4		0.0009	0.0002	4
3772.0	1.0		0.0010	0.0005	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁴⁸Cr(21 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁸Cr

Half Life: 21.56(3) hr.

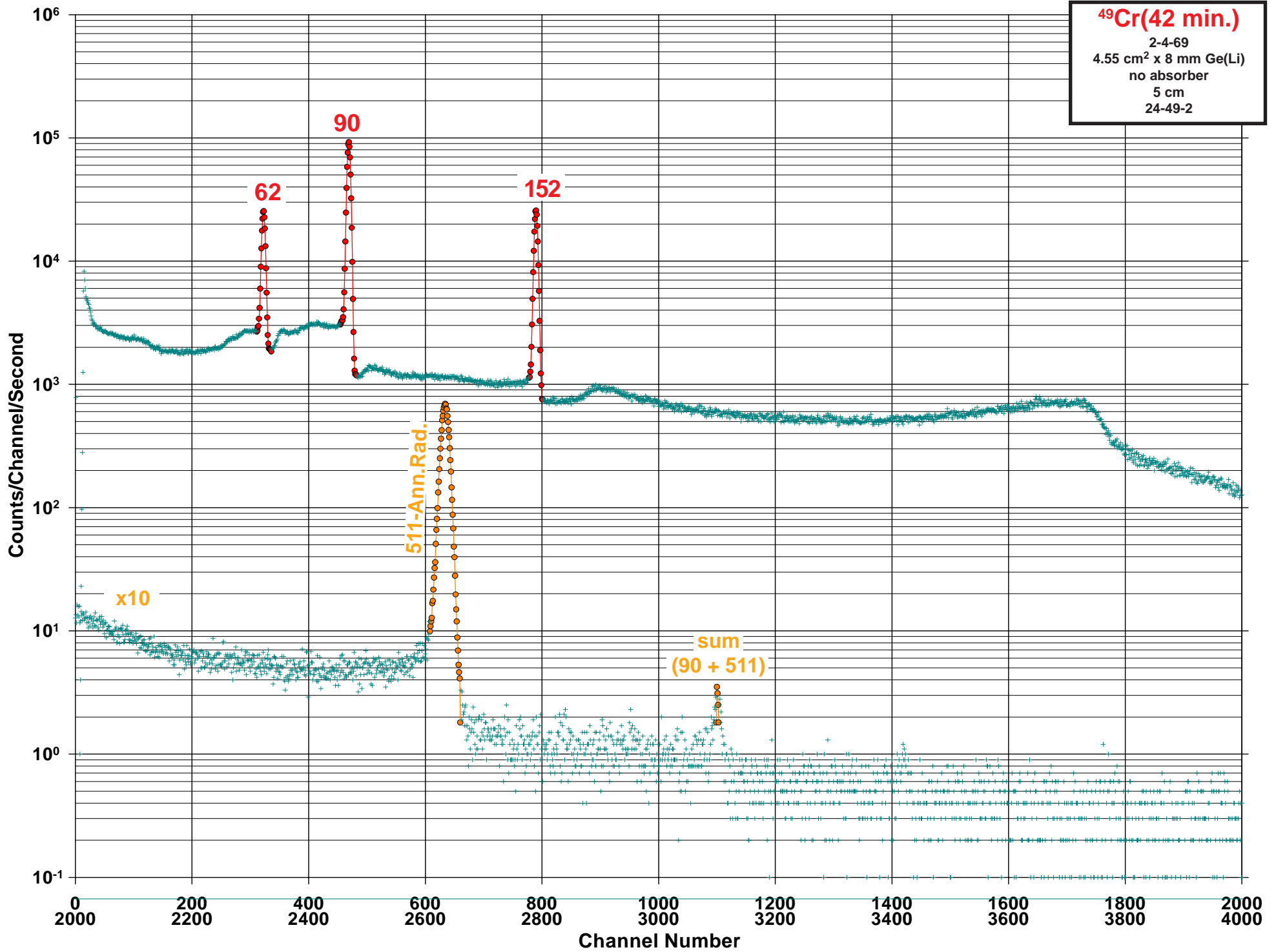
Detector: 4.55 cm² x 8 mm Ge(Li)

Method of Production: V(p,xn)

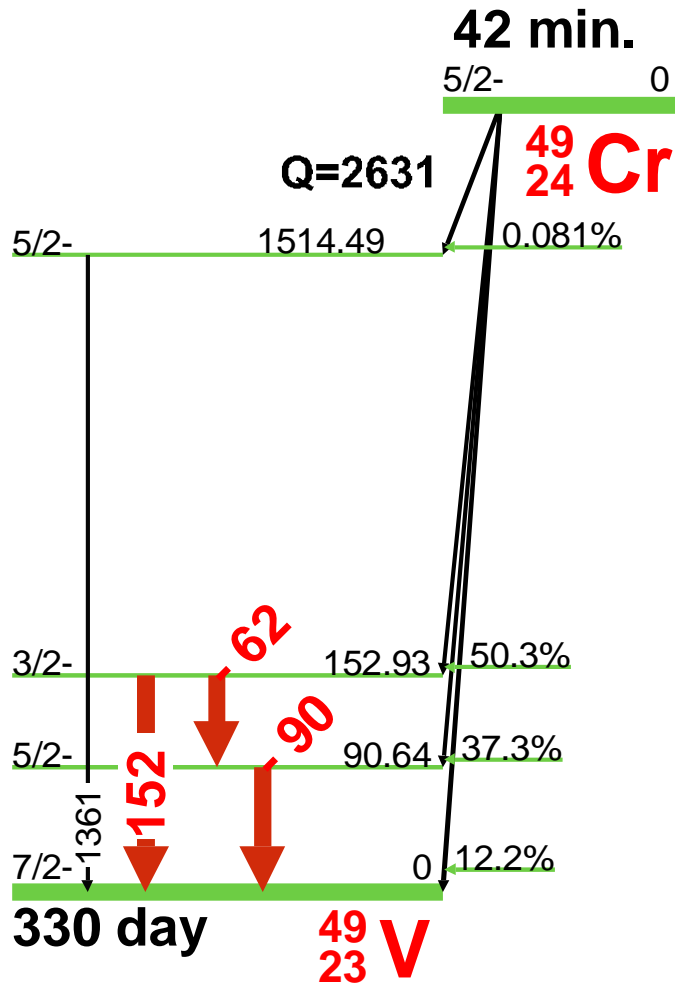
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	112.31	0.08	84	96.0	2.0	1
	308.24	0.06	100	100.0	2.0	1
	420.5			0.0300	0.0006	4
Ann.	511.006			3.1	0.5	2

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁴⁹Cr(42 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁴⁹Cr

Half Life: 42.3(1) min.

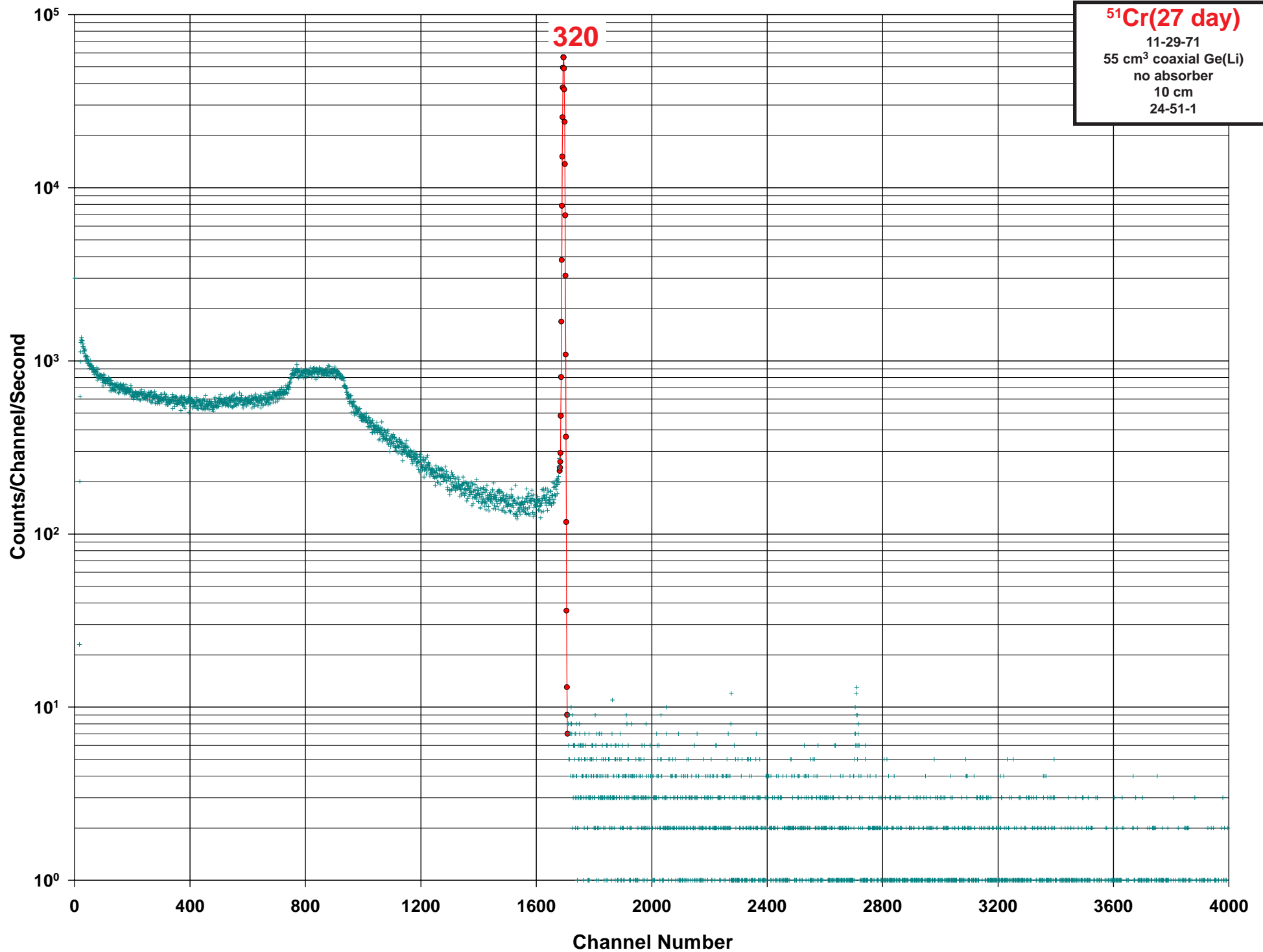
Detector: 4.55 cm² x 8 mm Ge(Li)

Method of Production: ⁵⁰Cr(γ,n)

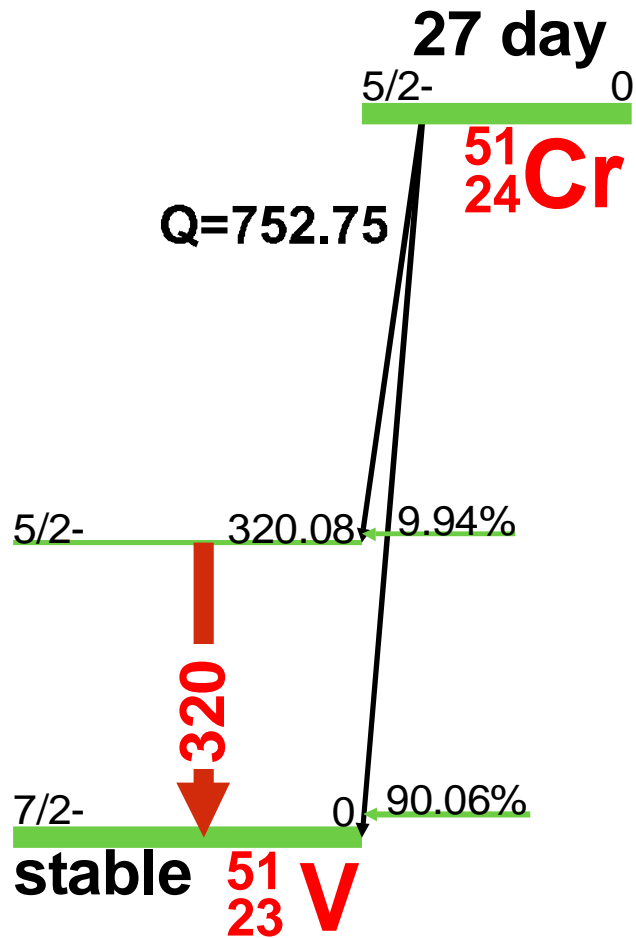
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	62.289	0.002	26.6	16.4	0.6	1
	90.639	0.002	100	53.2	1.9	1
	152.928	0.002	58.9	30.3	1.1	1
Ann.	511.006			183	4	1
	595.3			0.0003		4
	657.5			0.0003		4
	1021.3			0.0011		4
	1027.2	1.2		0.0001		4
	1064.60	0.20				4
	1155.30	0.20		0.0001		4
	1361.61	0.07		0.045	0.005	4
	1384.					4
	1423.3	0.3		0.010	0.003	4
	1433.					4
	1449.					4
	1508.30	0.20		0.008	0.003	4
	1514.10	0.20		0.026	0.003	4
	1570.60	0.20		0.020	0.003	4
	2091.1	0.7		0.0004	0.0001	4
	2143.7	0.6		0.0009	0.0001	4
	2183.0	1.0				4
	2218.6	1.0		0.0002	0.0001	4
	2236.2	1.0		0.0002	0.0001	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵¹Cr(27 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵¹Cr

Half Life: 27.7025(24) day

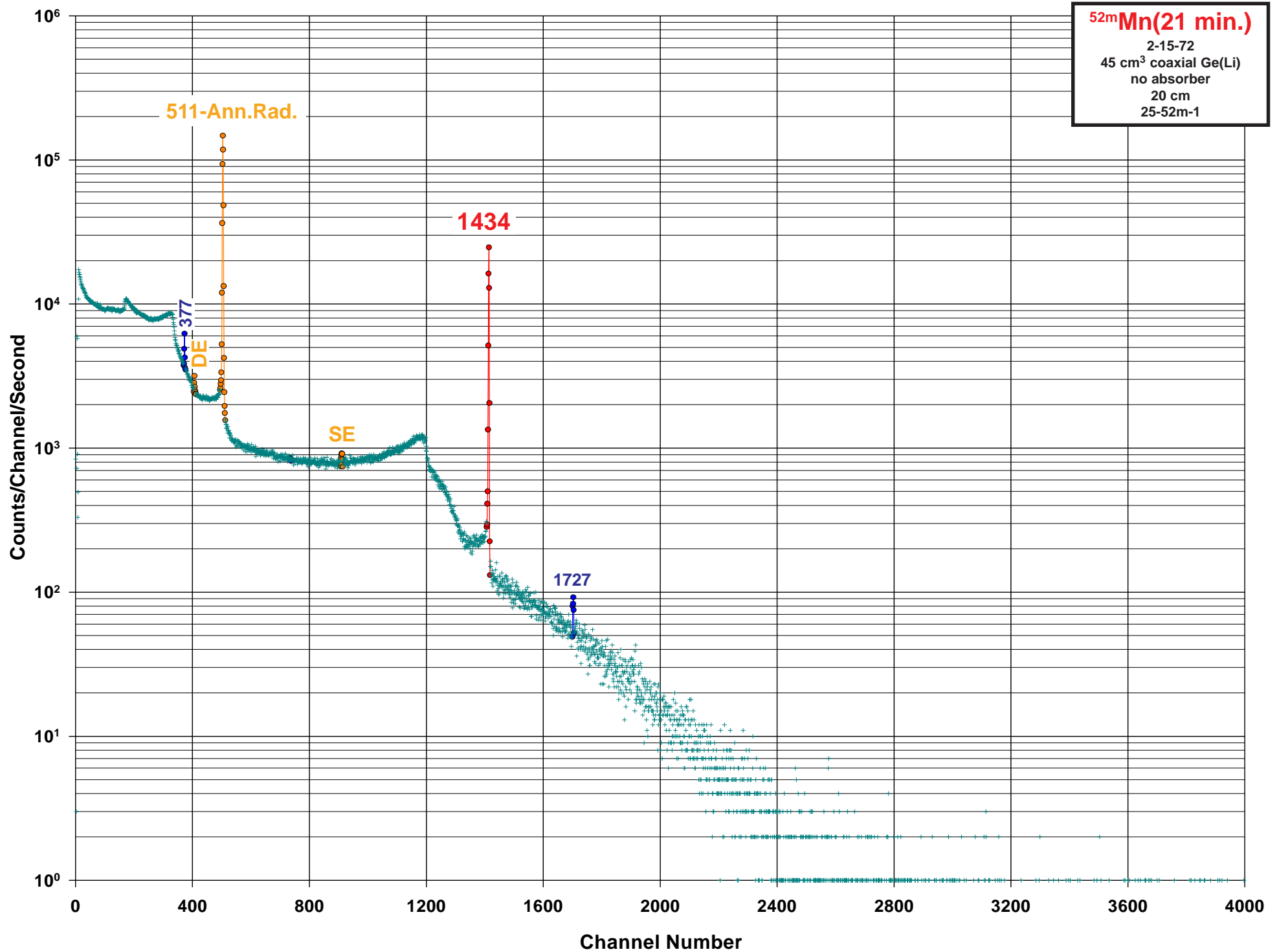
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁵⁰Cr(n,γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
320.0824	0.0004	100	9.92	0.05	1

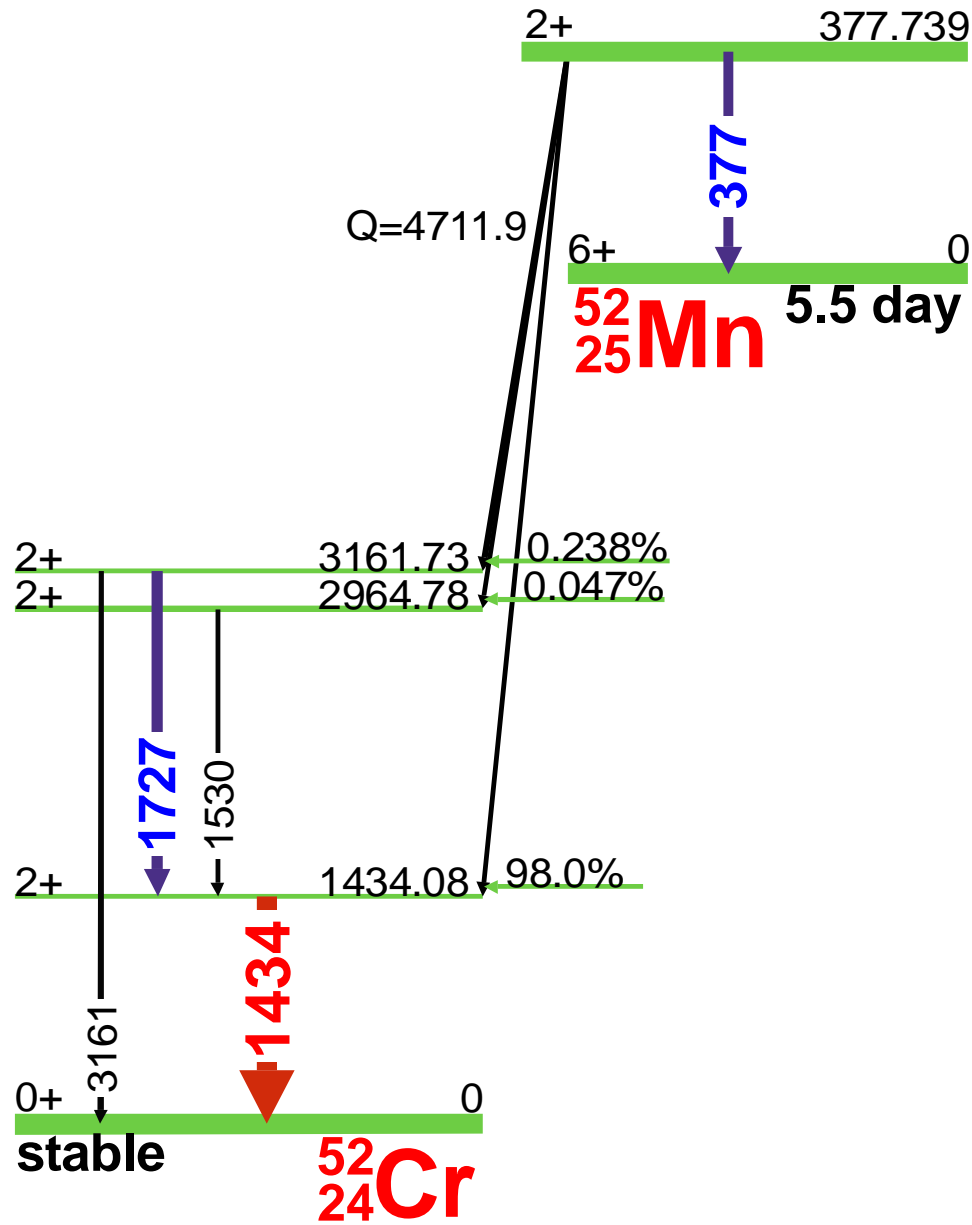
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{52m}Mn(21 min.) Decay Scheme

21 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{52m}Mn

Half Life: 21.1(2) min.

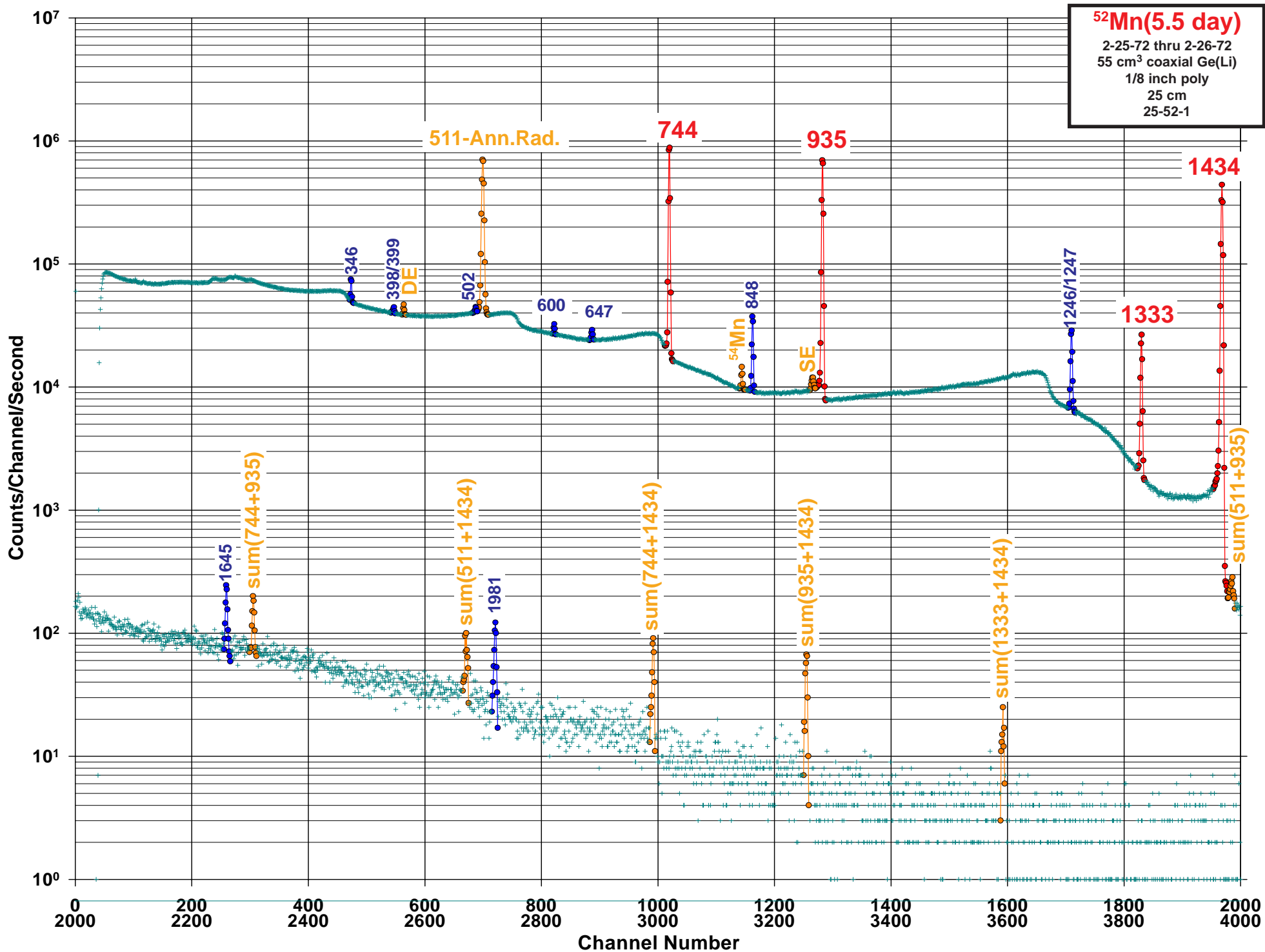
Detector: 45 cm³ coaxial Ge (Li)

Method of Production: ⁵²Cr(p,xn)

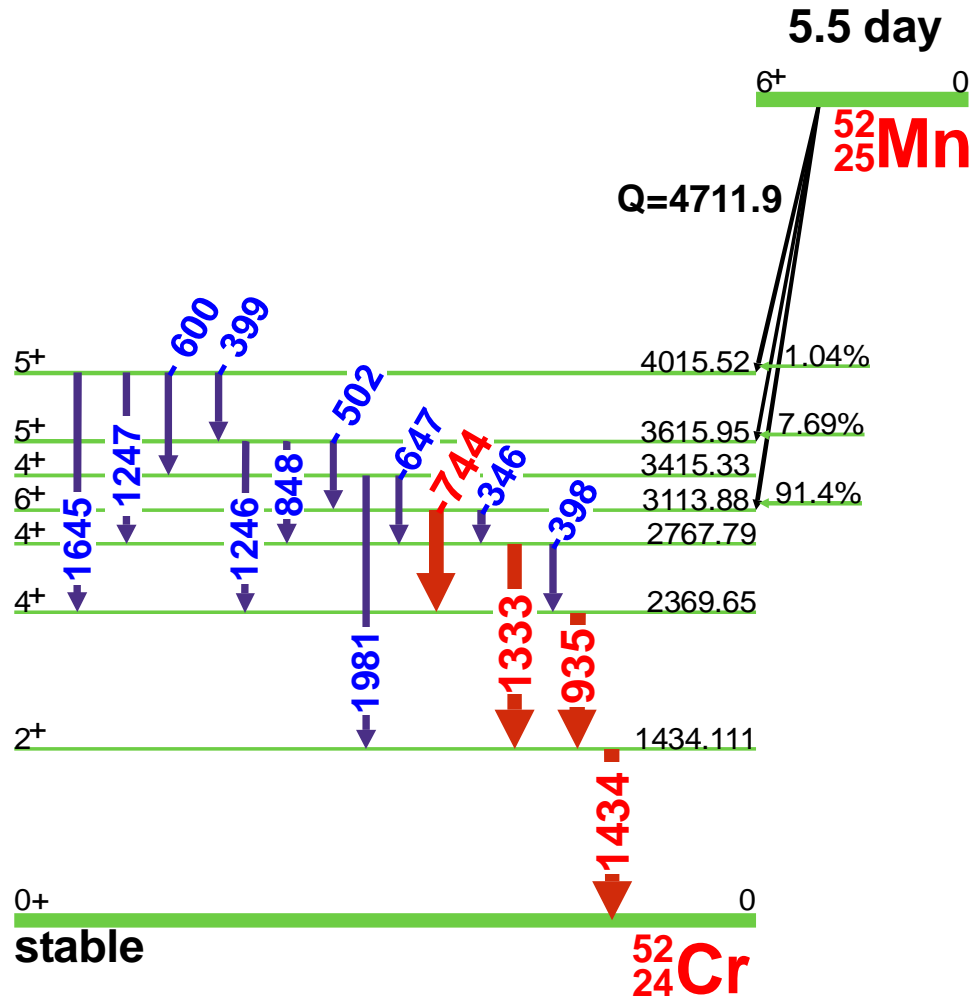
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	377.738	0.005		1.68	0.05	4
Ann.	511.006			188.	4.	1
	704.60	0.20		0.028	0.009	4
	935.52			0.020	0.010	4
	1332.62			0.029	0.010	4
	1434.06	0.010	100	98.2	2.0	1
	1530.670	0.010		0.0462	0.0020	4
	1727.53	0.07	0.4	0.216	0.010	4
	2038.00	0.20		0.0079	0.0010	4
	2337.40	0.20		0.0069	0.0010	4
	2847.7	0.7		0.0006	0.0005	4
	2965.0	1.0		0.0004	0.0003	4
	3129.0	1.0		0.0001		4
	3161.80	0.10		0.022	0.003	4
	3381.50	0.10		0.0025	0.0005	4
	3771.70	0.20		0.0018	0.0004	4
	3951.0	1.0		0.0007	0.0003	4
	4815.40	0.20		0.0025	0.0004	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵²Mn(5.5 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵²Mn

Half Life: 5.591(3) day

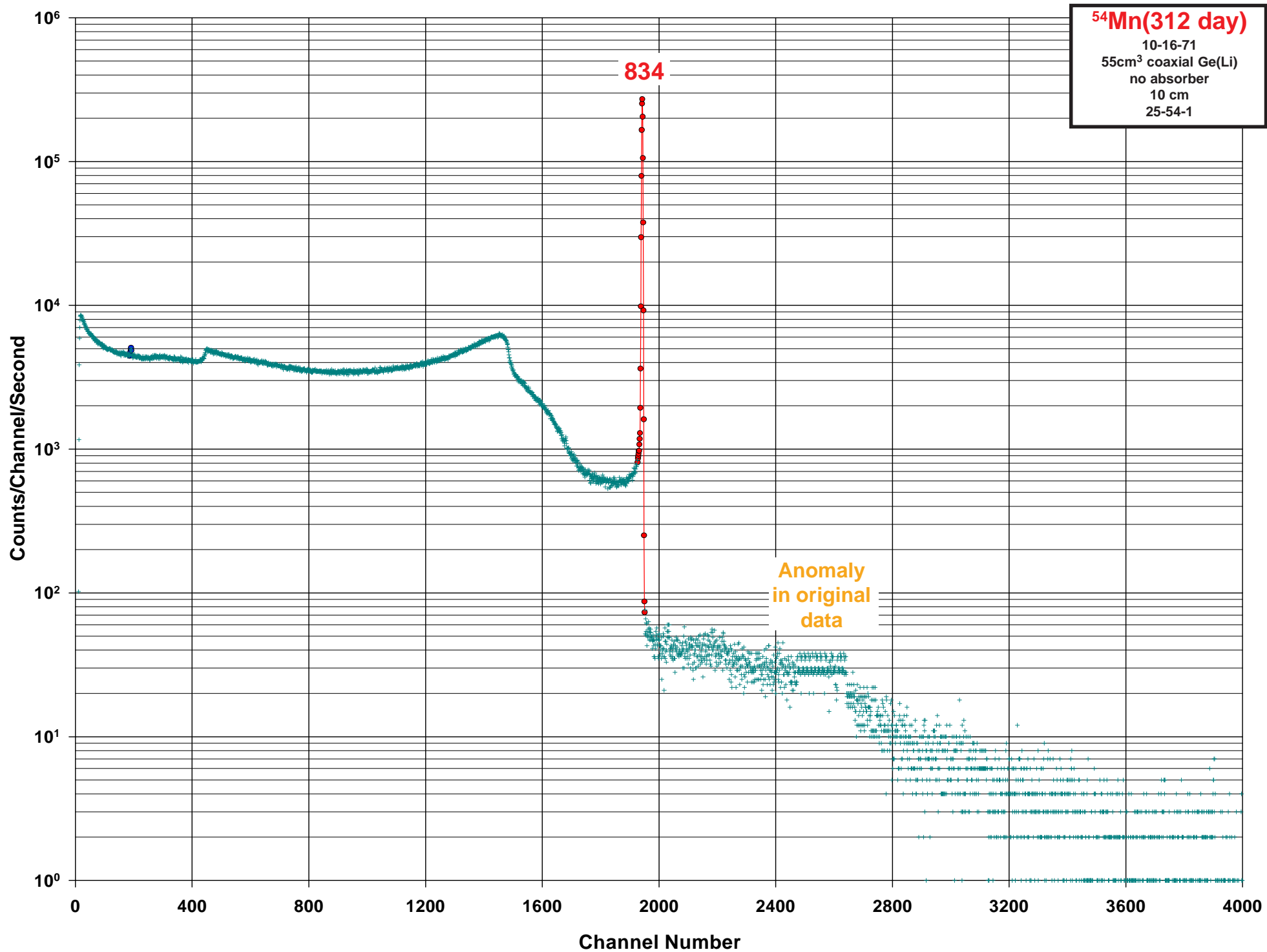
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁵²Cr(p,xn)

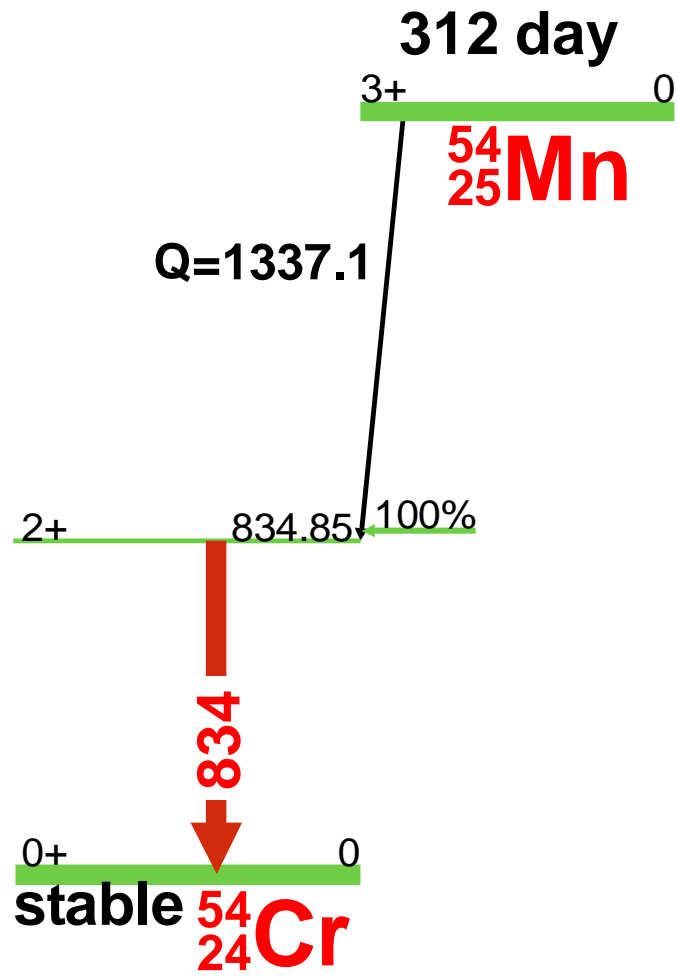
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	200.58	0.04		0.0760	0.0020	4
	346.02	0.04	1.2	0.980	0.010	4
D	398.09	0.09	0.36	0.089	0.007	4
	399.57	0.05		0.183	0.007	
	502.06	0.05	0.14	0.210	0.020	4
Ann.	511.006			58.6	0.8	1
	600.16	0.05	0.53	0.390	0.010	4
	647.47	0.06	0.40	0.400	0.020	4
	744.233	0.013	88.2	90.0	0.8	1
	848.18	0.05	3.4	3.32	0.03	3
	901.89	0.18		0.044	0.004	4
	935.544	0.012	95.0	94.5	0.9	1
	1045.75	0.08		0.070	0.020	4
D	1246.278	0.015	4.8	4.21	0.06	2
	1247.88	0.09		0.38	0.04	
	1333.649	0.017	5.3	5.07	0.05	1
	1434.092	0.017	100	100.0	0.6	1
	1441.0	1.0		0.0030	0.0020	4
	1645.82	0.04	0.055	0.047	0.003	3
	1839.14	0.17		0.0050	0.0010	4
	1981.12	0.04	0.039	0.034	0.003	3
	2257.42	0.19		0.0027	0.0006	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵⁴Mn(312 day) Decay Scheme



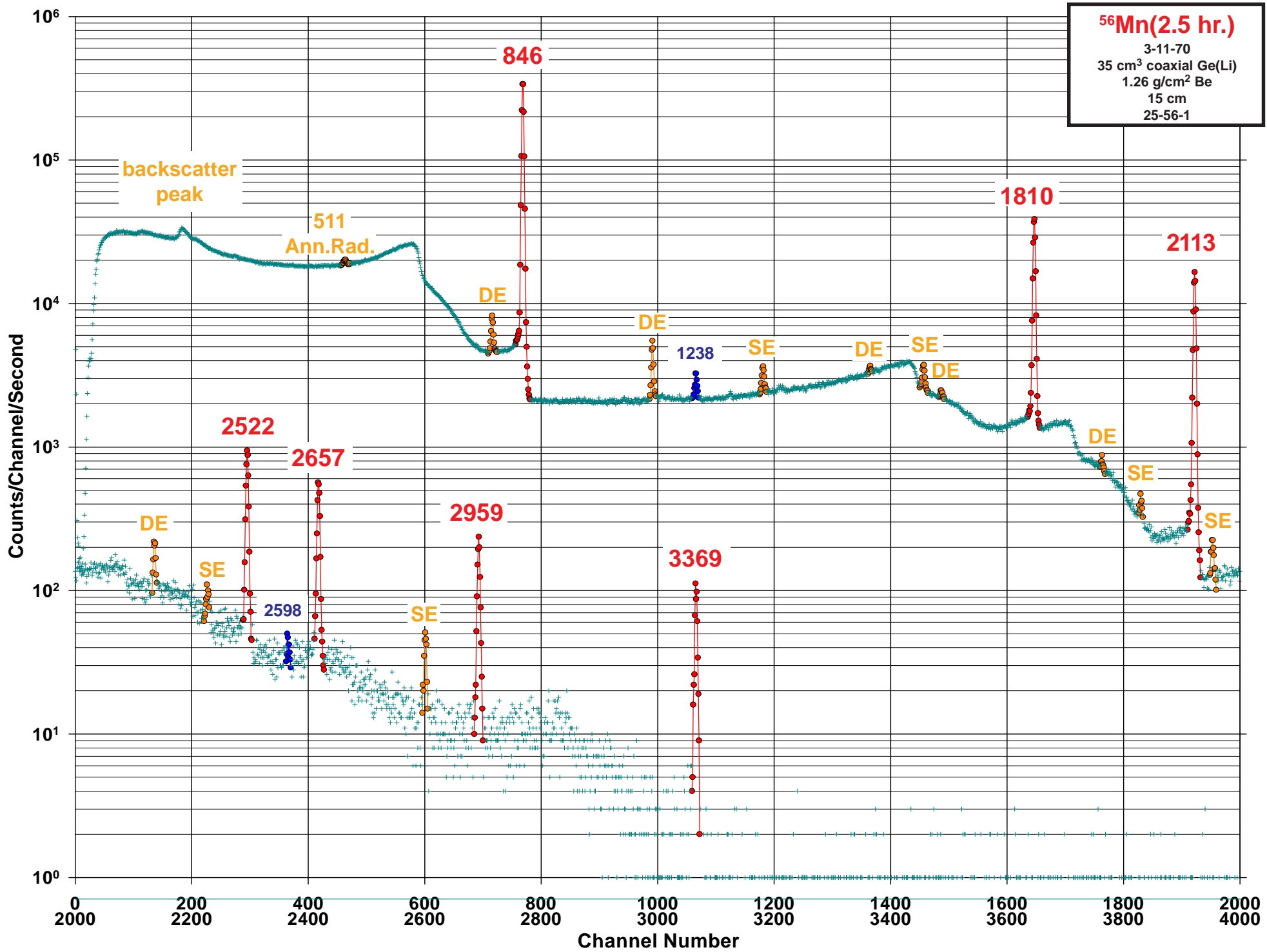
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁴Mn Half Life: 312.3(4) day
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: ⁵⁴Cr(p,n)

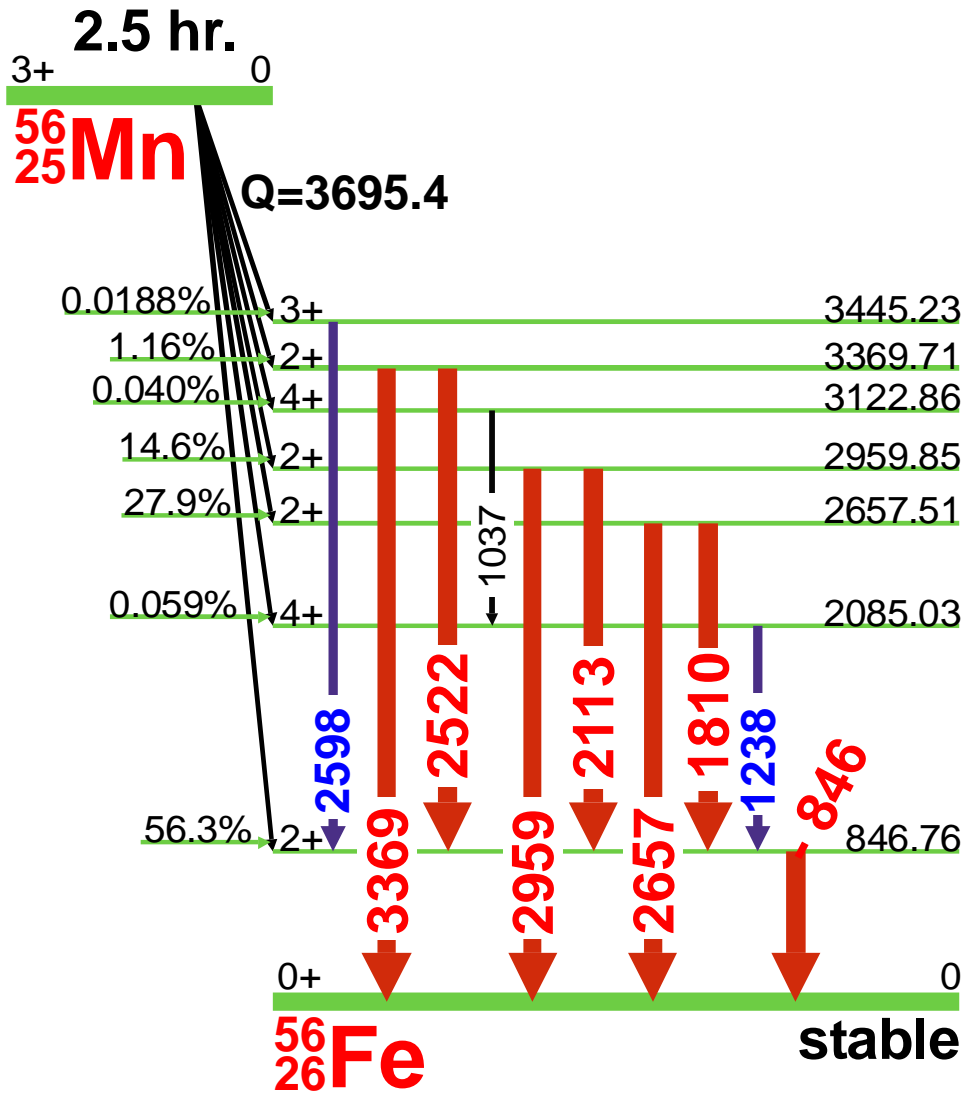
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
834.838	0.003	100	99.9760	0.0010	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵⁶Mn(2.5 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁶Mn

Half Life: 2.5785(2) hr.

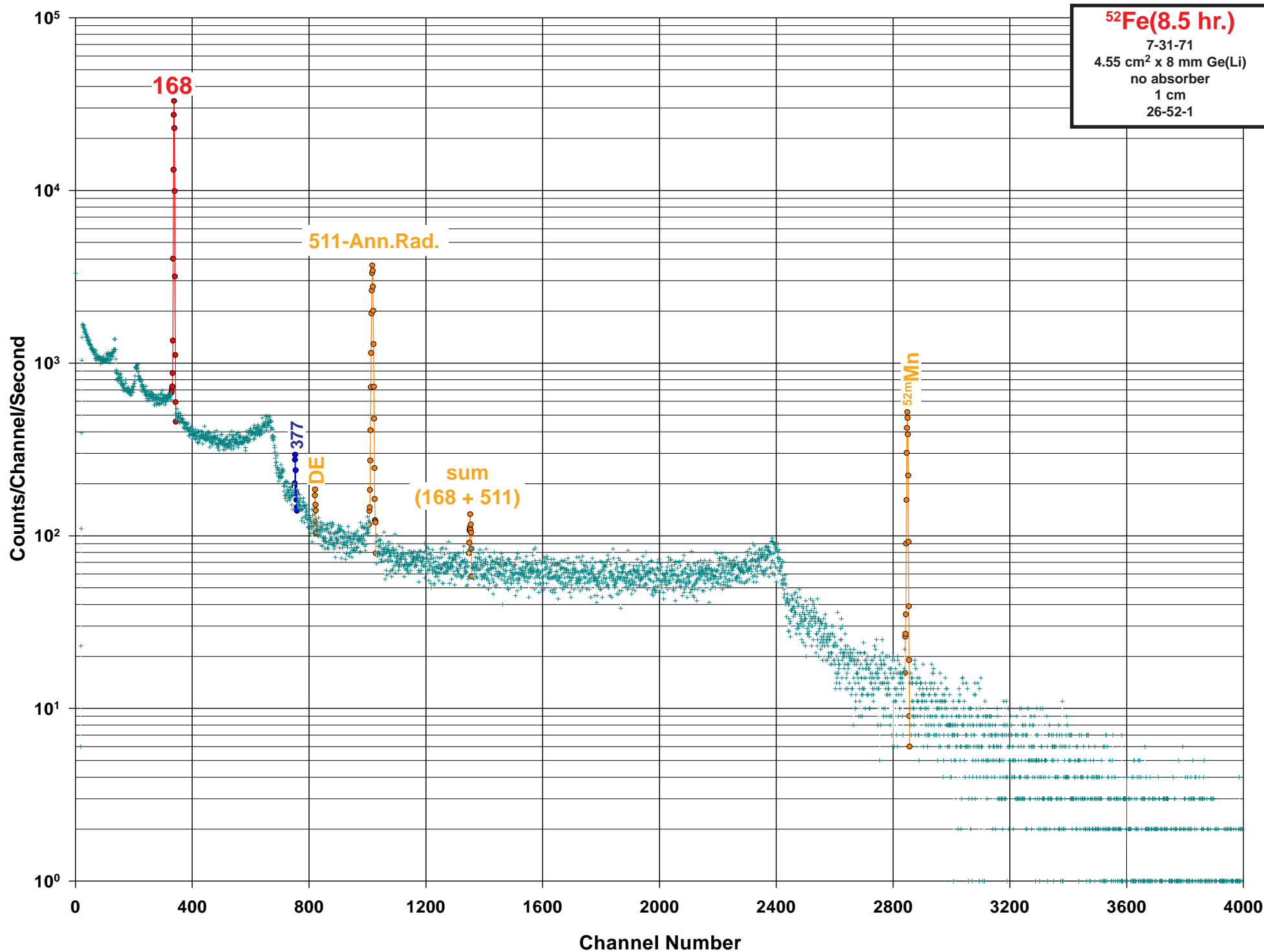
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ⁵⁵Mn(n,γ)

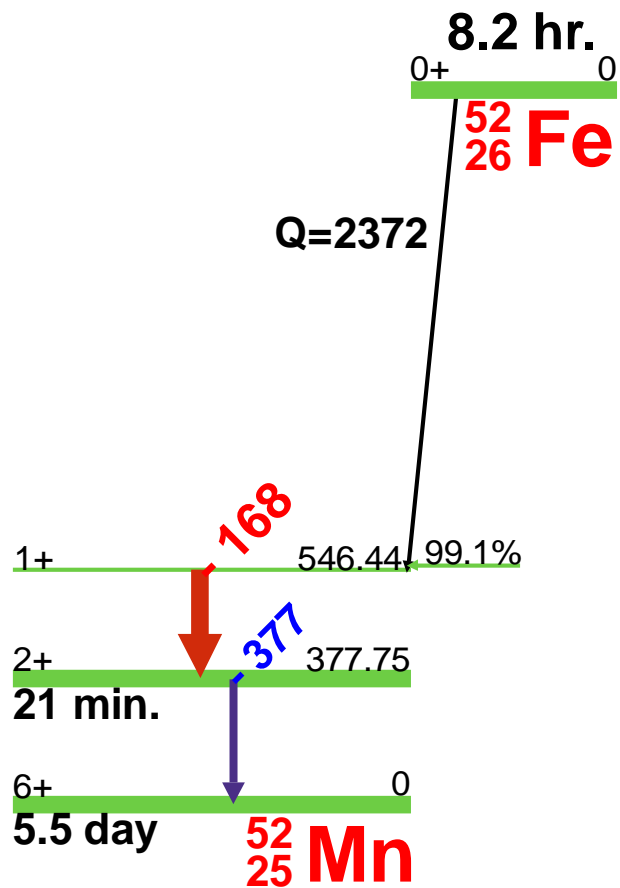
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
846.7638	0.0019	100	98.9	0.3	1
1037.8333	0.0024		0.040	0.005	4
1238.2736	0.0022	0.09	0.099	0.010	4
1810.726	0.004	28.7	27.2	0.8	1
2113.092	0.006	15.4	14.3	0.4	1
2522.88	0.06	1.15	0.99	0.03	1
2598.438	0.004		0.0188	0.0020	4
2657.45	0.05	0.76	0.652	0.020	1
2959.77	0.06	0.33	0.306	0.010	1
3369.60	0.07	0.184	0.168	0.010	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵²Fe(8.2 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵²Fe

Half Life: 8.275(8) hr.

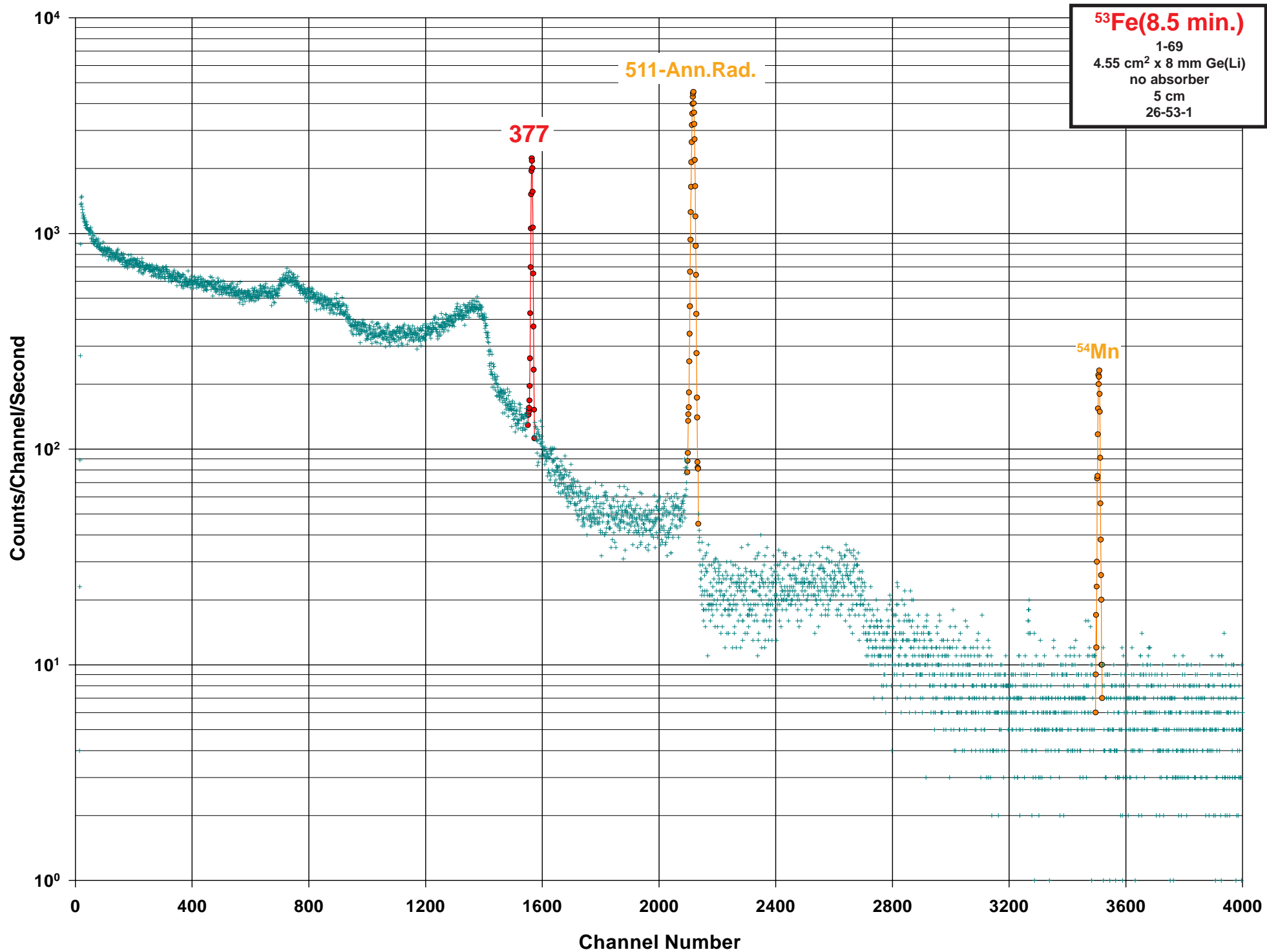
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁵⁴Fe(γ,2n)

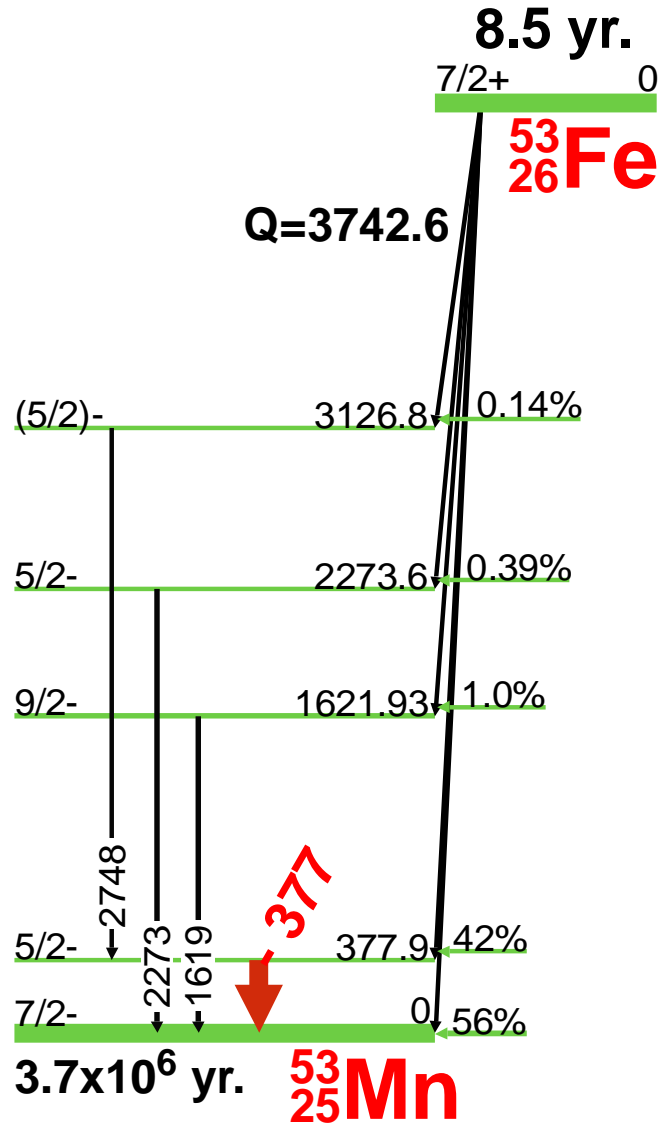
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	168.688	0.002	100	99.2	2.7	1
	377.748	0.005		1.64	0.04	3
Ann.	511.006			109.9		1
	704.600	0.200		0.029	0.010	4
	1039.928	0.017		0.095	0.004	4
	1530.709	0.019		0.0452	0.0021	4
	1727.57	0.08		0.211	0.010	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵³Fe(8.5 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵³Fe

Half Life: 8.51(2) min.

Detector: 4.55 cm² x 8 mm Ge (Li)

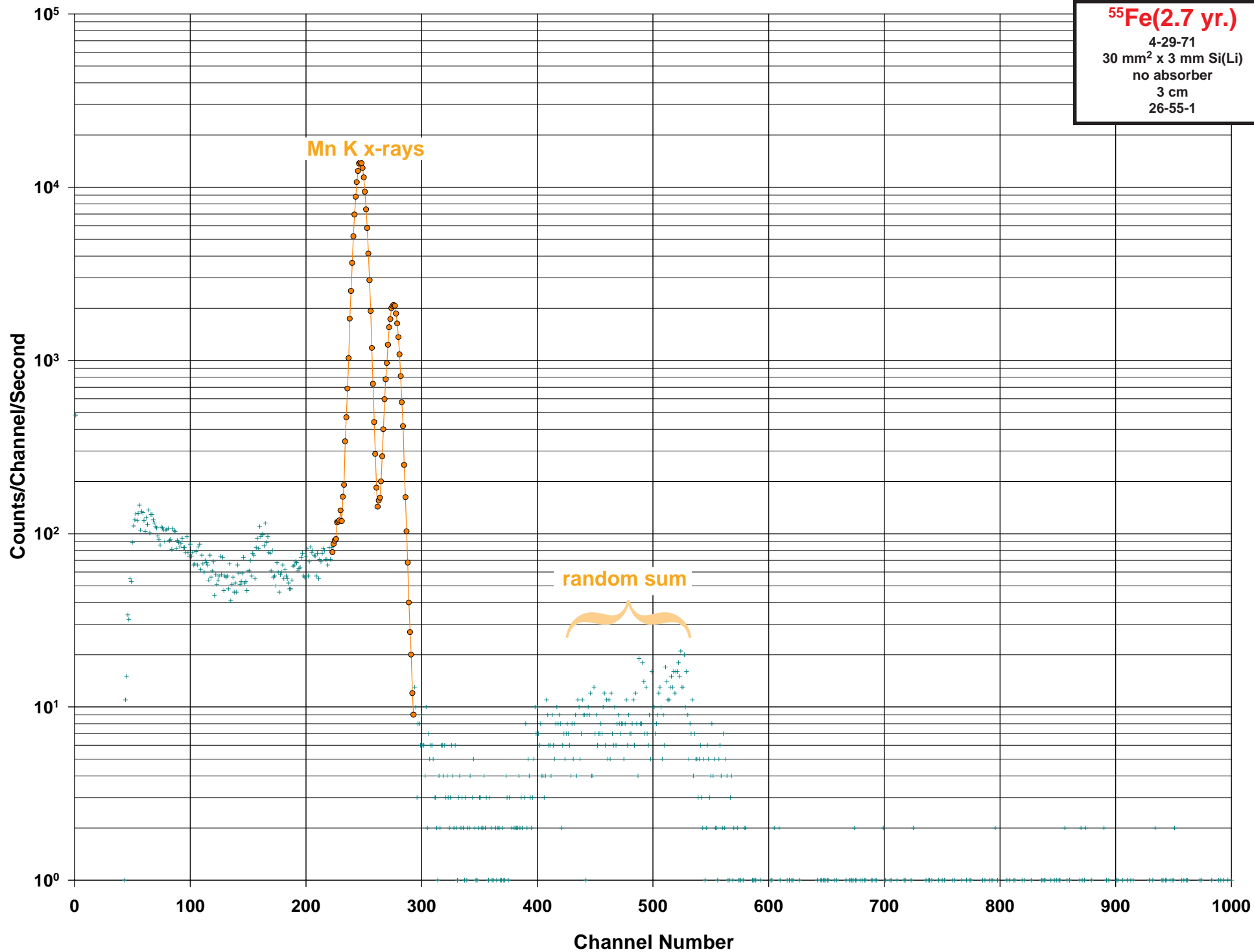
Method of Production: ⁵⁴Fe(γ,n)

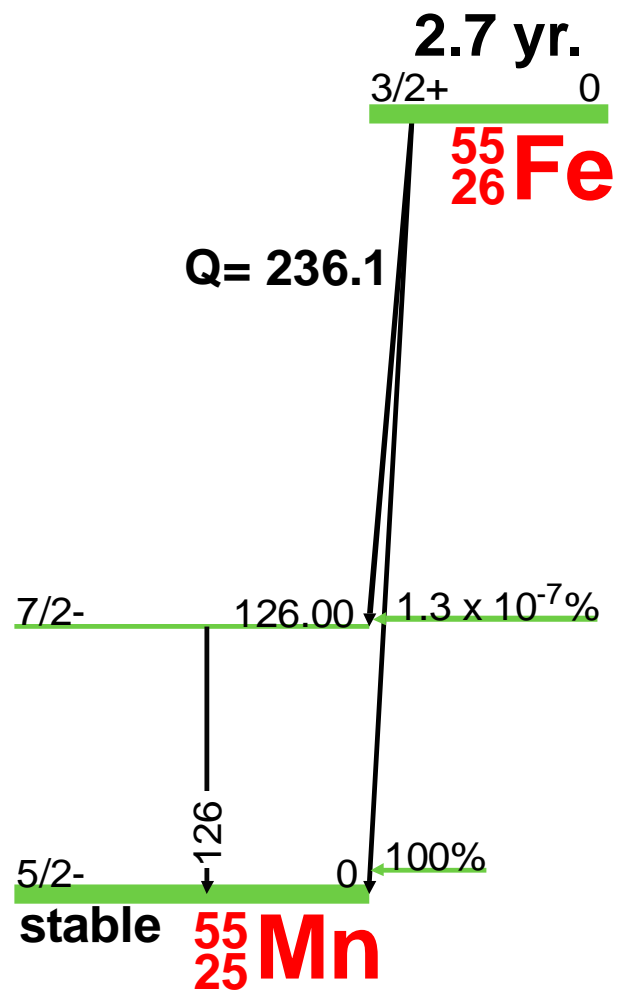
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	377.9	0.1	100	42	3	1
Ann.	511.006			192	22	1
	1288	0.1		0.084	0.006	4
	1397.6	0.8		0.008	0.004	4
	1619.9	0.1		0.5	0.09	4
	2273.5	0.3		0.38	0.05	4
	2307.7	0.6		0.013	0.004	4
	2685.6	0.4		0.08	0.022	4
	2748.8	0.4		0.14	0.04	4
	2946.6	0.4		0.05	0.017	4
	3248.8	0.8		0.038	0.021	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data



⁵⁵Fe(2.7 yr.)
4-29-71
30 mm² x 3 mm Si(Li)
no absorber
3 cm
26-55-1



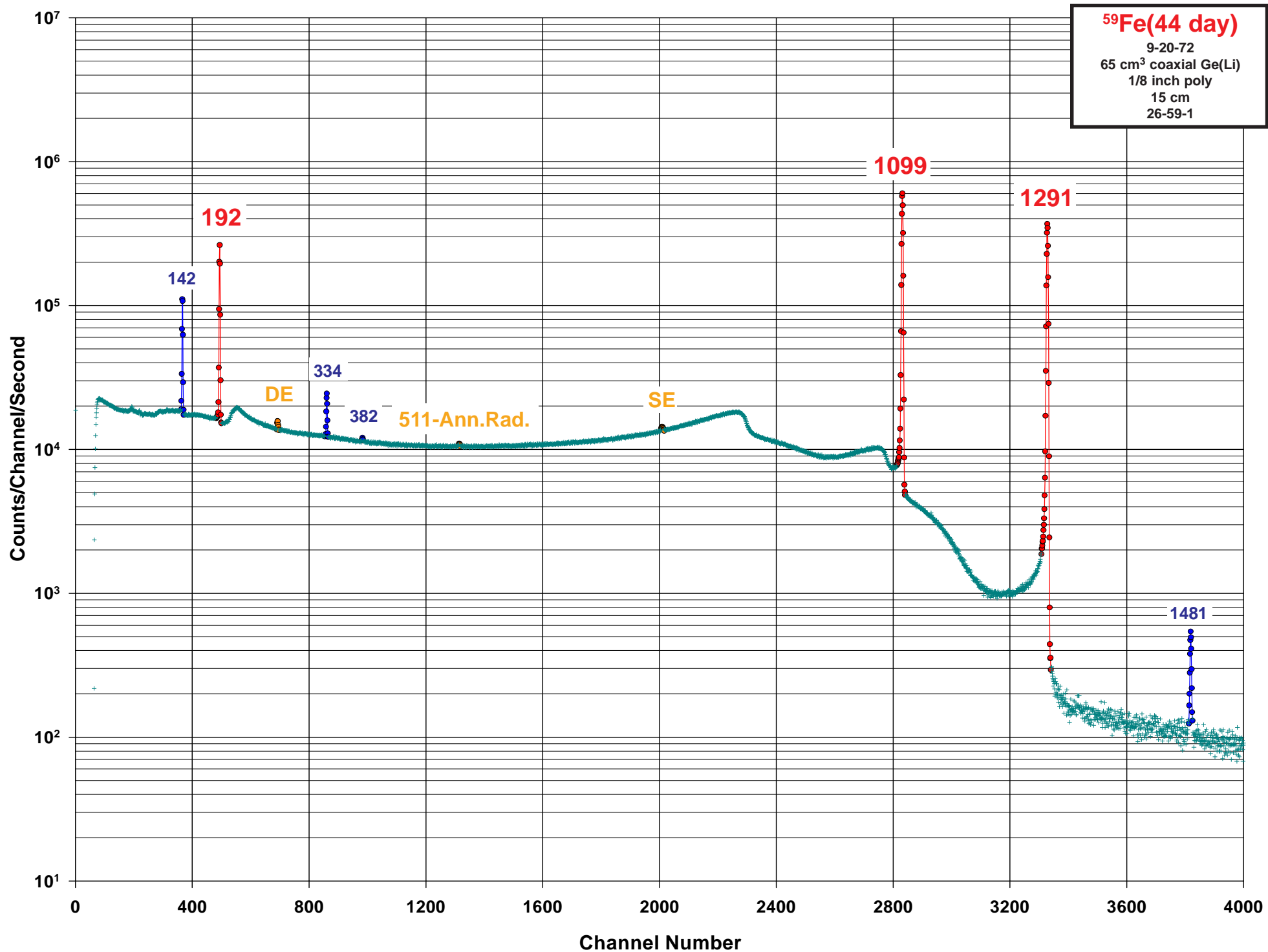
^{55}Fe (2.7 yr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{55}Fe

Half Life: 2.73(3) yr.

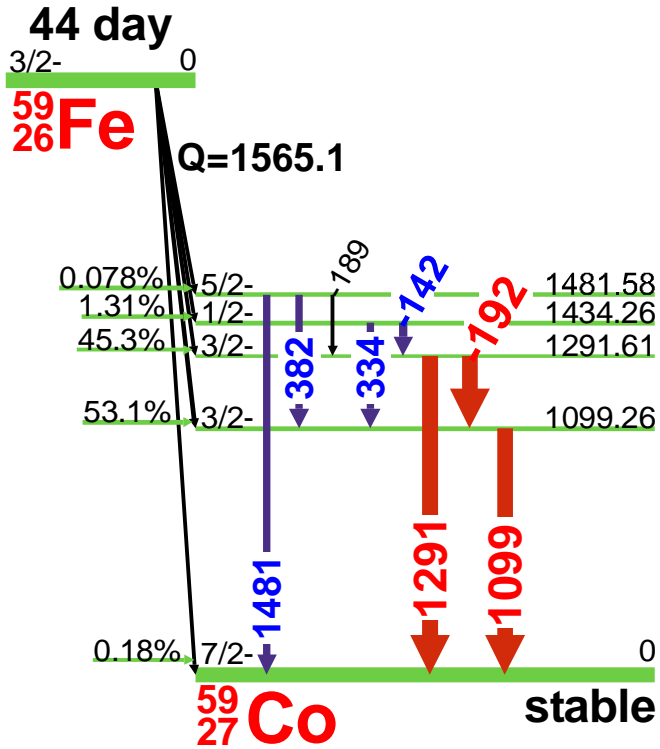
Detector: 30 mm² x 3 mm Si (Li)Method of Production: $^{54}\text{Fe}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
126.00	0.10		0.00000013	0.00000002	4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



⁵⁹Fe(44 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁹Fe

Half Life: 44.503(6) day

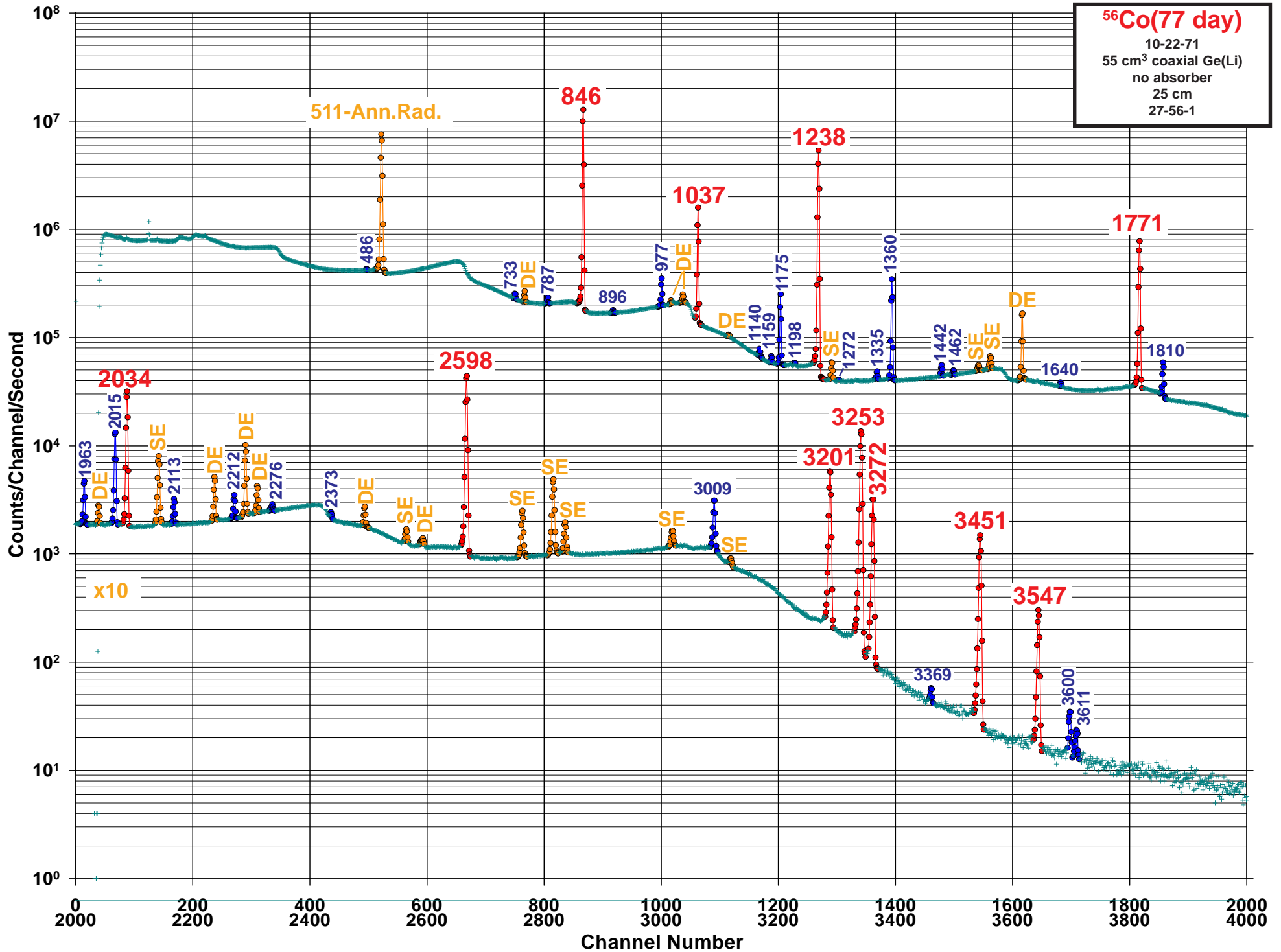
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ⁵⁸Fe(n,γ)

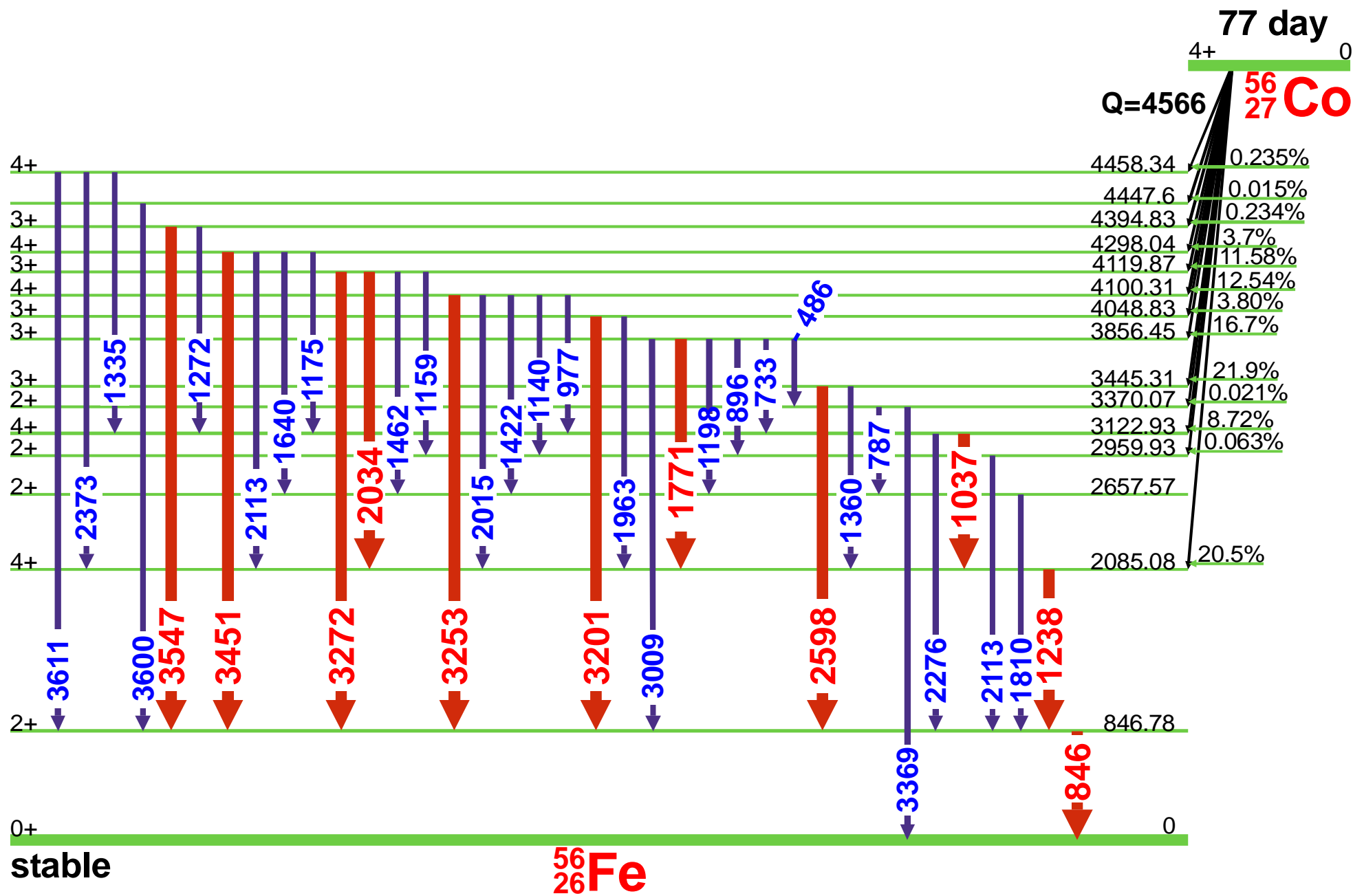
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
142.651	0.002	1.54	1.02	0.04	2
189.			0.0009	0.0009	4
192.349	0.005	4.7	3.08	0.12	1
334.8	0.2	0.47	0.270	0.011	3
382.0	0.4	0.05	0.018	0.003	4
1099.251	0.004	100	56.5	1.8	1
1291.596	0.007	77	43.2	1.4	1
1481.7	0.2	0.11	0.059	0.006	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁵⁶Co(77 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{56}Co E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

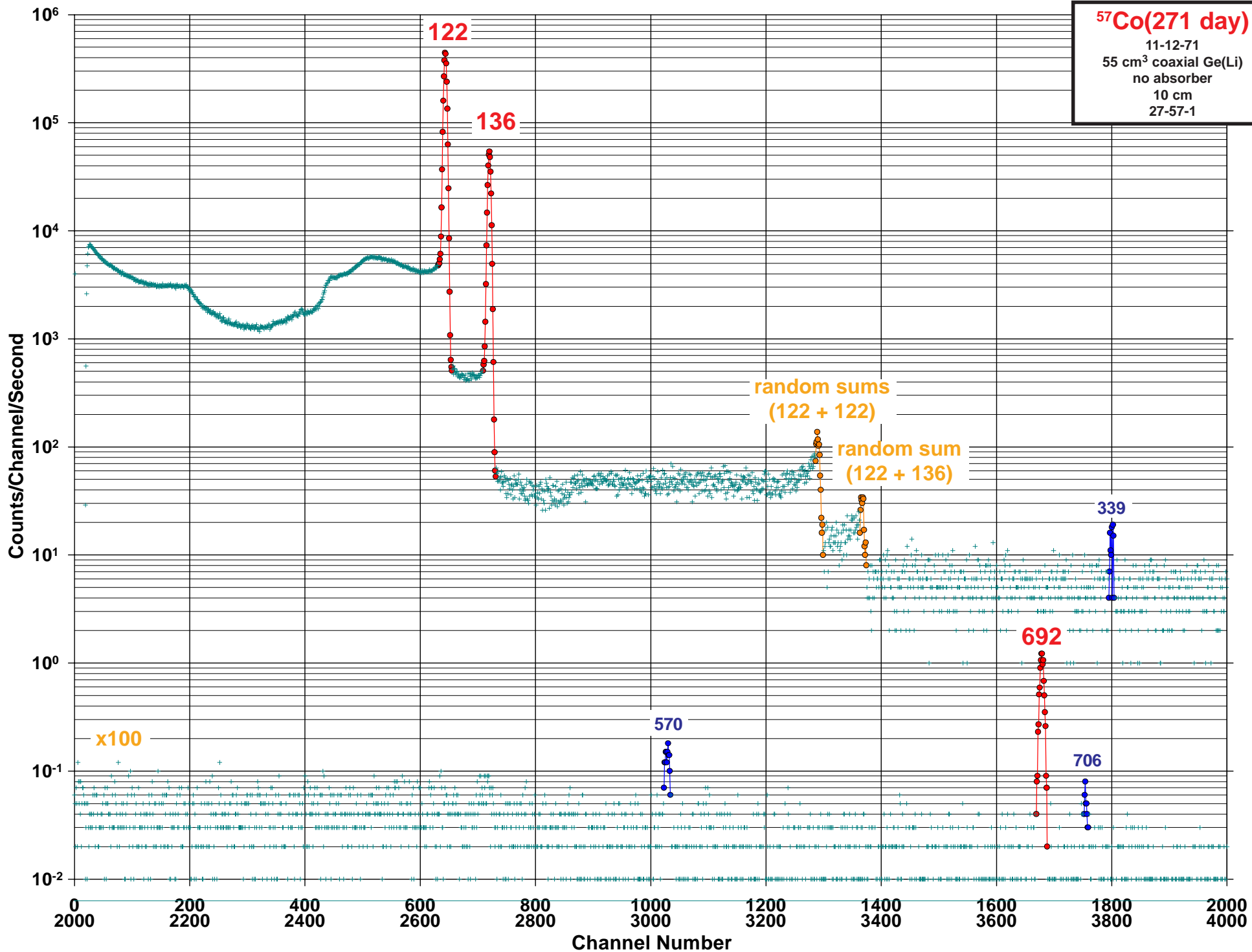
Half Life: 77.27(3) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{56}\text{Fe}(p,n)$

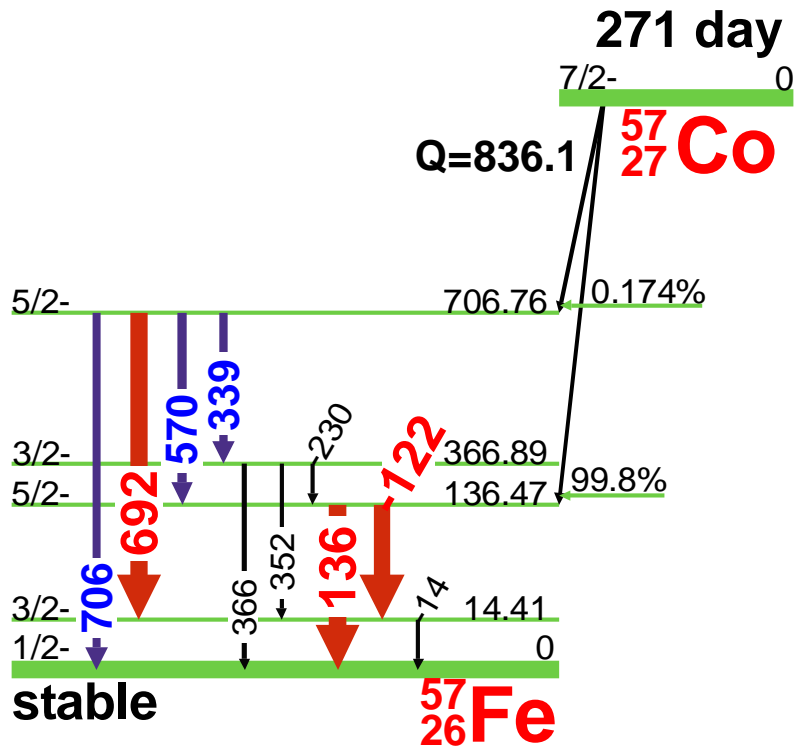
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	263.41	0.1		0.022	0.004	4
	411.38	0.08		0.025	0.005	4
	486.54	0.11	0.04	0.061	0.01	4
Ann.	511.006			37.6	1.8	1
	655			0.038	0.008	4
	674.7			0.038	0.007	4
	733.511	0.005	0.32	0.195	0.011	4
	787.742	0.007	0.32	0.305	0.012	4
	846.771	0.004	100	100	3	1
	852.78	0.05		0.05	0.003	4
	896.531	0.012	0.08	0.095	0.017	4
	977.373	0.004	1.4	1.43	0.014	3
	997.33	0.16		0.129	0.014	4
	1037.84	0.006	14.55	14.13	0.05	1
	1089.03	0.24		0.05	0.003	4
	1140.404	0.021	0.2	0.129	0.02	4
	1159.92	0.018	0.12	0.095	0.013	4
	1175.102	0.006	2.32	2.238	0.011	2
	1198.78	0.2	0.05	0.051	0.009	4
	1238.282	0.007	67.2	66.07	0.19	1
	1272.2	0.6	0.03	0.025	0.008	4
	1335.389	0.02	0.12	0.129	0.006	4
	1360.215	0.012	4.32	4.255	0.015	2
	1442.75	0.08	0.172	0.172	0.007	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1462.34	0.12	0.07	0.084	0.006	4
1640.404	0.021	0.108	0.069	0.01	4
1771.351	0.016	15.45	15.48	0.05	1
1810.772	0.017	0.762	0.657	0.01	3
1963.714	0.012	0.71	0.706	0.01	3
2015.181	0.016	2.97	3.029	0.013	2
2034.755	0.013	7.71	7.77	0.03	1
2113.123	0.01	0.37	0.366	0.006	3
2212.933	0.018	0.38	0.39	0.007	4
2276.36	0.16	0.10	0.126	0.007	4
2373.7	0.4	0.07	0.083	0.011	4
2523.86	0.2		0.068	0.011	4
2598.459	0.013	16.2	16.96	0.06	1
2657.4	0.8		0.021	0.006	4
3009.596	0.007	1.19	0.954	0.021	3
3201.962	0.016	2.96	3.13	0.09	1
3253.416	0.015	7.20	7.62	0.24	1
3272.99	0.015	1.73	1.78	0.06	1
3369.69	0.3	0.01	0.011	0.002	4
3451.152	0.017	0.836	0.93	0.04	1
3547.93	0.06	0.17	0.178	0.009	1
3600.7	0.4	0.015	0.0165	0.0007	3
3611.8	0.8	0.009	0.0085	0.0004	4





⁵⁷Co(271 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁷Co

Half Life: 271.79(9) day

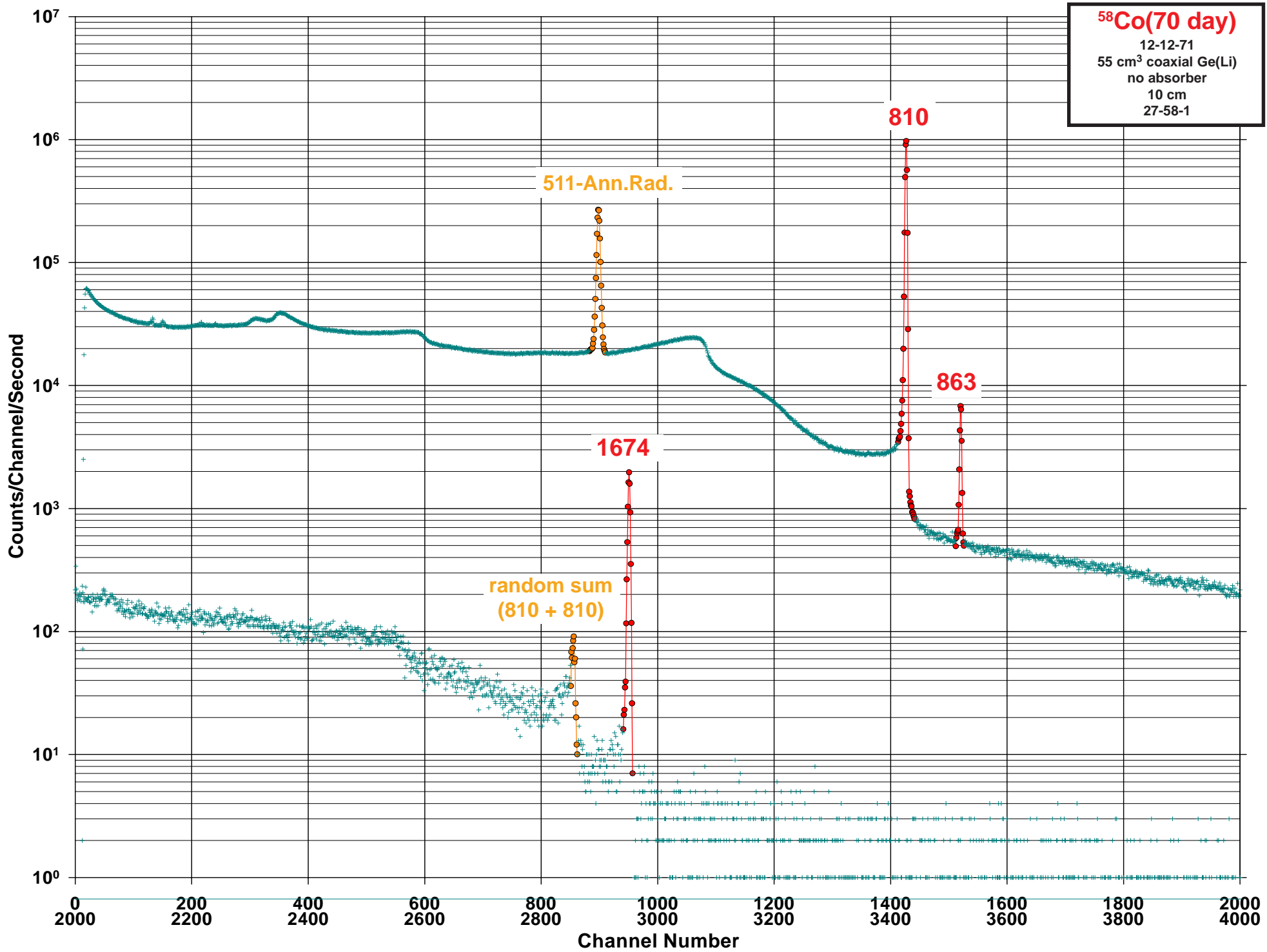
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁵⁷Fe(p,n)

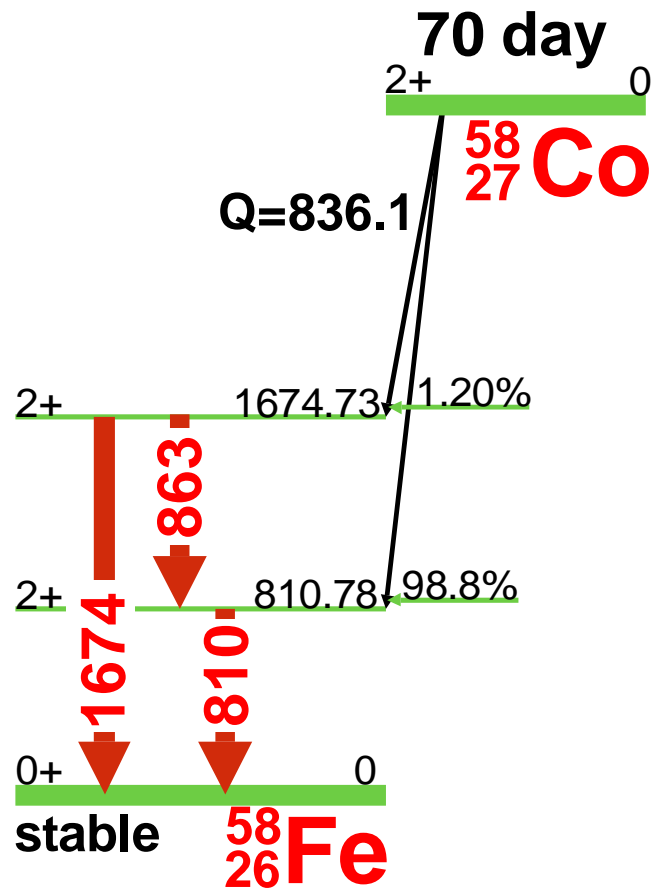
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
14.4129	0.0006		9.16	0.15	4
122.0614	0.0003	100	85.60	0.17	1
136.4743	0.0005	12.9	10.68	0.08	1
230.4	0.4		0.0004	0.0004	4
339.69	0.21		0.0037	0.0003	3
352.33	0.21		0.0030	0.0003	4
366.8	0.3		0.0012	0.0003	4
570.09	0.20	0.01	0.0158	0.0010	3
692.41	0.07	0.19	0.149	0.010	1
706.54	0.22		0.0050	0.0005	3

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁵⁸Co(70 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁸Co

Half Life: 70.86(7) day

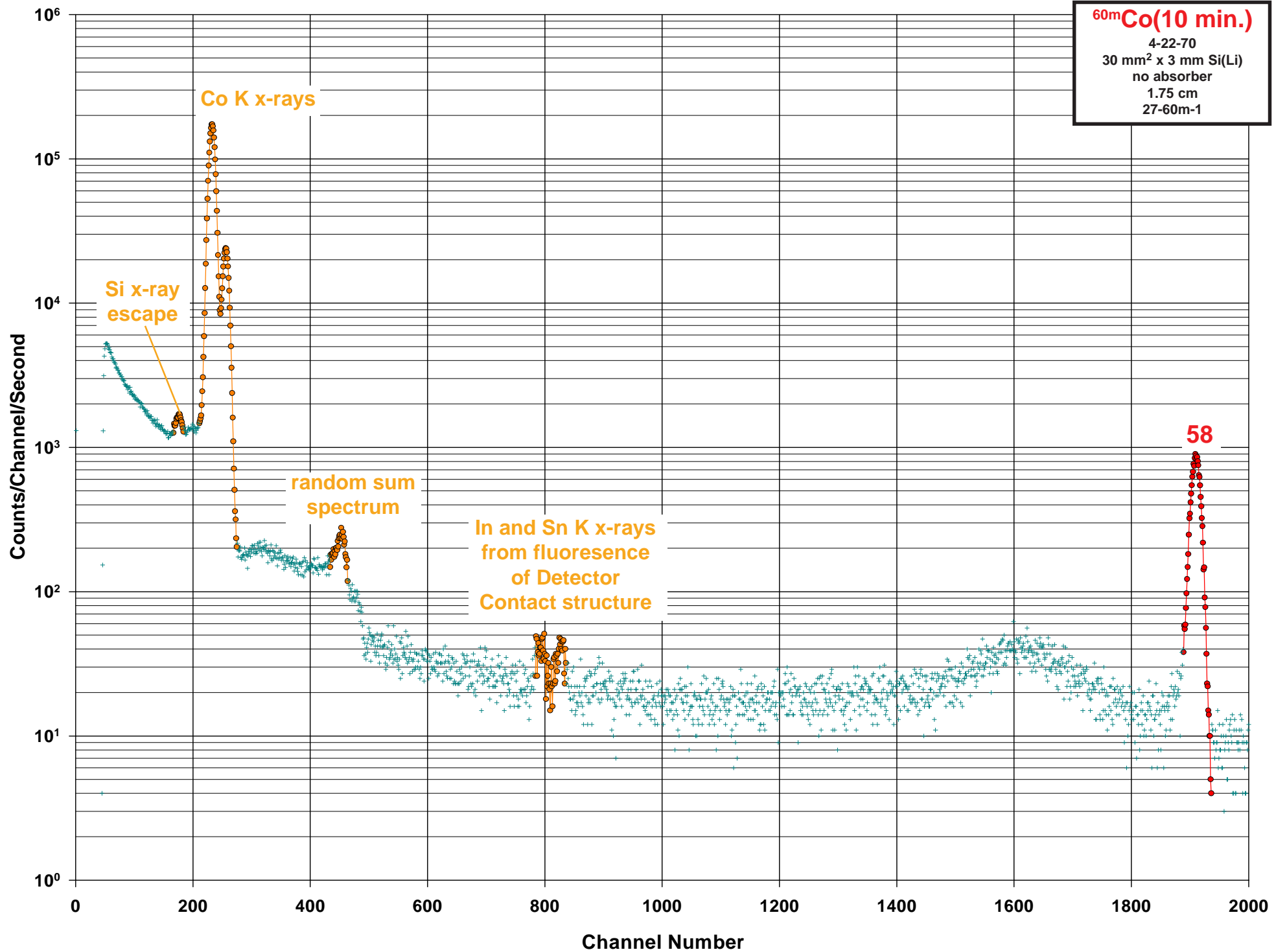
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁵⁸Ni(n,p)

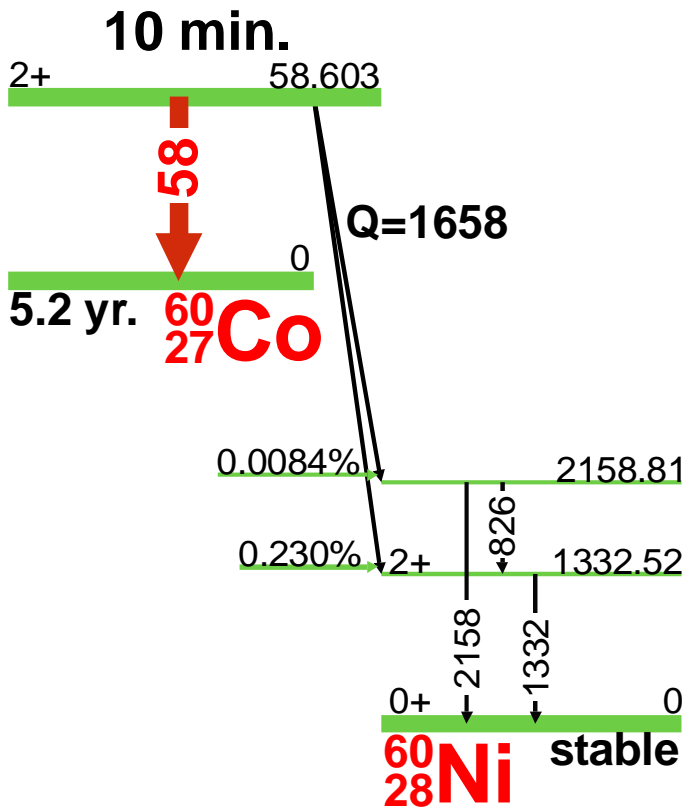
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			29.5	0.3	1
	810.775	0.009	100	99.450	0.010	1
	863.959	0.009	0.74	0.683	0.011	1
	1674.730	0.010	0.54	0.518	0.008	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{60m}Co(10 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{60m}Co

Half Life: 10.467(6) min.

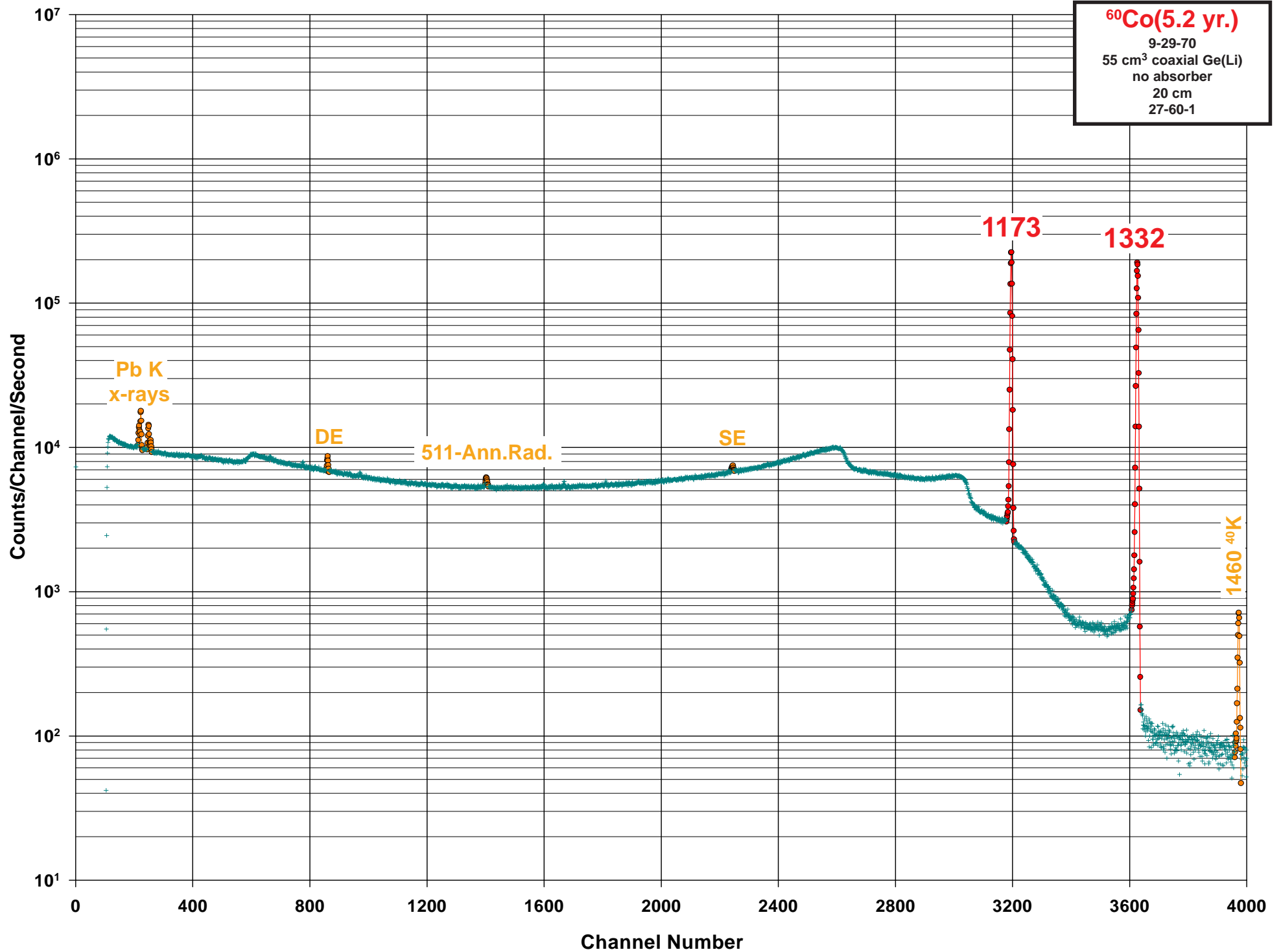
Detector: 33 mm² x 3 mm Si(Li)

Method of Production: ⁵⁹Co(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
58.603	0.007	100	2.04	0.06	1
826.28	0.09		0.0077		4
1332.501	0.005		0.24	0.03	4
2158.77	0.09		0.0007		4

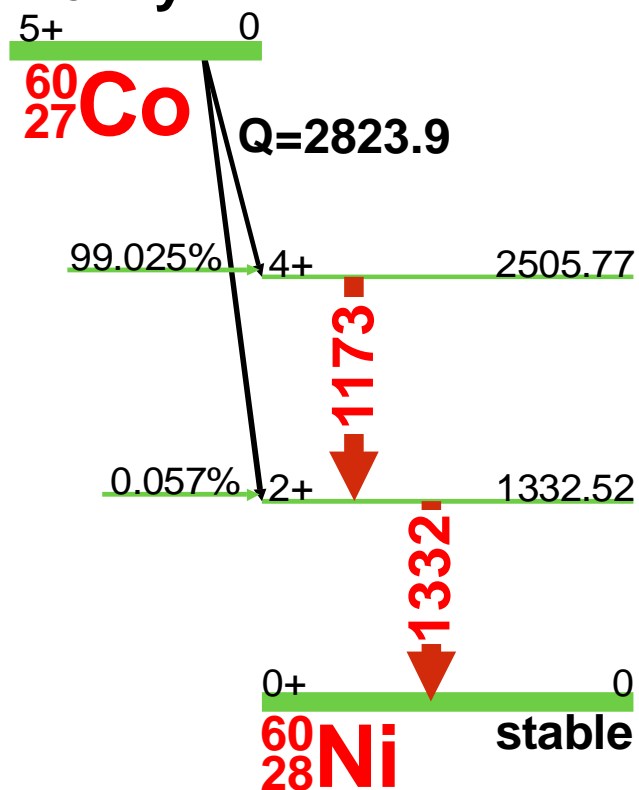
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{60}Co (5.2 yr.) Decay Scheme

5.2 yr.



GAMMA-RAY ENERGIES AND INTENSITIES

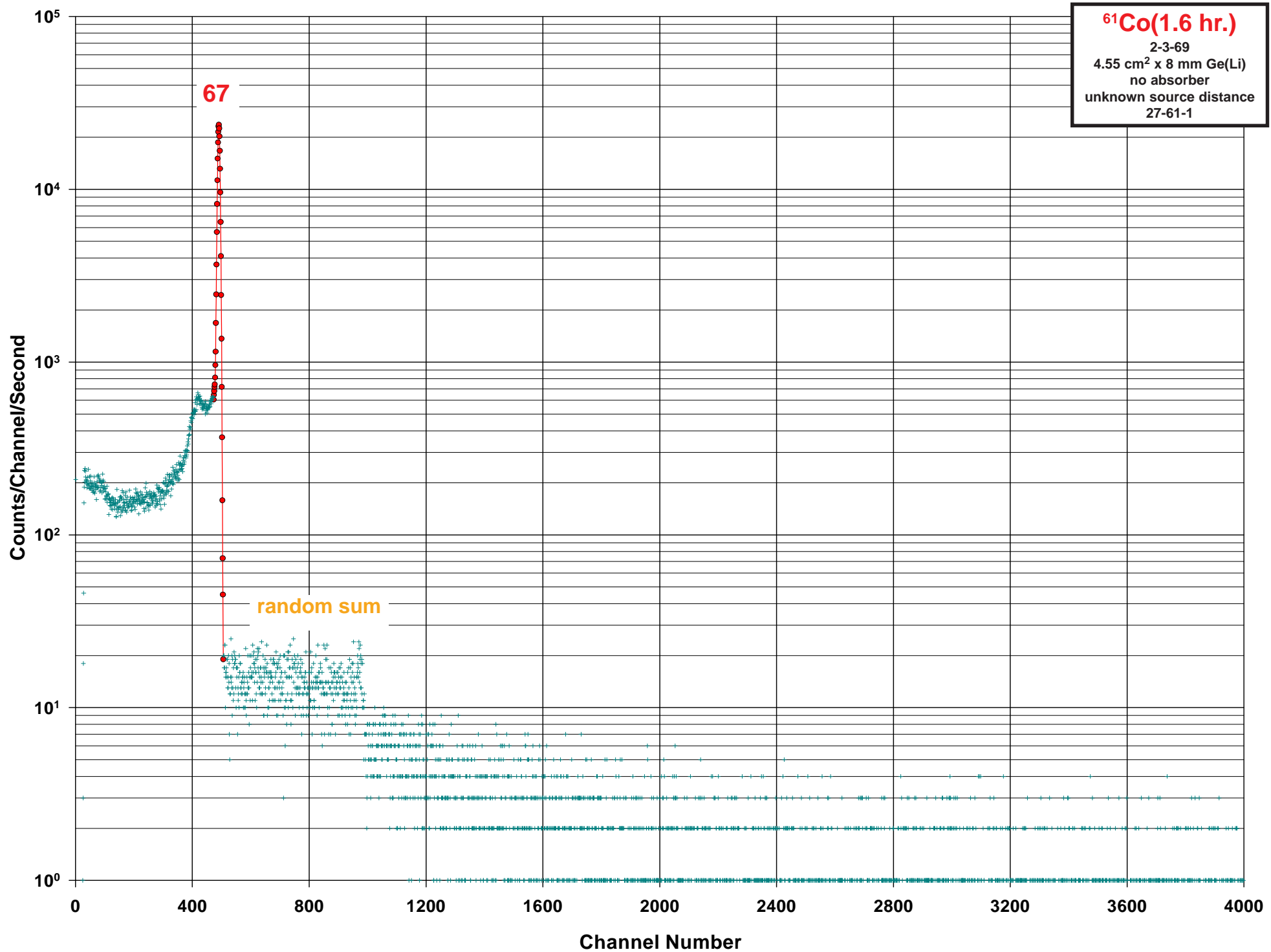
Nuclide: ^{60}Co

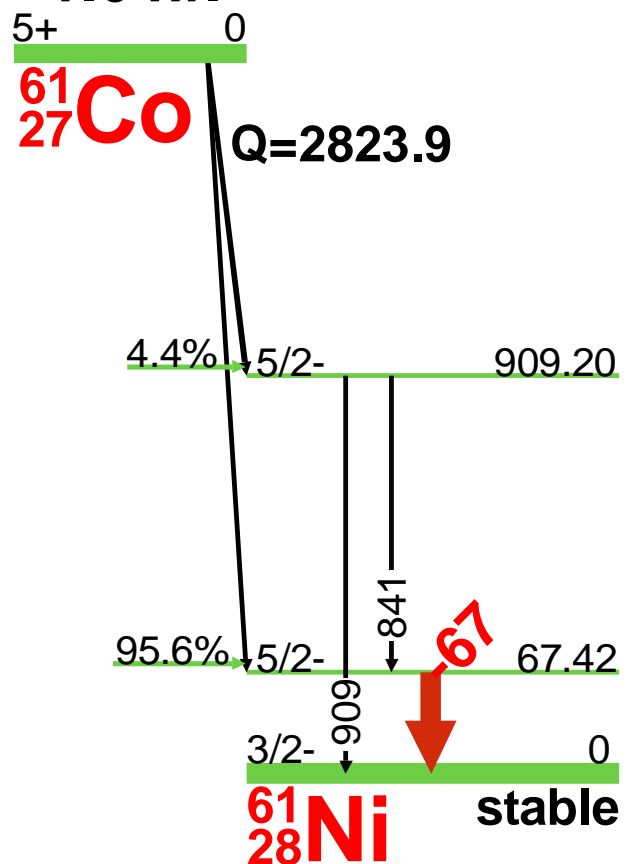
Half Life: 5.2714(5) yr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{59}\text{Co}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
346.93	0.07		0.0076	0.0005	4
826.28	0.09		0.0076	0.0008	4
1173.237	0.004	100	99.9736	0.0007	1
1332.501	0.005	100	99.9856	0.0004	1
2158.77	0.09		0.0011	0.0002	4
2505.					4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



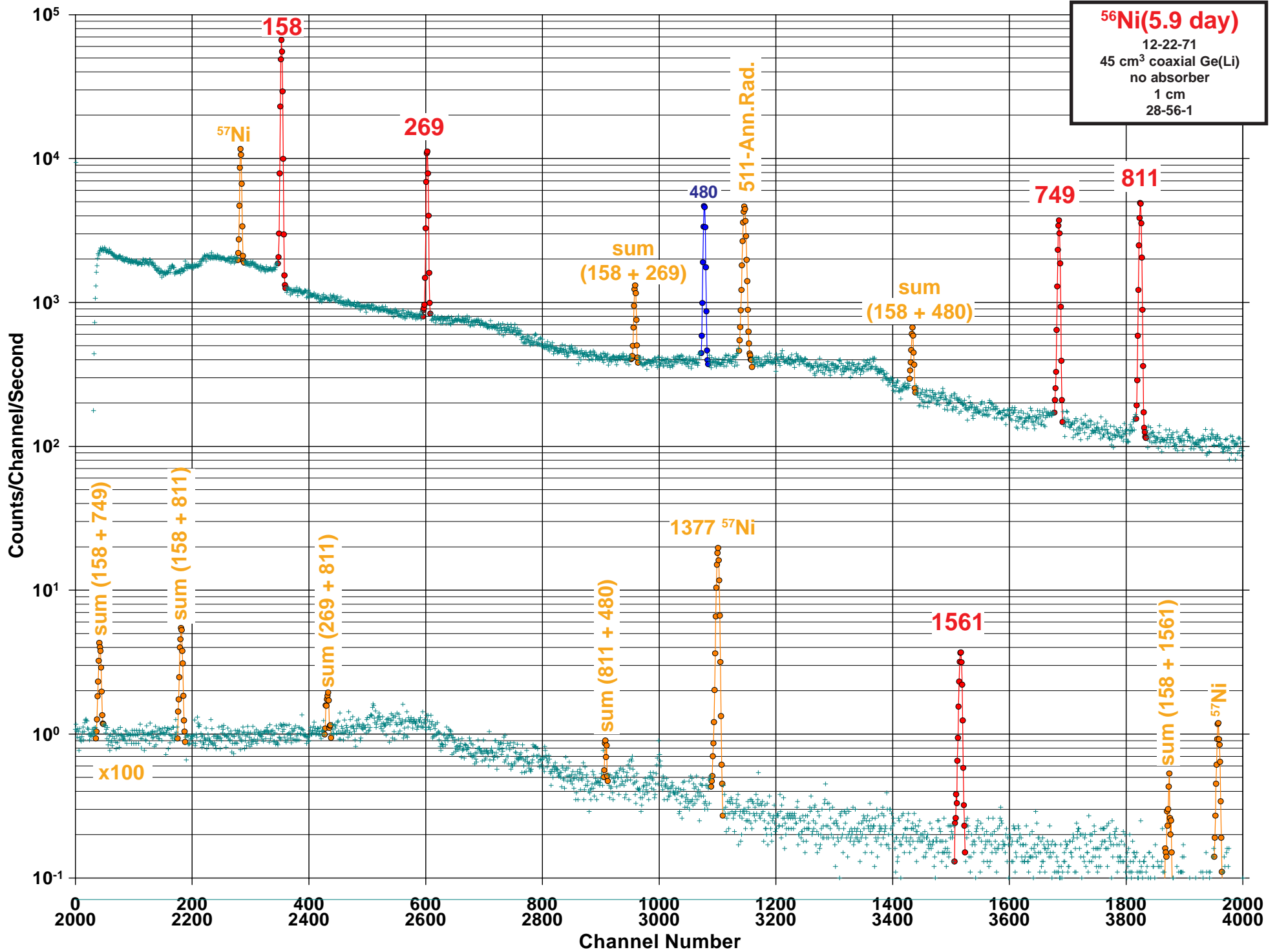
^{61}Co (1.6 hr.) Decay Scheme**1.6 hr.****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{61}Co

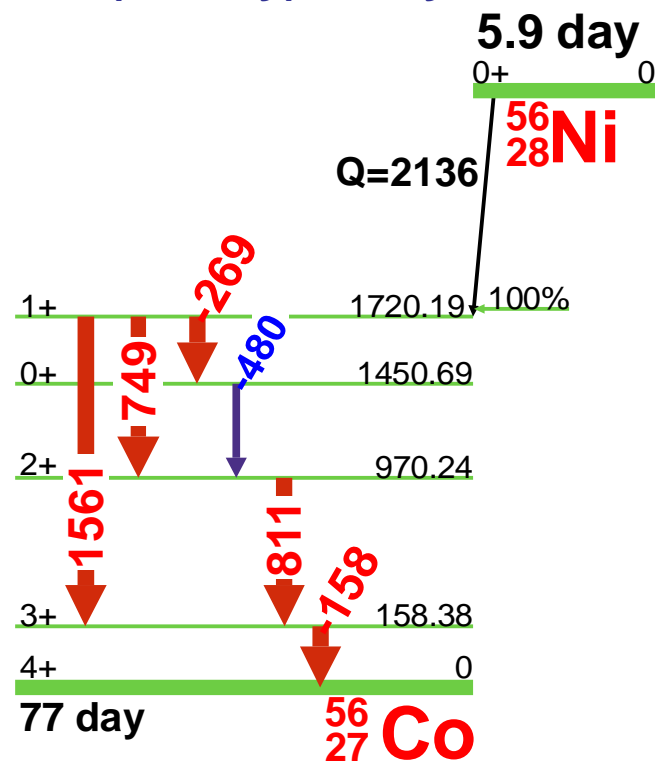
Half Life: 1.650(5) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{61}\text{Ni}(n,p)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
67.415	0.010	100.	84.7	0.4	1
841.7	0.5		0.79	0.07	4
909.2	0.5		3.62	0.27	4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



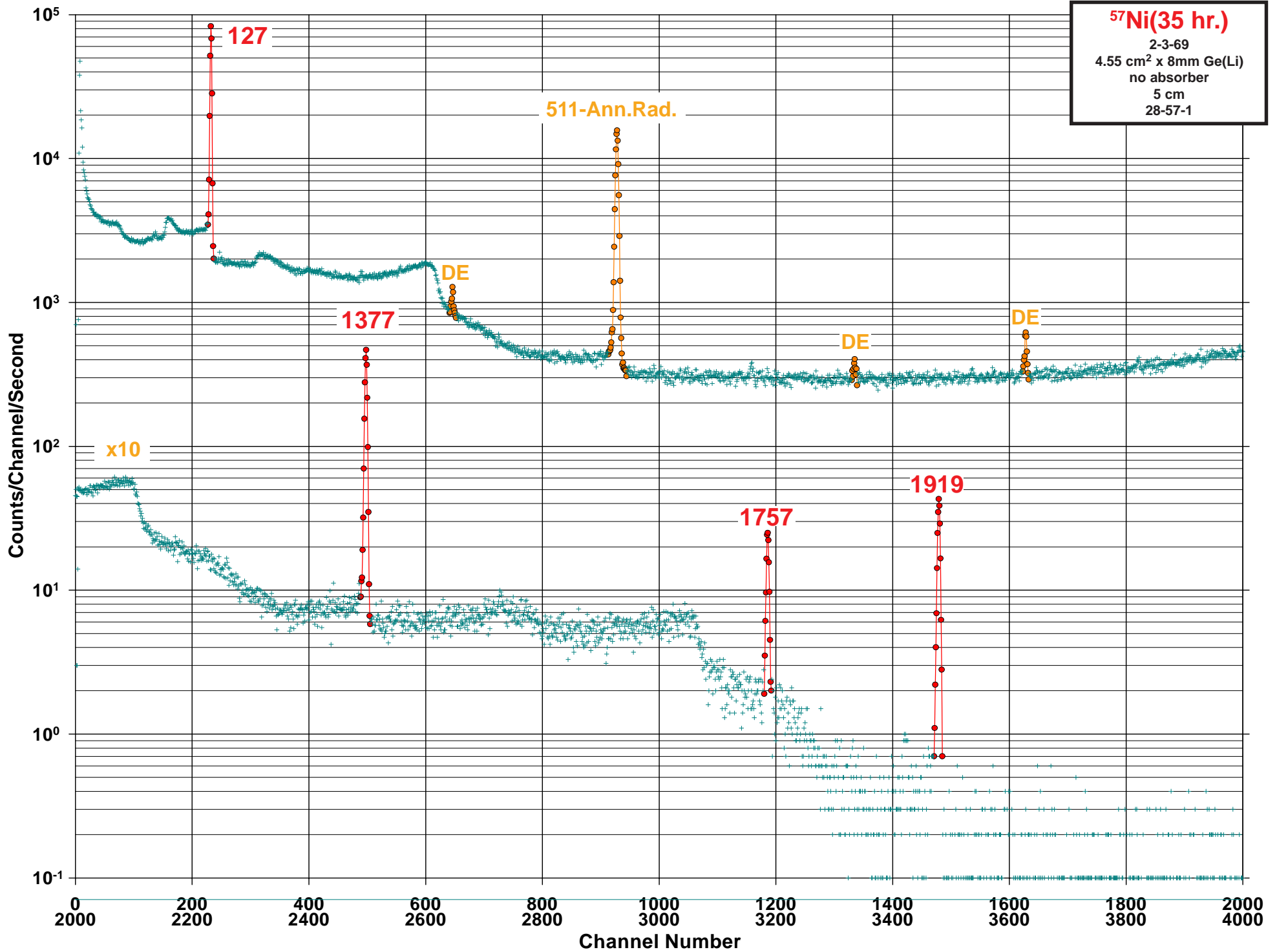
^{56}Ni (5.9 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{56}Ni

Half Life: 5.9(1) day

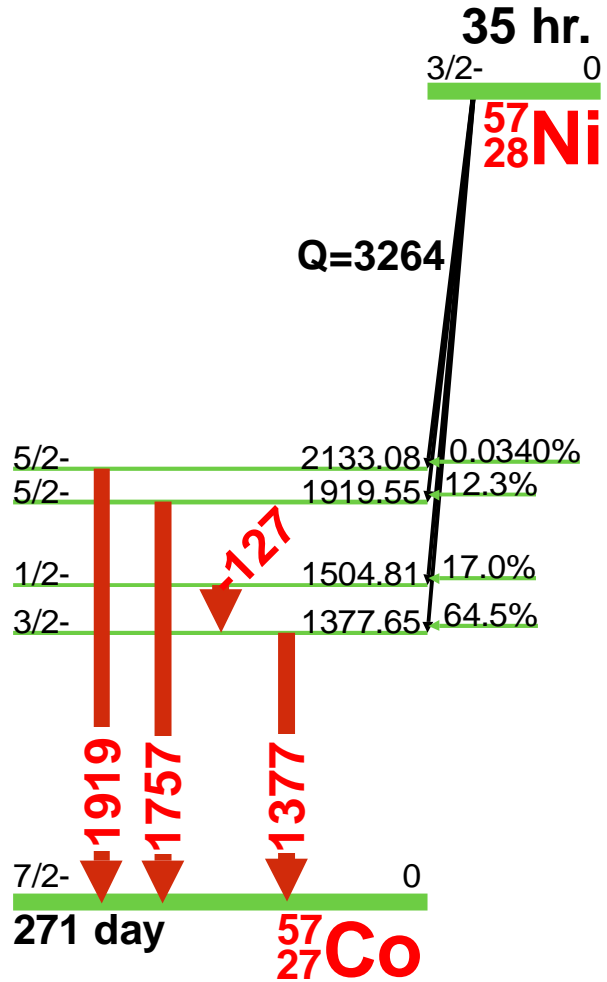
Detector: 45 cm³ coaxial Ge (Li)Method of Production: $^{58}\text{Ni}(\gamma, 2n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	158.38	0.03	100	98.8	1.0	1
	269.5	0.020	34.4	36.5	0.8	1
	480.440	0.020	32.2	36.5	0.8	2
Ann.	511.006			0.0014		4
	749.95	0.03	48.4	49.5	1.2	1
	811.85	0.03	75.0	86.0	0.9	1
	1561.80	0.05	13.3	14.0	0.6	1

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data



⁵⁷Ni(35 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁵⁷Ni

Half Life: 35.60(6) hr.

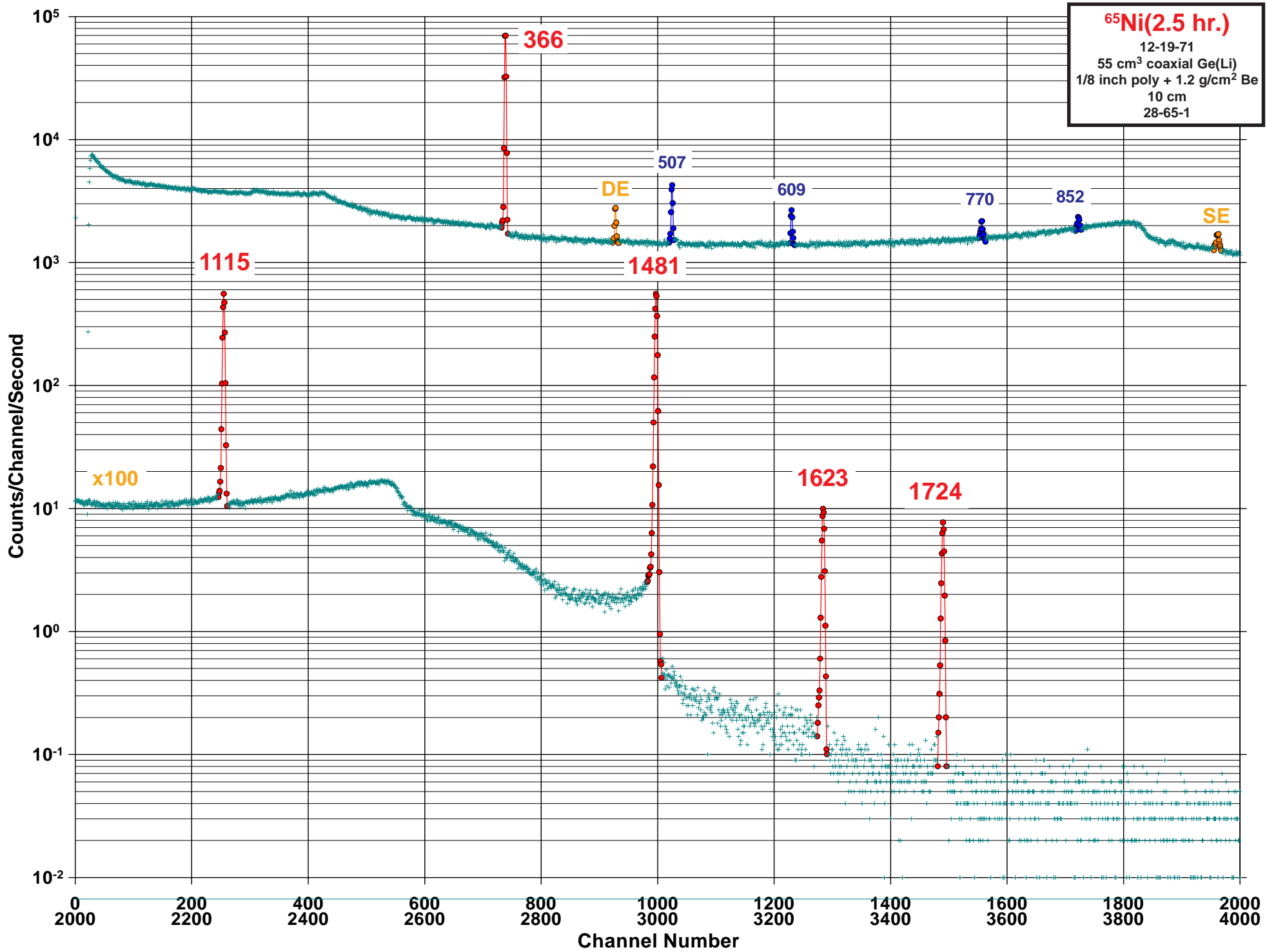
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁵⁸Ni(γ,n)

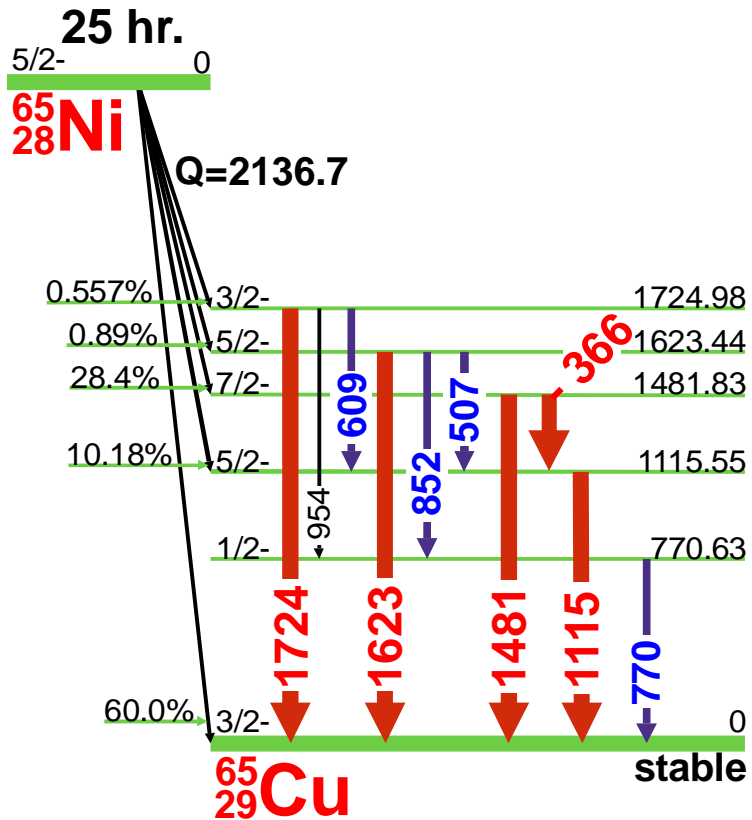
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	127.164	0.003	16.6	16.7	0.5	1
	161.86	0.03		0.0227	0.0008	4
	252.5					4
	304.10	0.10		0.0020	0.0006	4
	379.940	0.020		0.0670	0.0021	4
Ann.	511.006			86.	3.	1
	541.90	0.10		0.0037	0.0005	4
	673.44	0.04		0.0491	0.0012	4
	696.0	0.4		0.0009	0.0007	4
	755.30	0.10		0.0054	0.0007	4
	906.98	0.05		0.0613	0.0021	4
	1046.68	0.03		0.134	0.004	4
	1224.00	0.04		0.0629	0.0028	4
	1279.99	0.06		0.0096	0.0008	4
	1350.52	0.06		0.0020	0.0010	4
	1377.63	0.03	100	81.7	2.4	1
	1603.28	0.06		0.0039	0.0007	4
	1730.44	0.06		0.0523	0.0027	4
	1757.55	0.03	9.1	5.7517	0.2025	1
	1897.42	0.04		0.0278	0.0025	4
	1919.52	0.05	18.9	12.3	0.4	1
	2133.04	0.05		0.0286	0.0017	4
	2730.91	0.04		0.0199	0.0006	4
	2804.20	0.03		0.098	0.004	4
	3177.28	0.05		0.0111	0.0006	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁵Ni(2.5 hr.) Decay Scheme



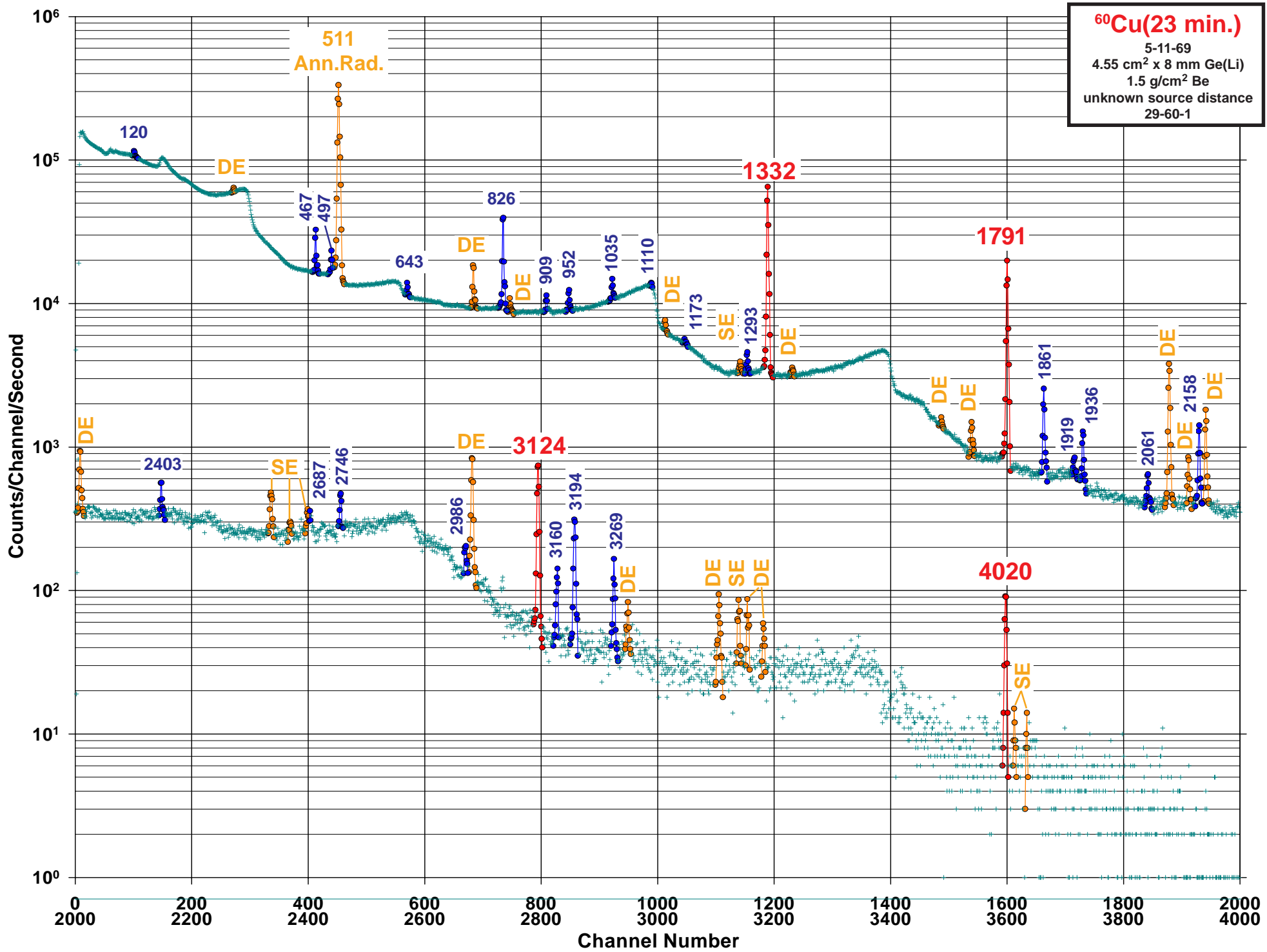
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁵Ni Half Life: 2.5172(3) hr.
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: ⁶⁴Ni(n,γ)

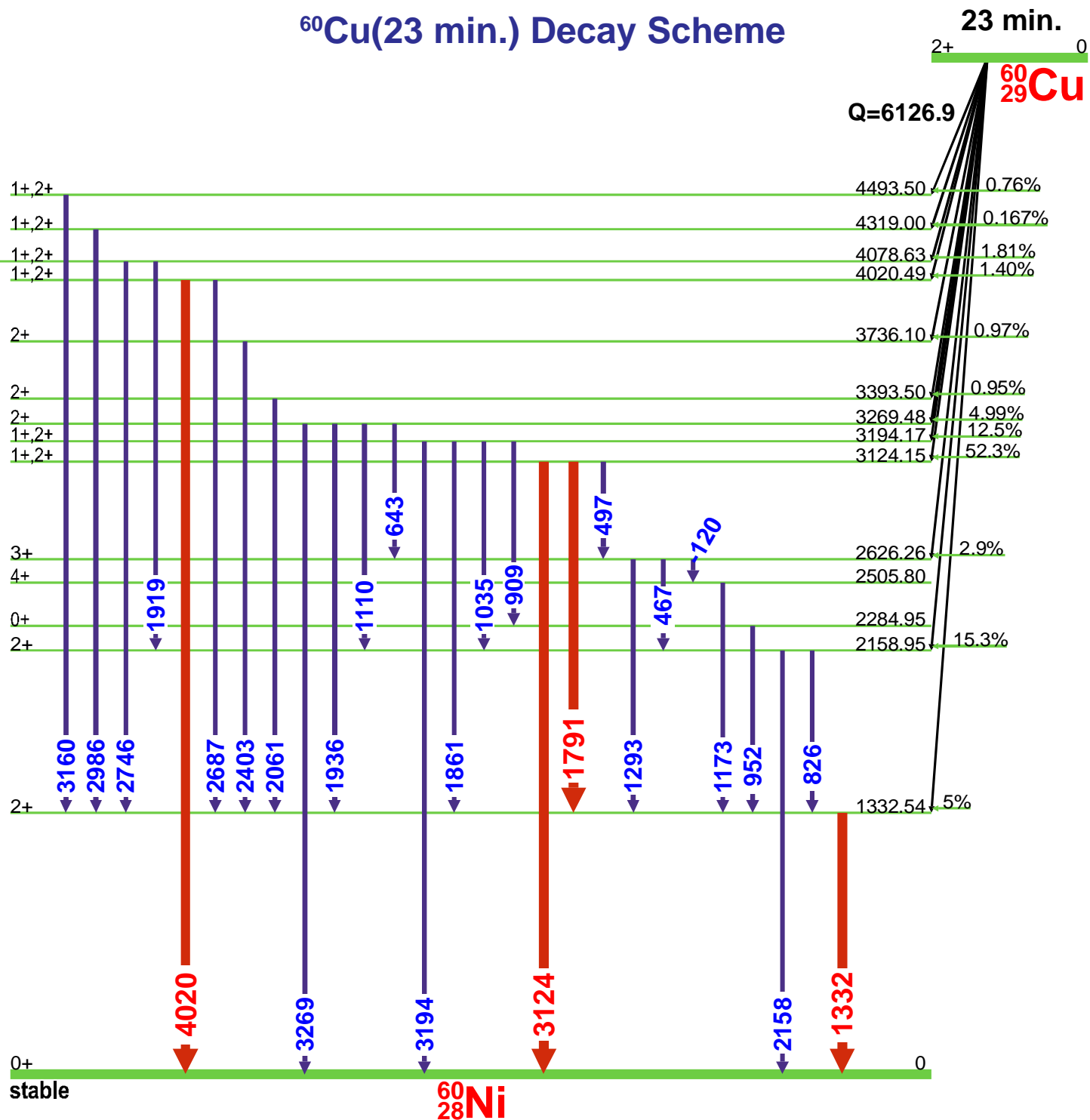
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
366.27	0.03	19.0	4.81	0.06	1
507.90	0.10	1.2	0.292	0.005	3
609.50	0.10	0.68	0.154	0.004	4
770.60	0.20	0.52	0.104	0.007	4
852.70	0.20	0.38	0.097	0.012	4
954.5	0.3		0.0035		4
1115.539	0.002	65.	15.43	0.13	1
1481.84	0.05	100	23.59	0.14	1
1623.42	0.06	2.1	0.498	0.014	1
1724.92	0.06	1.6	0.399	0.012	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁰Cu(23 min.) Decay Scheme



⁶⁰₂₈Ni

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{60}Cu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 23.7(4) min.

Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: Ni(p,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	120.5	0.3	0.15	0.194	0.018	4
	467.30	0.20	3.41	3.52	0.18	3
	497.90	0.20	1.28	1.67	0.09	4
Ann.	511.006			184.	8.	1
	611.			0.0229	0.0003	4
	614.			0.0220	0.0002	4
	643.2	0.3	1.16	0.97	0.05	4
	681.0	1.0		0.035	0.018	4
	739.6	1.0		0.079	0.026	4
	748.0	1.0		0.057	0.025	4
	826.40	0.20	21.0	21.7	1.1	2
	839.2	0.4		0.46	0.07	4
	896.3	0.5		0.13	0.05	4
	909.20	0.20	1.52	2.02	0.09	4
	952.40	0.20	3.24	2.73	0.18	4
	965.2	0.3		0.30	0.06	4
	984.5	0.6		0.08	0.04	4
	994.			0.035	0.026	4
	1027.			0.09	0.05	4
	1035.20	0.20	3.53	3.70	0.18	4
	1110.5	0.4		1.06	0.18	4
	1173.228	0.003	0.4	0.26	0.09	4
	1224.			0.0440	0.0005	4
	1234.2	0.7		0.11	0.04	4
	1293.70	0.20	2.00	1.85	0.18	4
	1307.1	0.6		0.106	0.026	4
	1332.492	0.004	100	88.0	1.0	1
	1420.1	0.5		0.114	0.018	4
	1425.1	0.6		0.070	0.018	4
	1451.4	0.5		0.167	0.026	4
	1486.			0.0528	0.0006	4
	1579.5	0.6		0.09	0.04	4
	1606.			0.0352	0.0004	4
	1693.			0.035	0.026	4
	1713.			0.018	0.026	4
	1735.4	0.6		0.062	0.018	4
	1767.0	0.5		0.10	0.04	4
	1791.6	0.3	52.0	45.4	2.3	1
	1813.			0.0202	0.0002	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1861.6	0.3	5.5	4.75	0.27	3
	1919.7	0.4	0.94	0.70	0.07	4
	1936.9	0.3	2.79	2.2	0.09	4
	2061.0	0.3	0.94	0.79	0.04	4
	2135.			0.018	0.013	4
	2158.90	0.20	3.8	3.34	0.18	3
	2176.0	2.0		0.052	0.015	4
	2263.6	0.8		0.11	0.04	4
	2334.4	1.2		0.035	0.018	4
	2377.0	1.0		0.062	0.013	4
	2389.6	1.0		0.12	0.04	4
	2403.3	0.6	0.94	0.77	0.08	4
	2420.			0.0264	0.0003	4
	2540.0	2.0		0.026	0.012	4
	2555.			0.0264	0.0003	4
	2602.			0.020	0.011	4
	2675.3	0.8		0.132	0.026	4
	2687.9	0.3		0.44	0.07	4
	2746.1	0.3		1.06	0.09	4
	2779.			0.0211	0.0002	4
	2889.6	0.7		0.020	0.008	4
	2986.3	0.5	0.59	0.123	0.018	4
	3002.			0.0211	0.0002	4
	3024.			0.0255	0.0003	4
	3124.1	0.3	6.2	4.75	0.27	1
	3160.8	0.3	0.73	0.581	0.027	3
	3194.1	0.3	2.47	2.024	0.091	2
	3203.			0.033	0.011	4
	3216.0	0.7		0.035	0.018	4
	3246.5	1.5		0.026	0.009	4
	3269.4	0.3	1.00	0.77	0.04	3
	3393.4	0.8		0.053	0.018	4
	3428.4	0.8		0.026	0.009	4
	3513.0	2.0		0.018	0.009	4
	3518.0	2.0		0.018	0.009	4
	3716.			0.0070	0.0001	4
	3735.6	1.3		0.026	0.009	4
	3872.	3.		0.011	0.004	4
	4007.8	1.5		0.079	0.026	4
	4020.4	0.4	1.08	0.77	0.08	1

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{60}Cu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 23.7(4) min.

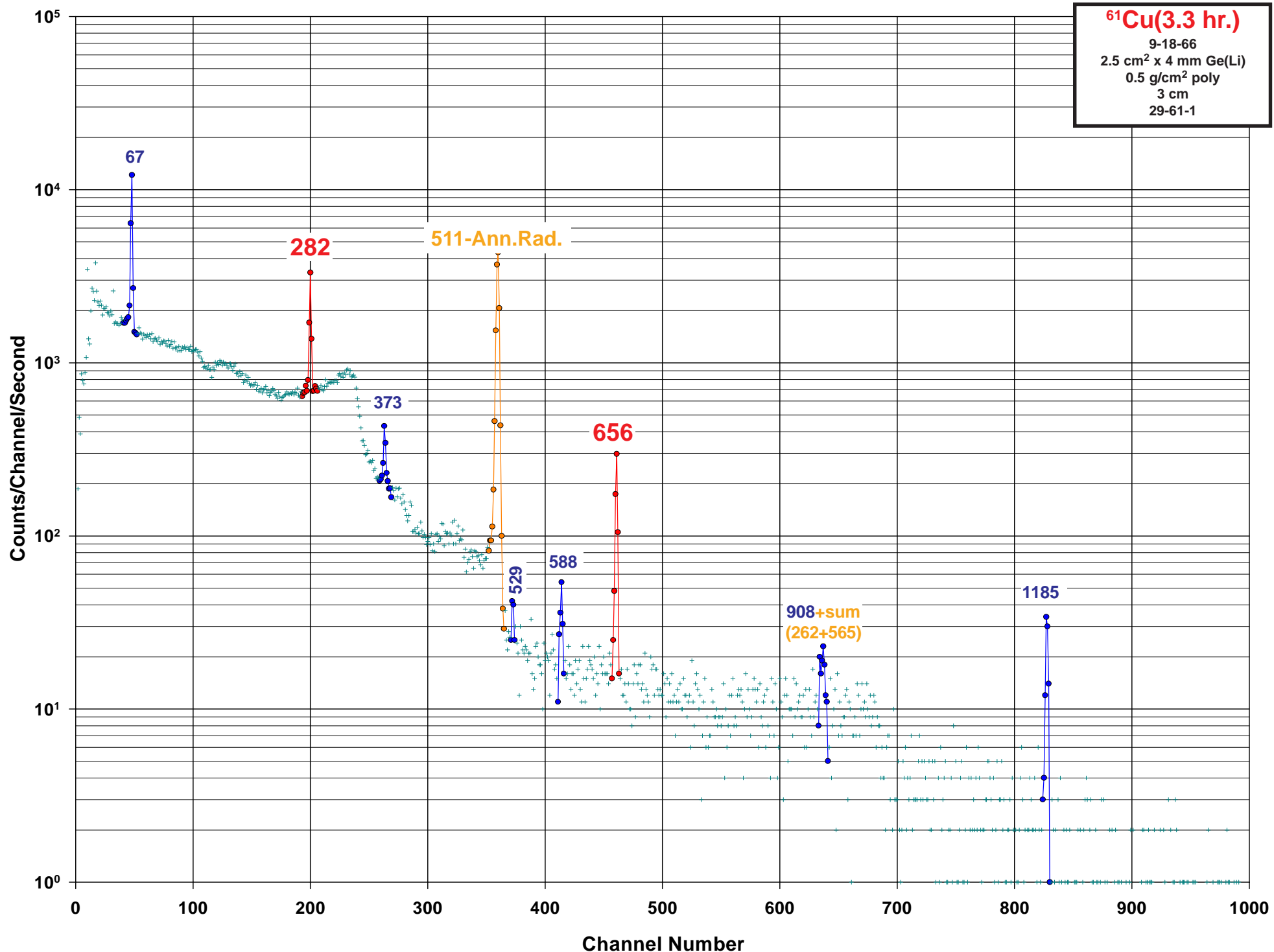
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: Ni(p,xn)

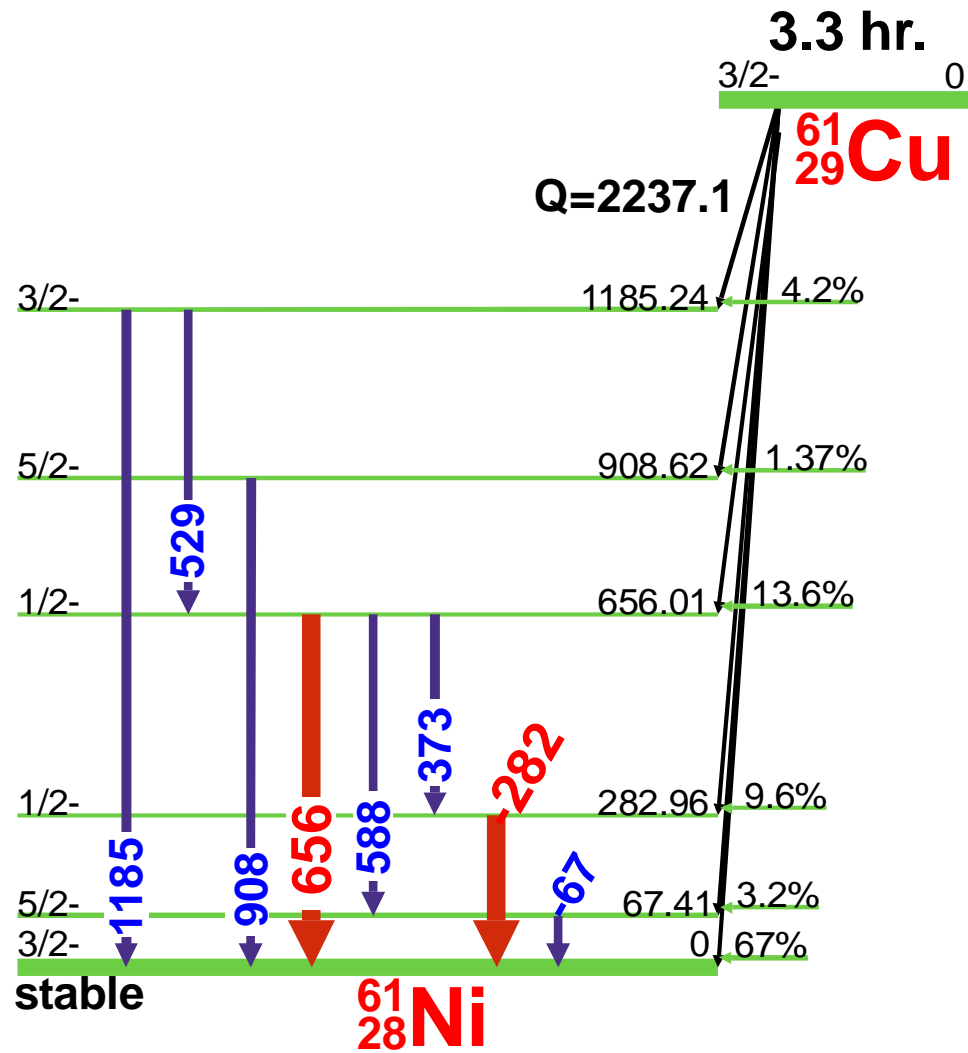
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
4078.3	0.4		0.062	0.018	4
4319.4	1.0		0.044	0.009	4
4334.6	1.1		0.0123	0.0018	4
4494.0	0.7		0.0396	0.008	4
4536.			0.0062	0.0001	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
4548.7	0.7		0.040	0.008	4
4578.9	0.8		0.022	0.006	4
4759.0	1.2		0.008	0.005	4
4843.1	1.6		0.0088	0.0026	4
5048.	3.		0.0018	0.0009	4





⁶¹Cu (3.3 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶¹Cu

Half Life: 3.333(5) hr.

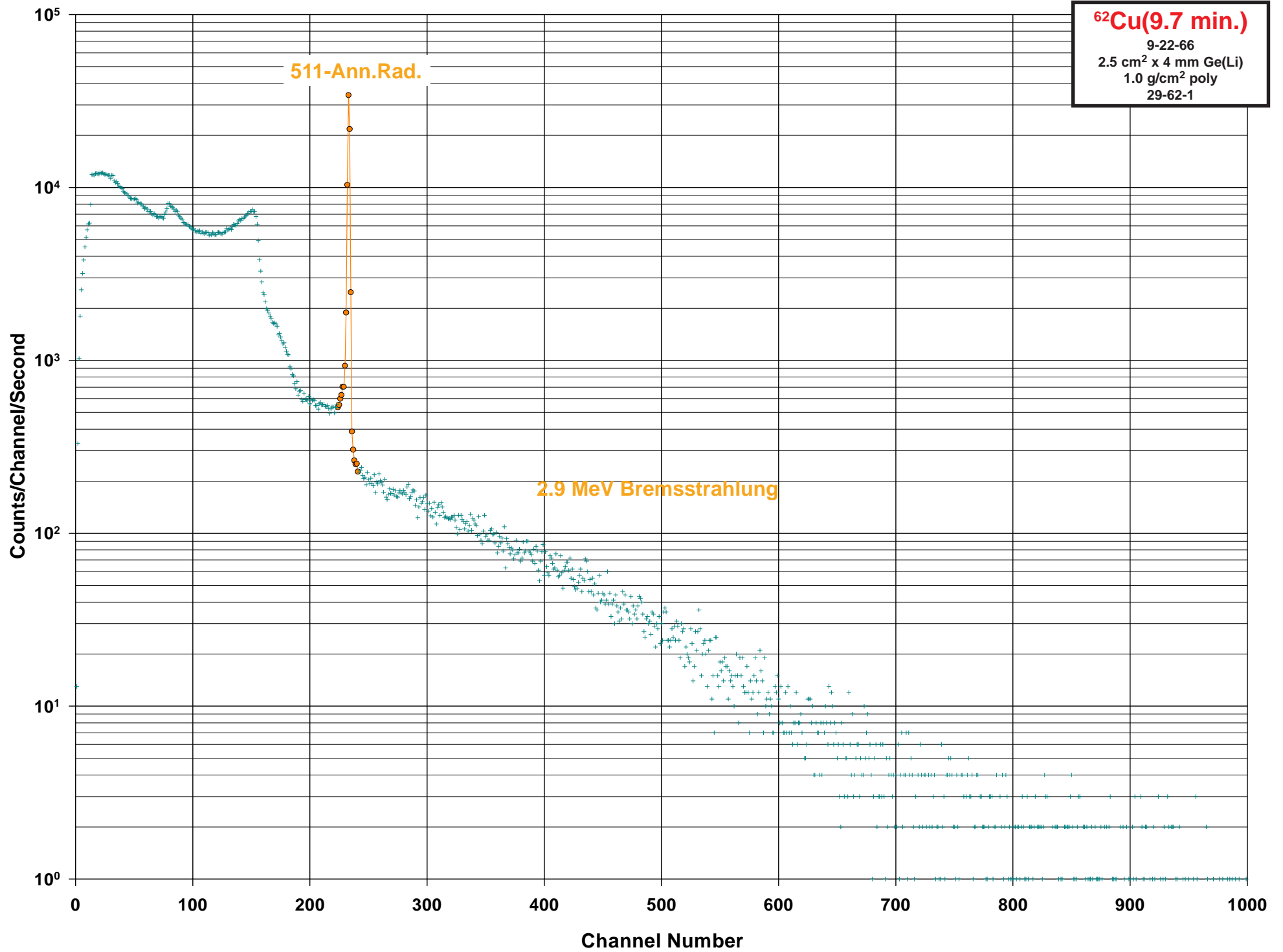
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ⁶³Cu(γ,2n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	67.412	0.003	6.2	4.2	0.8	2
	117.5			0.010	0.006	4
	215.55	0.18		0.022	0.008	4
	282.956	0.002	9.2	12.2	2.2	1
	373.050	0.005	2.35	2.1	0.4	3
Ann.	511.006		100	121	12	1
	529.169	0.022		0.38	0.07	4
	545.	5.		0.0059	0.0011	4
	588.605	0.009		1.17	0.21	4
	625.605	0.024		0.040	0.008	4
	656.008	0.004	7.0	10.8	2.0	1
	701.1	0.3				4
	816.692	0.013		0.31	0.06	4
	841.211	0.017		0.21	0.04	4
	902.294	0.020		0.083	0.016	4
	908.631	0.017		1.10	0.20	4
	947.4	0.4		0.010	0.005	4
	1014.8			0.010	0.004	4
	1032.162	0.027		0.042	0.008	4
	1064.896	0.020		0.048	0.009	4
	1073.465	0.025		0.033	0.007	4
	1099.560	0.019		0.25	0.04	4
	1117.82	0.04		0.032	0.007	4
	1132.35	0.03		0.090	0.017	4
	1185.234	0.015	3.12	3.7	0.7	2
	1446.492	0.019		0.045	0.009	4
	1542.204	0.023		0.026	0.005	4
	1609.62	0.05		0.021	0.004	4
	1662.000	0.019		0.053	0.010	4
	1729.473	0.018		0.054	0.010	4
	1997.7	0.9		0.0039	0.0007	4
	2120.			0.0098	0.0018	4
	2124.			0.041	0.008	4

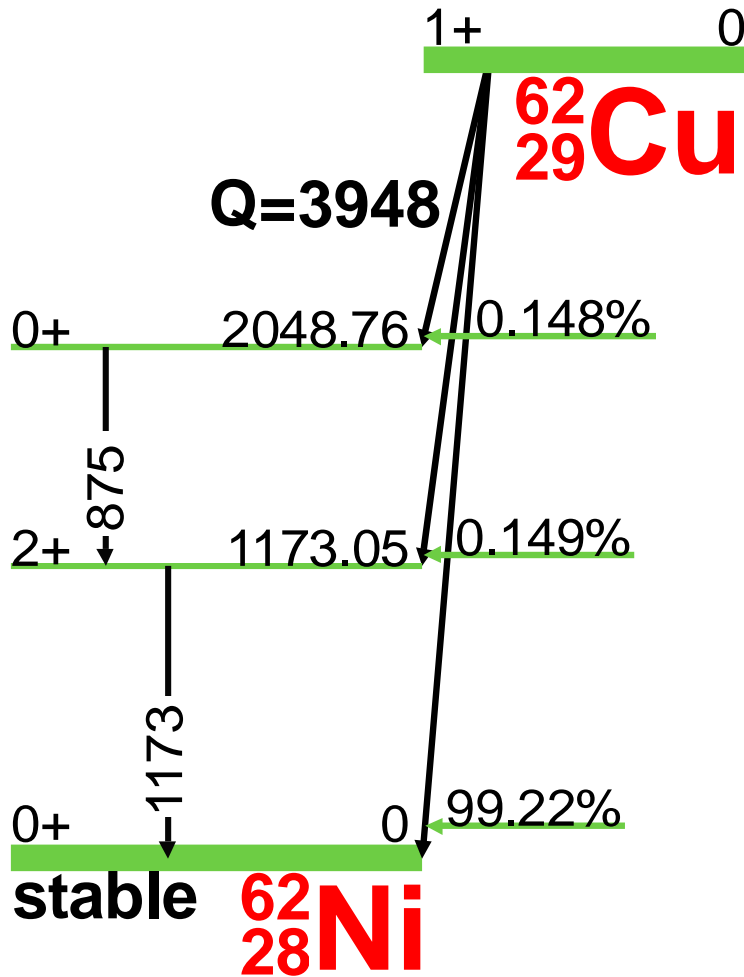
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶²Cu(9.7 min.) Decay Scheme

9.7 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶²Cu

Half Life: 9.74(2) min.

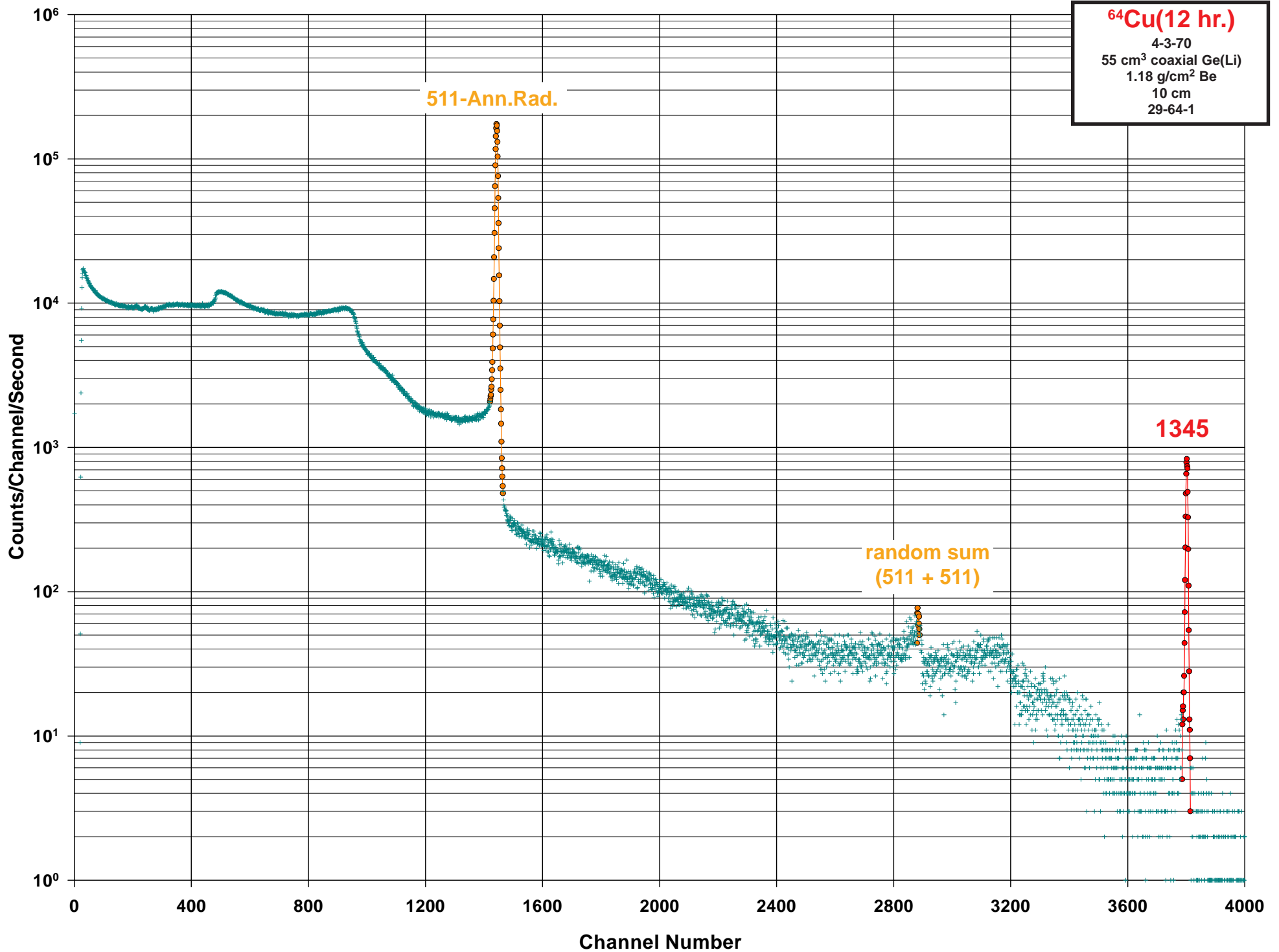
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ⁶³Cu(γ,n)

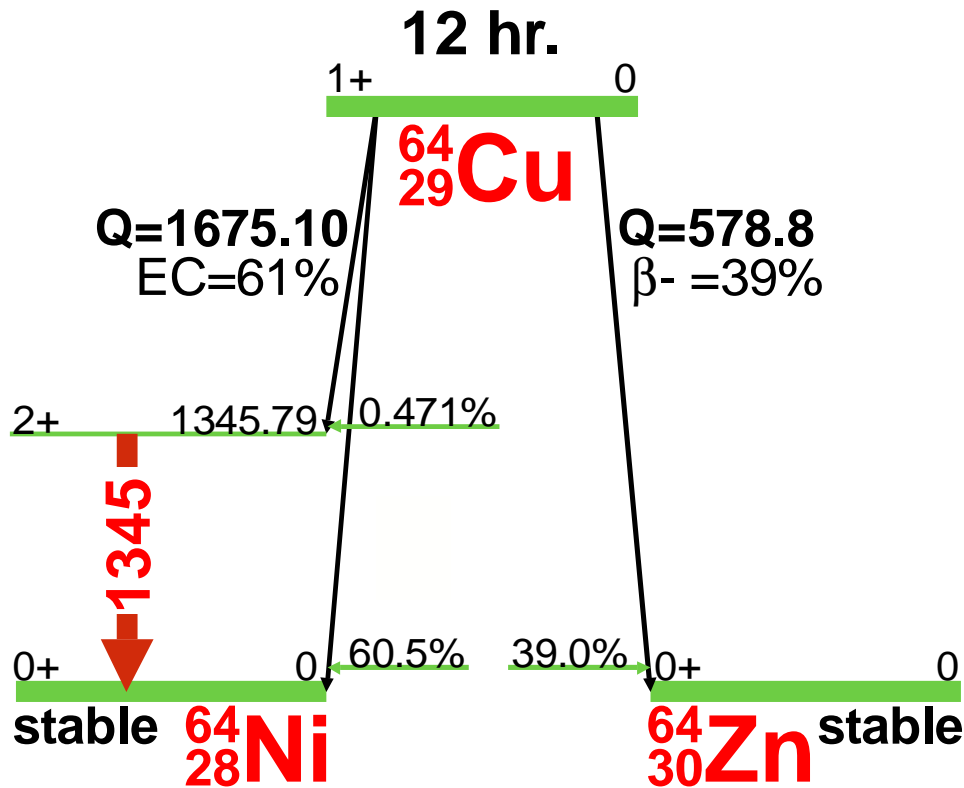
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006		100	192.9	0.6	1
	855.6			0.0004		4
	875.71	0.07		0.150	0.009	4
	1067.0	1.0		0.0006	0.0003	4
	1128.98	0.10		0.0324	0.0022	4
	1173.02	0.10		0.342	0.013	4
	1717.6	0.4		0.0027	0.0004	4
	1985.0	1.0		0.0010	0.0003	4
	2084.6	0.4		0.0051	0.0010	4
	2097.6	0.3		0.0030	0.0004	4
	2301.96	0.08		0.0414	0.0026	4
	3158.2	1.0		0.0006	0.0001	4
	3257.3	1.0		0.0001	0.0001	4
	3271.4	0.4		0.0007	0.0001	4
	3369.9	0.3		0.0080	0.0006	4
	3861.7	1.1		0.0003	0.0001	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁴Cu(12 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁴Cu

Half Life: 12.700(2) hr.

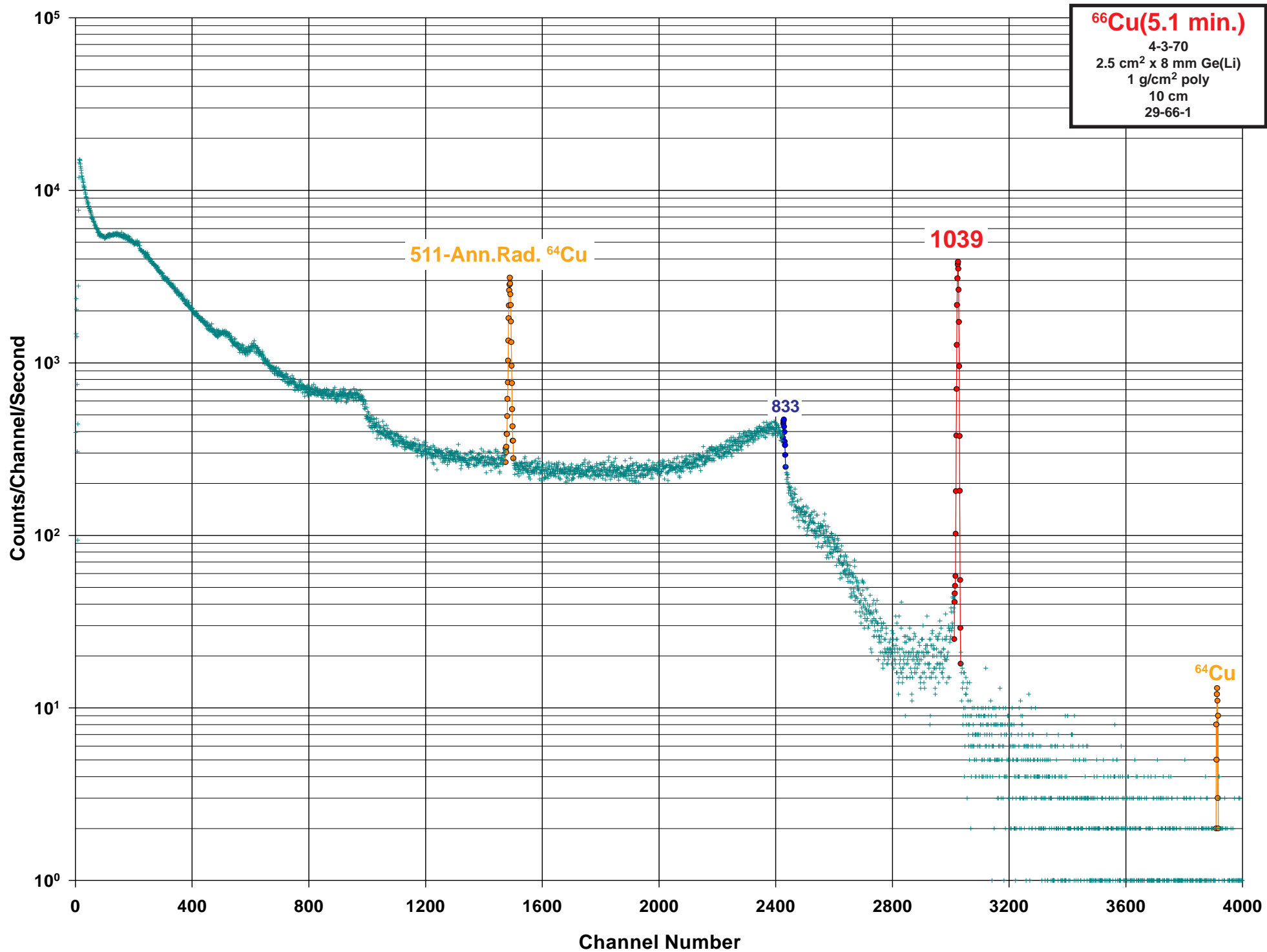
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁶³Cu(n,γ)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006		100	34.5	0.4	1
	1345.77	0.06	1.05	0.471	0.010	1

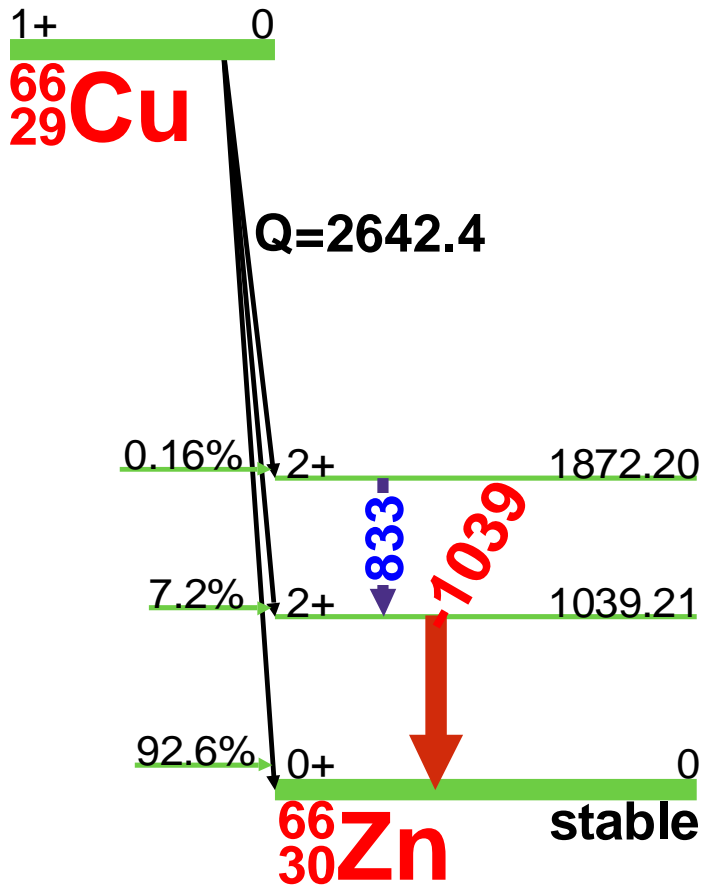
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁶Cu(5.1 min.) Decay Scheme

5.1 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁶Cu

Half Life: 5.120(14) min.

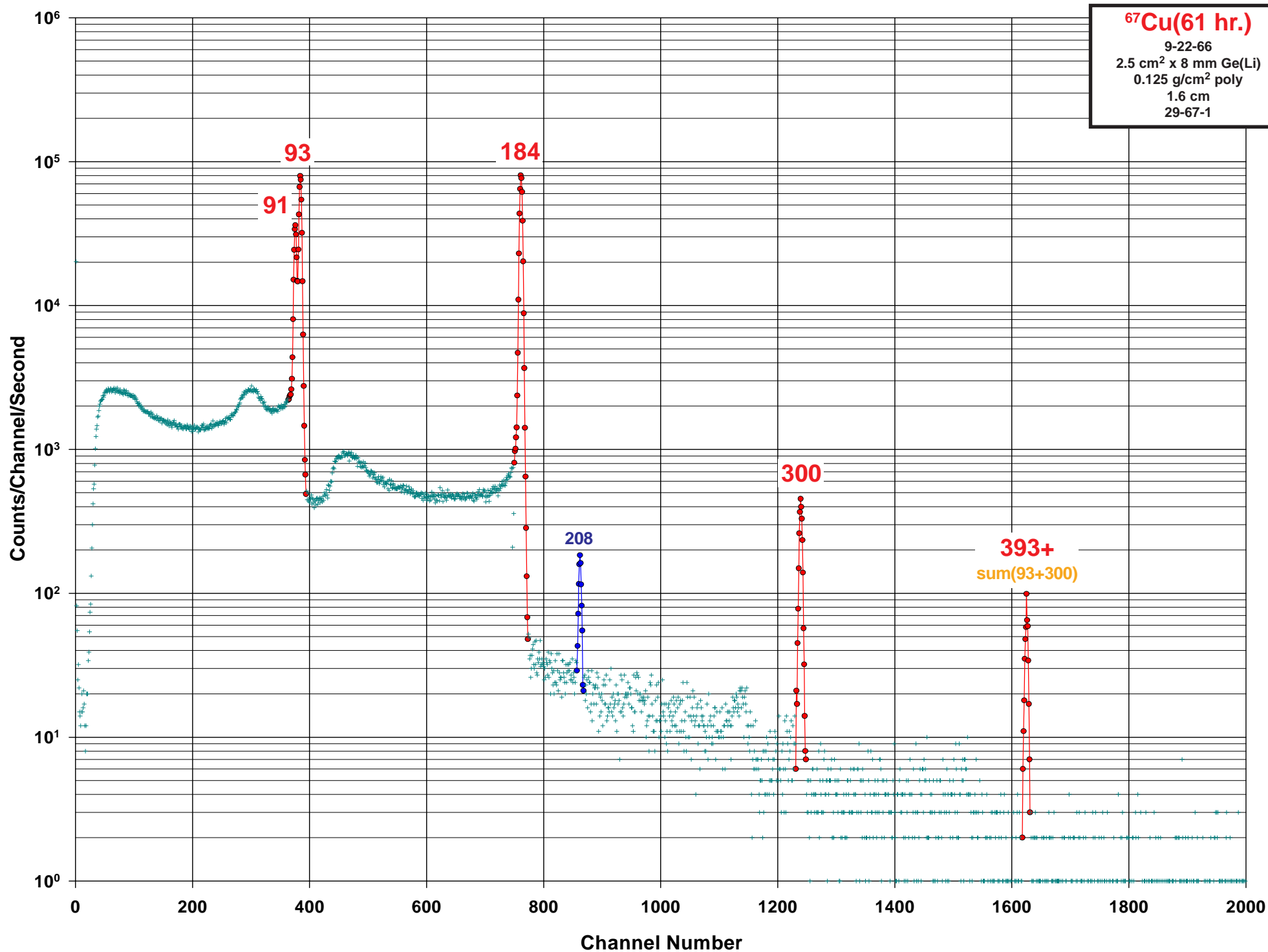
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁶⁵Cu(n,γ)

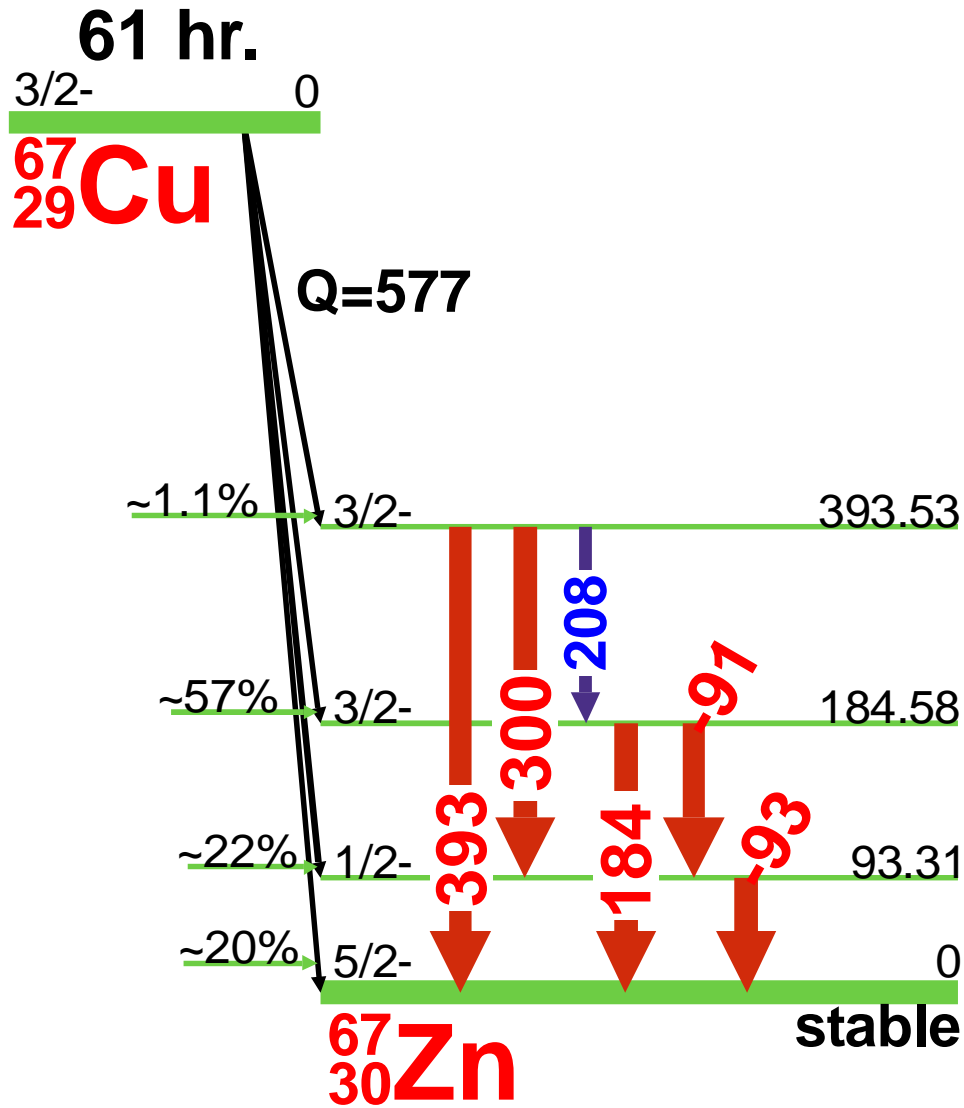
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
833.0	1.0	3.8	0.16	0.05	4
1039.20	0.20	100	7.4	1.8	1
1332.5	1.5		0.0028	0.0008	4
1872.2			0.0004	0.0001	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁶⁷Cu(61 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁷Cu

Half Life: 61.83(12) hr.

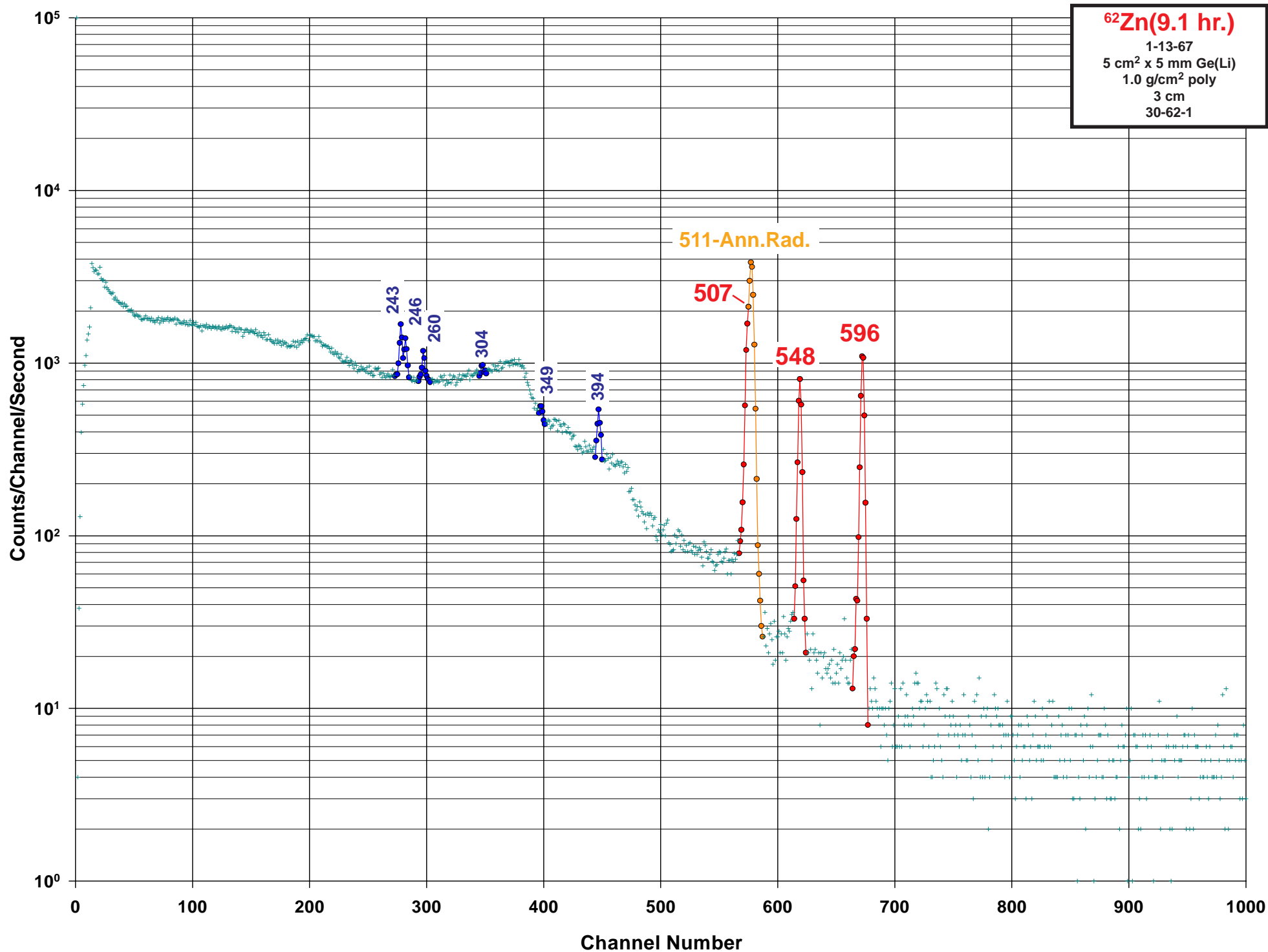
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁶⁸Zn(γ,p)

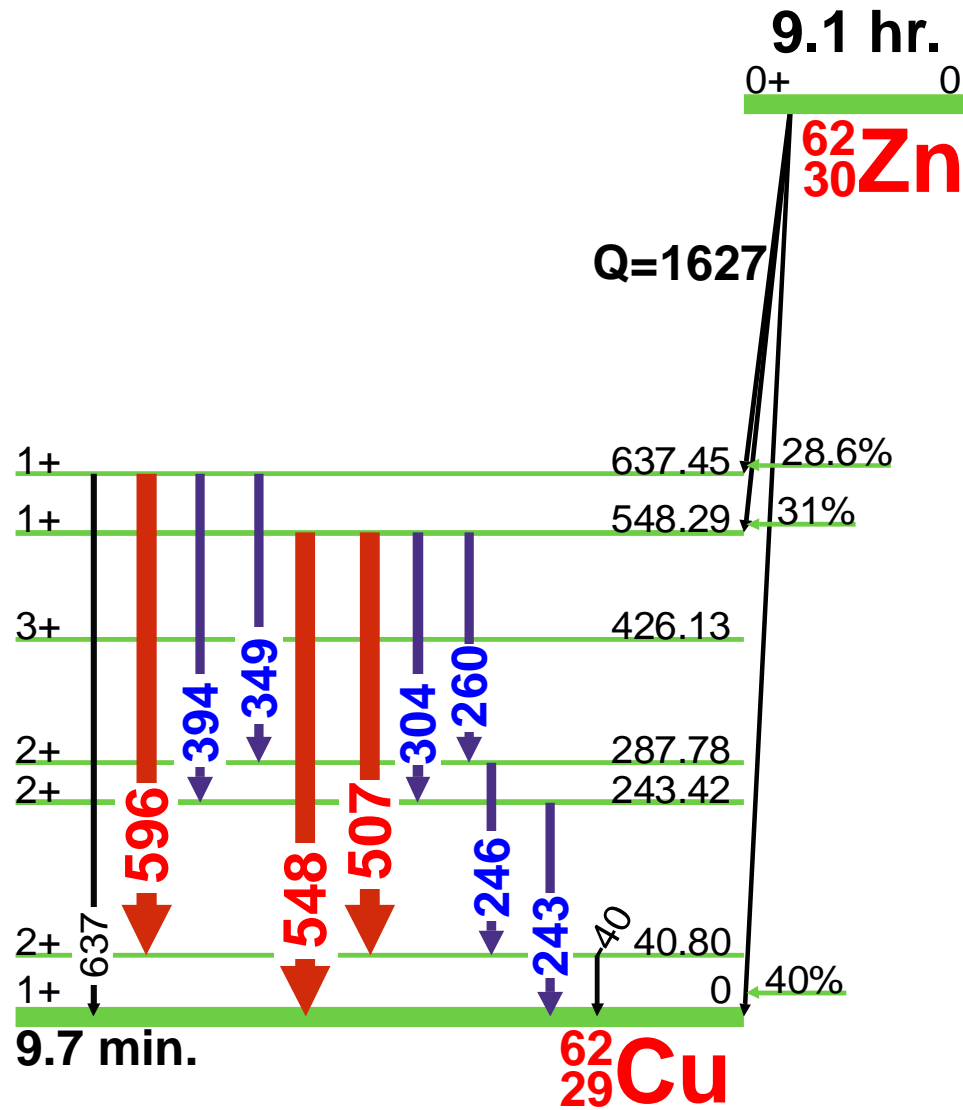
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
91.266	0.005	15.5	7.00	0.10	1
93.311	0.005	34.5	16.10	0.20	1
184.577	0.010	100	48.7	0.3	1
208.951	0.010	0.24	0.115	0.005	2
300.219	0.010	1.64	0.797	0.011	1
393.529	0.010	0.48	0.220	0.008	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶²Zn(9.1 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶²Zn

Half Life: 9.186(13) hr.

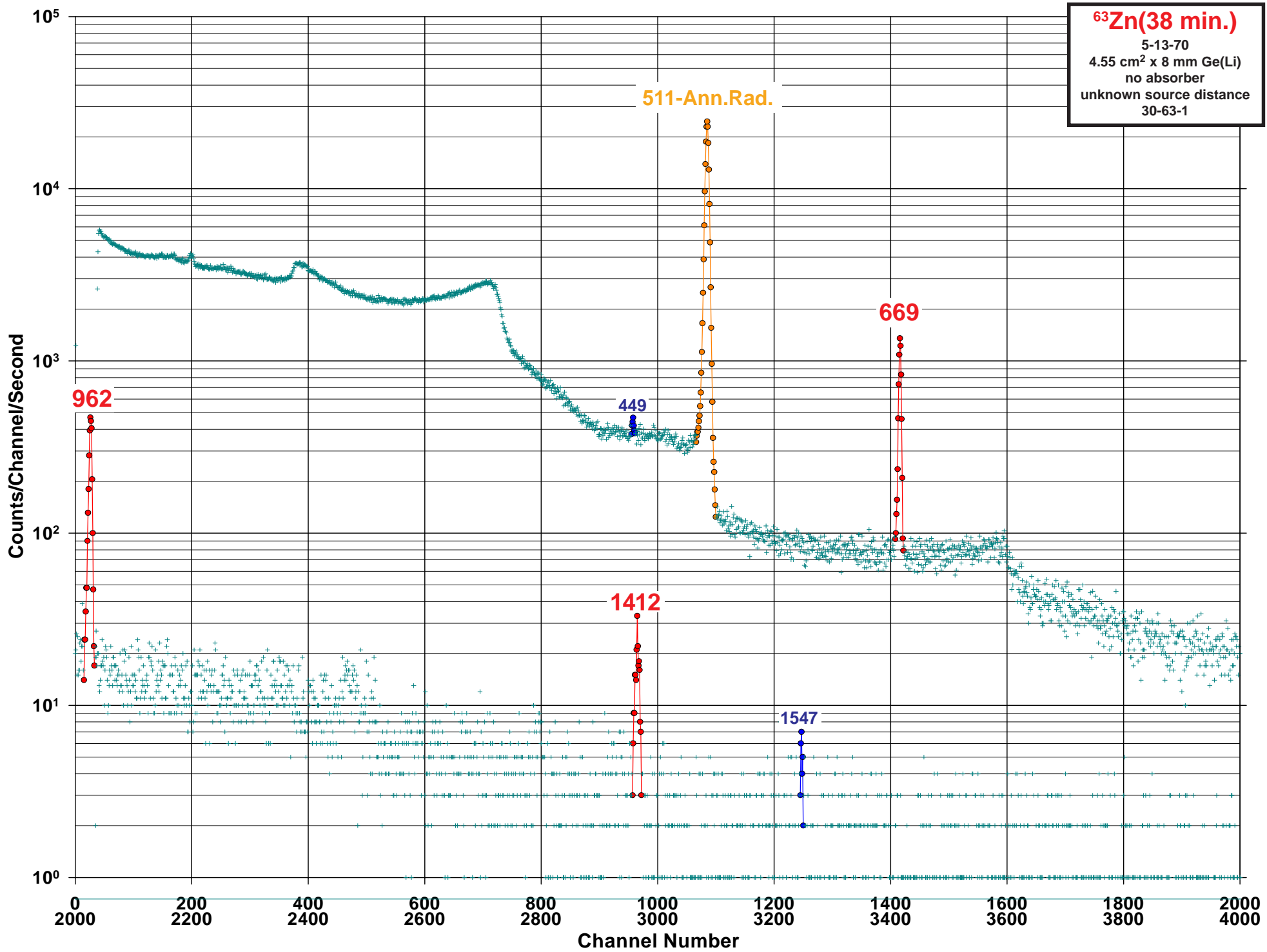
Detector: 5 cm² x 5 mm Ge (Li)

Method of Production: ⁶⁴Zn(γ ,2n)

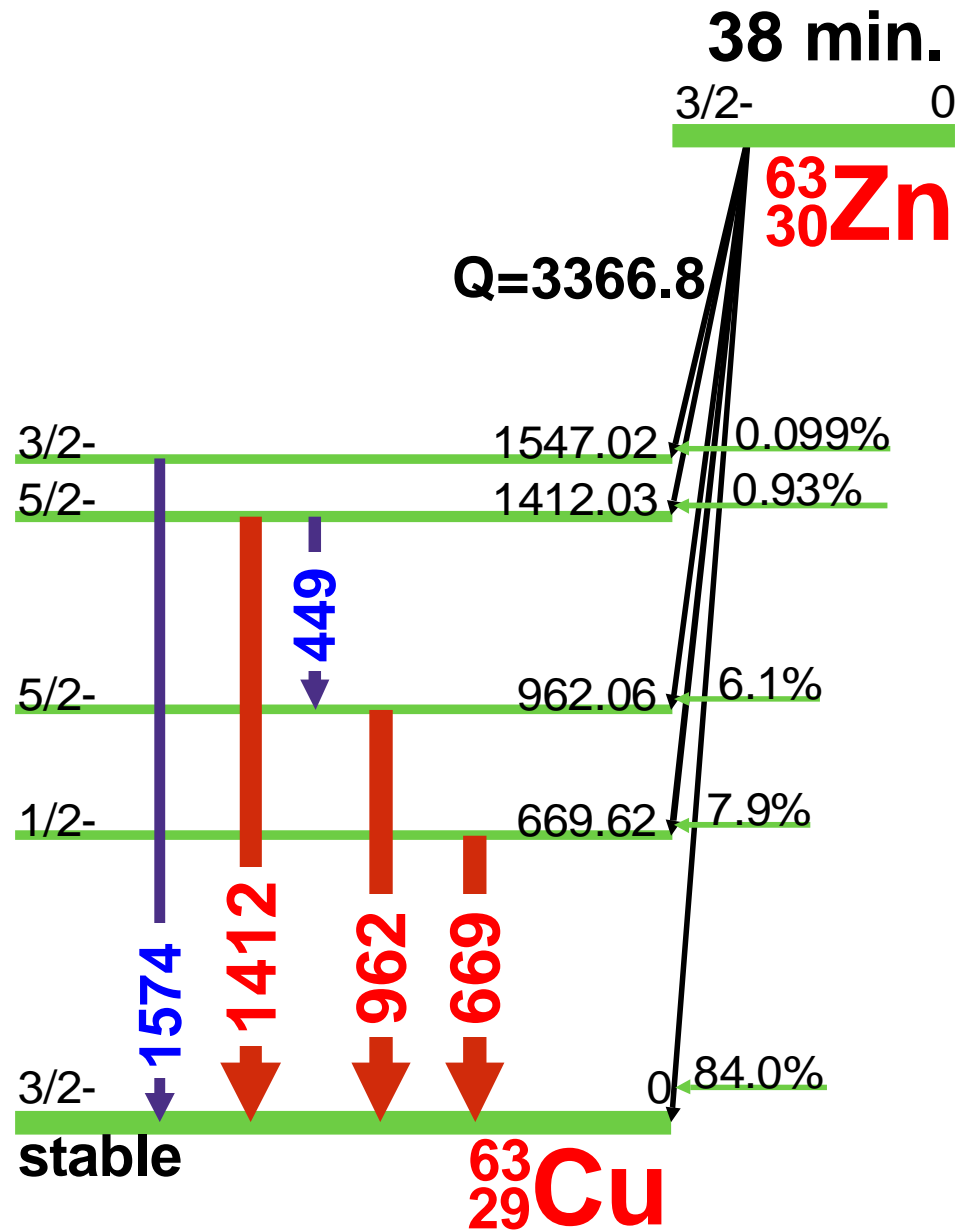
<i>E_γ</i> (keV)	σE_{γ}	<i>I_γ</i> (rel)	<i>I_γ</i> (%)	σI_{γ}	S
40.85	0.06		25.5	2.4	4
202.67	0.06		0.0109	0.0015	4
243.36	0.06	3.68	2.52	0.23	3
246.95	0.06	3.3	1.90	0.18	3
260.43	0.07	1.5	1.35	0.13	4
304.88	0.09		0.289	0.027	4
349.60	0.13		0.45	0.04	4
385.31	0.09		0.0174	0.0021	4
394.03	0.06	3.11	2.24	0.17	3
489.17	0.07		0.0159	0.0020	4
507.60	0.10	17.8	14.8	1.4	1
Ann. 511.006			16.6	2.4	1
548.35	0.11	16.6	15.3	1.4	1
596.56	0.13	28.6	26.0	2.0	1
627.8	0.4		0.0008	0.0003	4
637.41	0.07		0.255	0.025	4
644.82	0.06		0.0143	0.0013	4
657.5	0.5		0.0013	0.0003	4
671.84	0.09		0.0044	0.0006	4
731.23	0.15		0.0023	0.0004	4
792.03	0.07		0.0088	0.0010	4
827.59	0.14		0.0030	0.0004	4
881.4	0.3		0.0146	0.0015	4
915.44	0.16		0.0153	0.0016	4
1141.91	0.11		0.035	0.003	4
1186.2	0.3		0.0039	0.0013	4
1221.50	0.20		0.0015	0.0003	4
1321.3	0.7		0.0013	0.0001	4
1389.1	0.4		0.0117	0.0012	4
1429.9	0.7		0.028	0.003	4
1485.1	0.5		0.0005	0.0003	4
1525.9	0.6		0.0057	0.0014	4

E_γ, σE_{γ} , *I_γ*, σI_{γ} - 1998 ENSDF Data





⁶³Zn(38 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{63}Zn E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

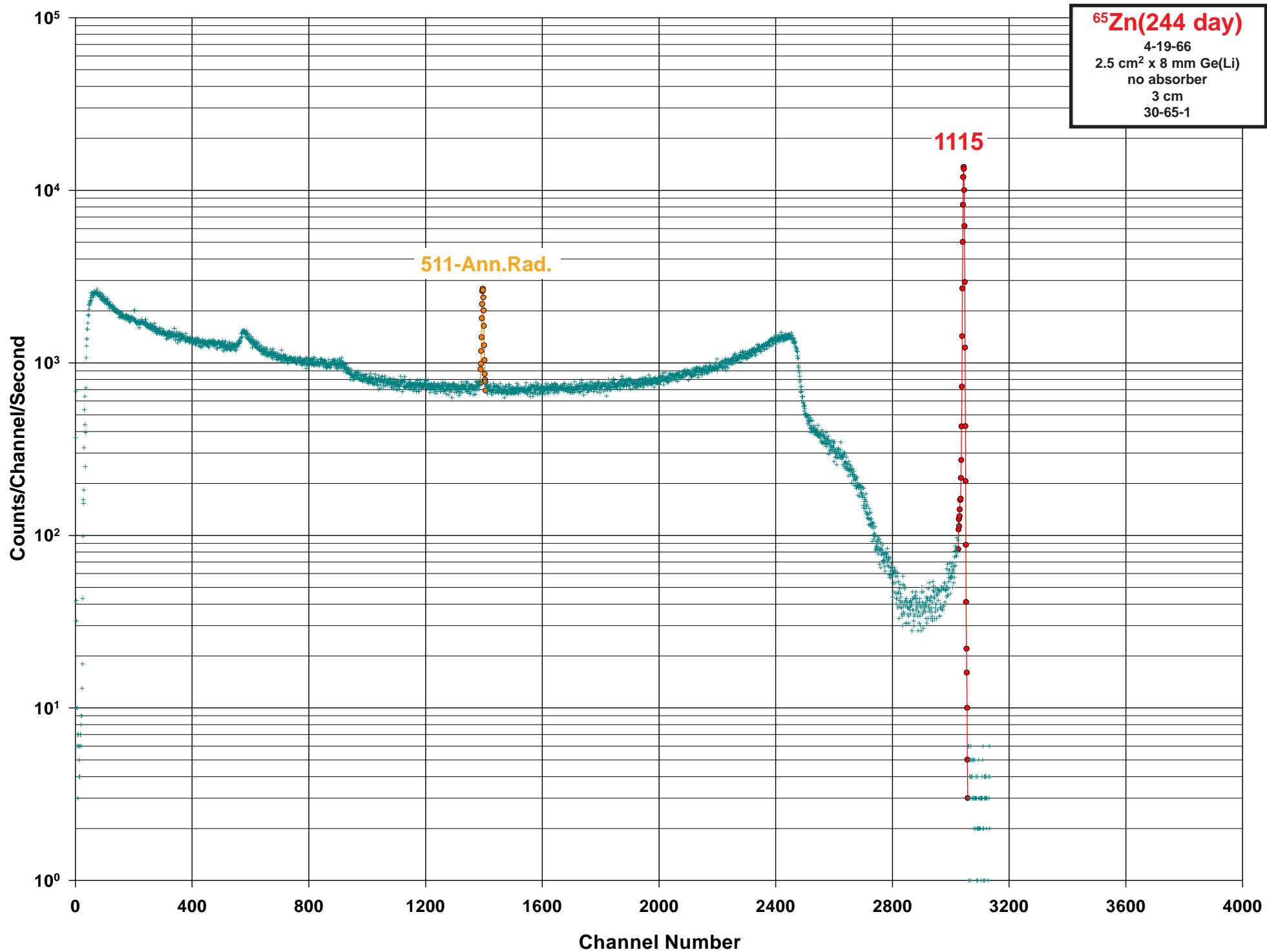
Half Life: 38.47(5) min.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{64}\text{Zn}(\gamma, n)$

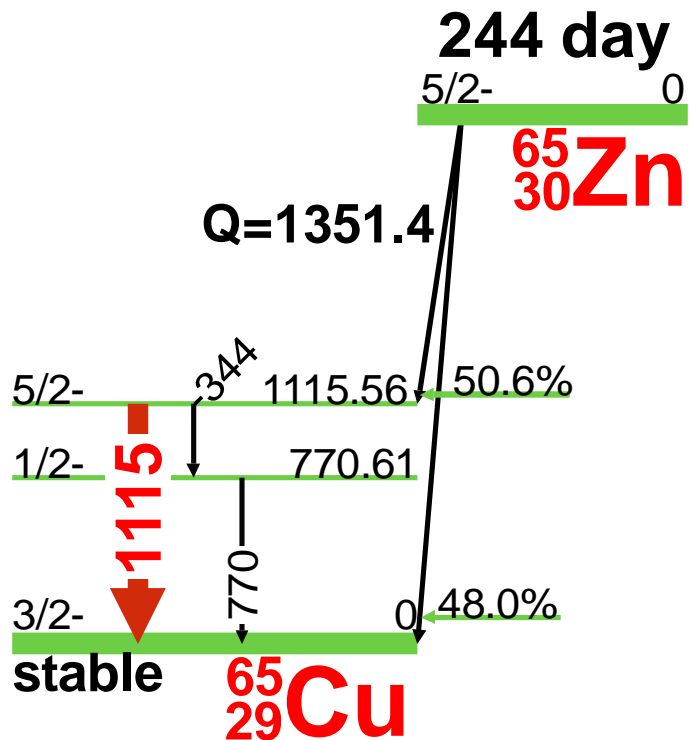
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	244.3	0.5		0.0053	0.0008	4
	365.2	0.4		0.0115	0.0025	4
	443.13	0.20		0.016	0.004	4
	449.93	0.05		0.236	0.018	4
	475.8	0.9		0.006	0.003	4
Ann.	511.006			184	2	1
	515.0	1.0		0.021	0.008	4
	533.8	0.6		0.0049	0.0016	4
	584.82	0.15		0.033	0.004	4
	624.3	0.3		0.014	0.003	4
	669.62	0.05	100	8.2	0.3	1
	675.0	0.6		0.015	0.003	4
	685.6	0.6		0.0041	0.0016	4
	742.25	0.10		0.067	0.009	4
	754.8	0.8		0.0066	0.0025	4
	765.7	0.5		0.0066	0.0025	4
	877.2	0.8		0.0033	0.0016	4
	899.0	0.4		0.0123	0.0025	4
	924.3	0.5		0.0098	0.0020	4
	962.06	0.04	75.0	6.5	0.4	1
	989.6	0.7		0.0039	0.0011	4
	1048.8	0.5		0.0044	0.0012	4
	1123.72	0.07		0.111	0.012	4
	1130.67	0.25		0.0131	0.0025	4
	1149.50	0.16		0.0189	0.0026	4
	1169.6	0.3		0.0077	0.0017	4
	1208.8	0.3		0.0123	0.0025	4
	1233.7	0.5		0.0025	0.0008	4
	1327.03	0.08		0.069	0.005	4
	1341.7	0.6		0.0025	0.0008	4
	1374.47	0.13		0.0344	0.0028	4
	1389.66	0.08		0.043	0.006	4
	1392.55	0.08		0.097	0.015	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1412.08	0.05	10.0	0.75	0.04	1
	1445.8	0.4		0.0025	0.0008	4
	1479.1	0.5		0.0016	0.0008	4
	1547.04	0.06		0.122	0.007	3
	1573.71	0.20		0.0164	0.0017	4
	1667.2	0.6		0.0014	0.0006	4
	1696.6	1.0		0.0020	0.0010	4
	1754.9	0.5		0.0043	0.0010	4
	1827.0	0.5		0.0042	0.0011	4
	1861.3	0.3		0.0139	0.0020	4
	1866.1	0.3		0.0197	0.0026	4
	1927.2	0.7		0.0057	0.0012	4
	2011.4	0.5		0.0107	0.0017	4
	2026.8	0.3		0.056	0.006	4
	2046.4	0.8		0.0037	0.0011	4
	2062.1	0.3		0.034	0.004	4
	2081.4	0.3		0.0148	0.0017	4
	2092.6	0.5		0.0025	0.0008	4
	2110.8	0.5		0.0062	0.0013	4
	2181.8	0.7		0.0013	0.0008	4
	2188.0	0.7		0.0016	0.0008	4
	2219.9	0.7		0.0030	0.0008	4
	2336.5	0.3		0.075	0.006	4
	2497.4	0.4		0.0213	0.0026	4
	2512.0	0.5		0.0098	0.0017	4
	2536.0	0.3		0.066	0.007	4
	2696.6	0.3		0.040	0.004	4
	2716.9	0.4		0.0131	0.0017	4
	2780.3	0.4		0.0156	0.0017	4
	2806.6	0.6		0.0041	0.0008	4
	2857.6	0.8		0.0033	0.0008	4
	2889.4	0.8		0.0025	0.0008	4
	3044.6	0.8		0.0049	0.0008	4
	3100.7	0.8		0.0006	0.0002	4





⁶⁵Zn(244 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁵Zn

Half Life: 244.3(3) day

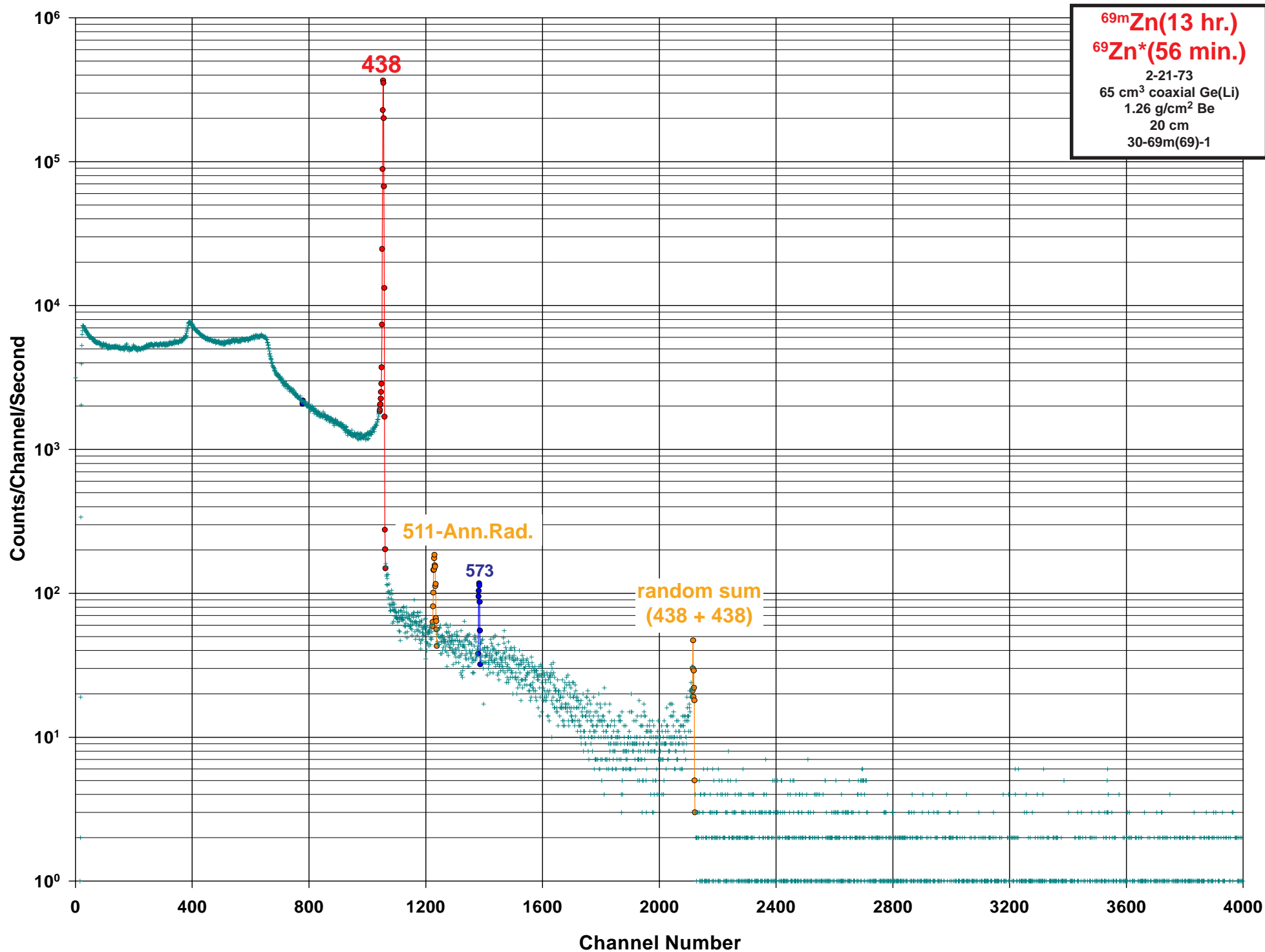
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁶⁴Zn(n, γ)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	344.95	0.20		0.0030	0.0003	4
Ann.	511.006			2.78	0.04	2
	770.60	0.20		0.0030	0.0003	4
	1115.546	0.004	100	50.60	0.24	1

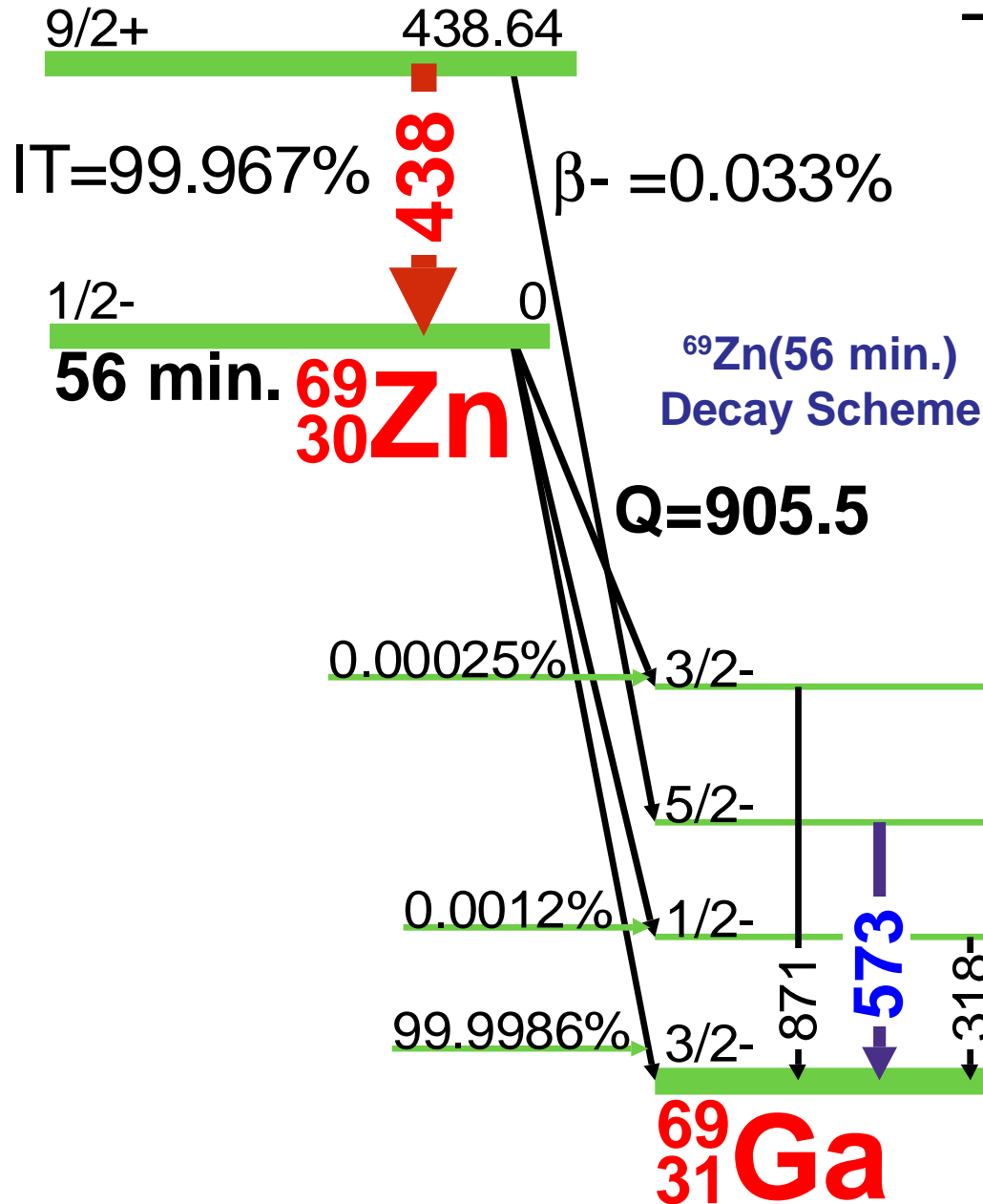
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{69m}Zn(13 hr.) Decay Scheme

13 hr.



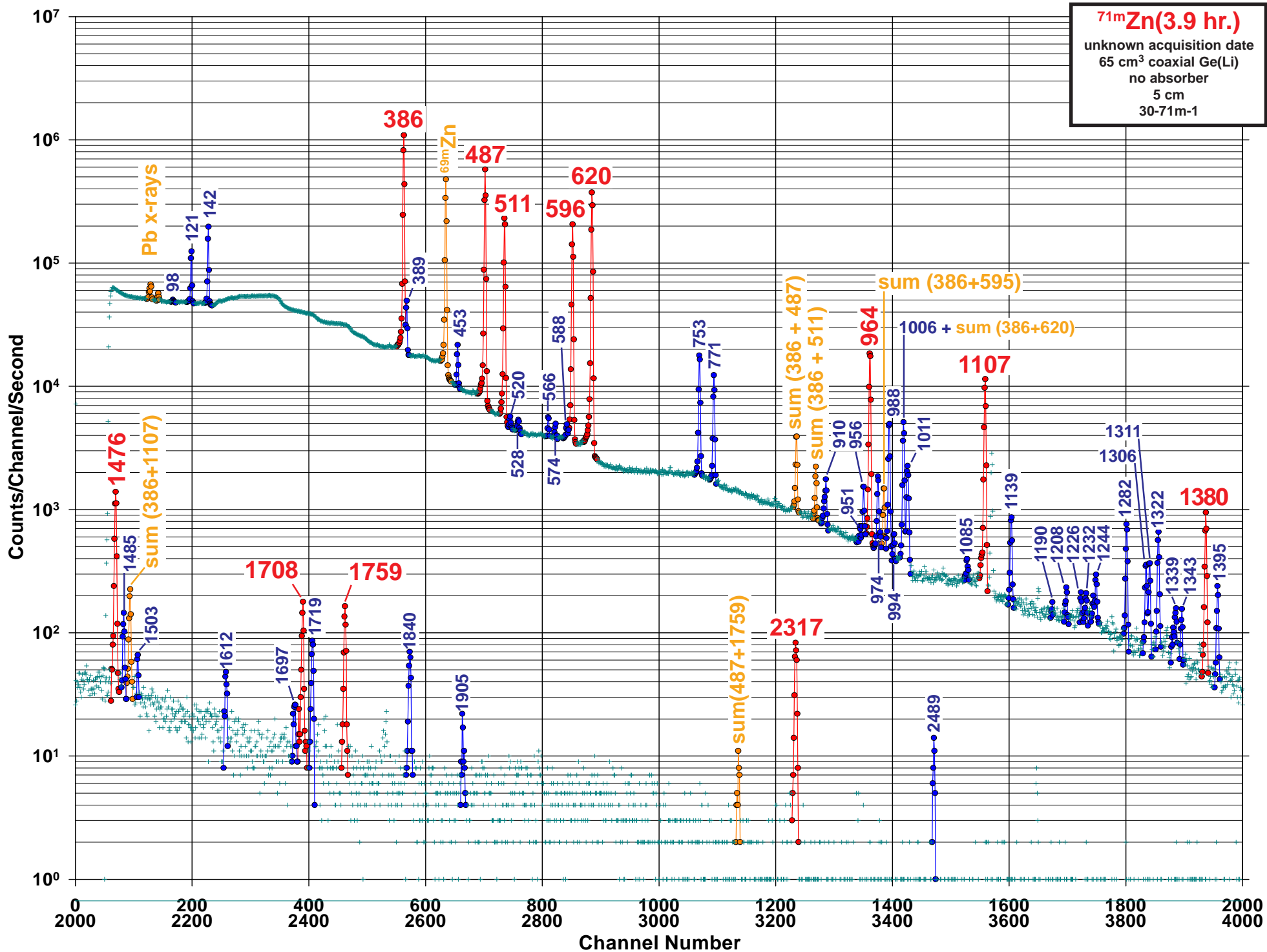
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{69m}Zn - ⁶⁹Zn* Half Life: 13.76(2) hr. - 56.4(9) min.*
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: ⁶⁸Zn(n, γ)

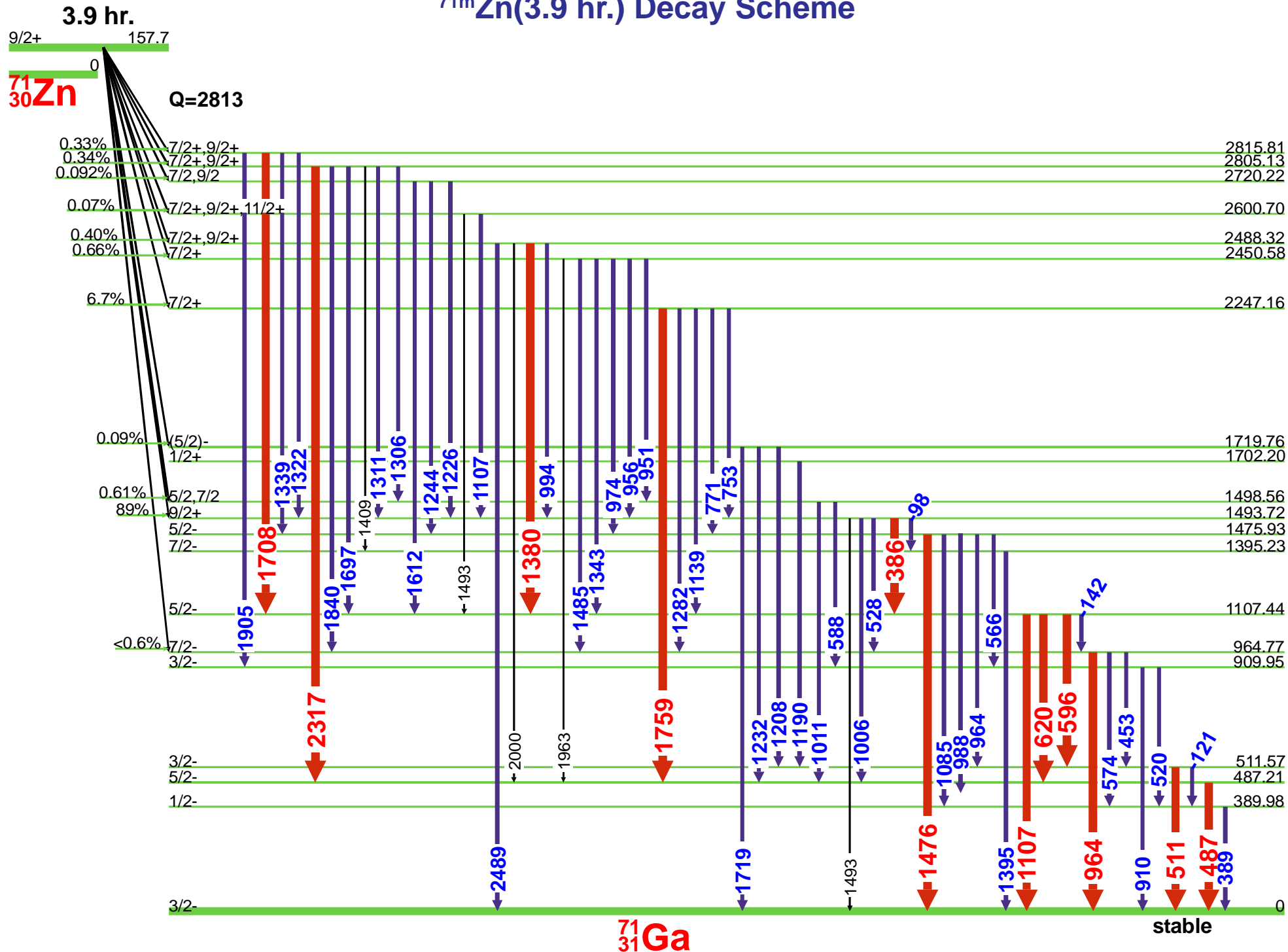
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
318.40	0.20		0.0012	0.0002	4
438.634	0.018	100	94.80	0.20	1
573.90	0.20	0.09	0.033	0.003	3
871.70	0.20		0.0002	0.0001	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{71m}Zn(3.9 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{71}mZn E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

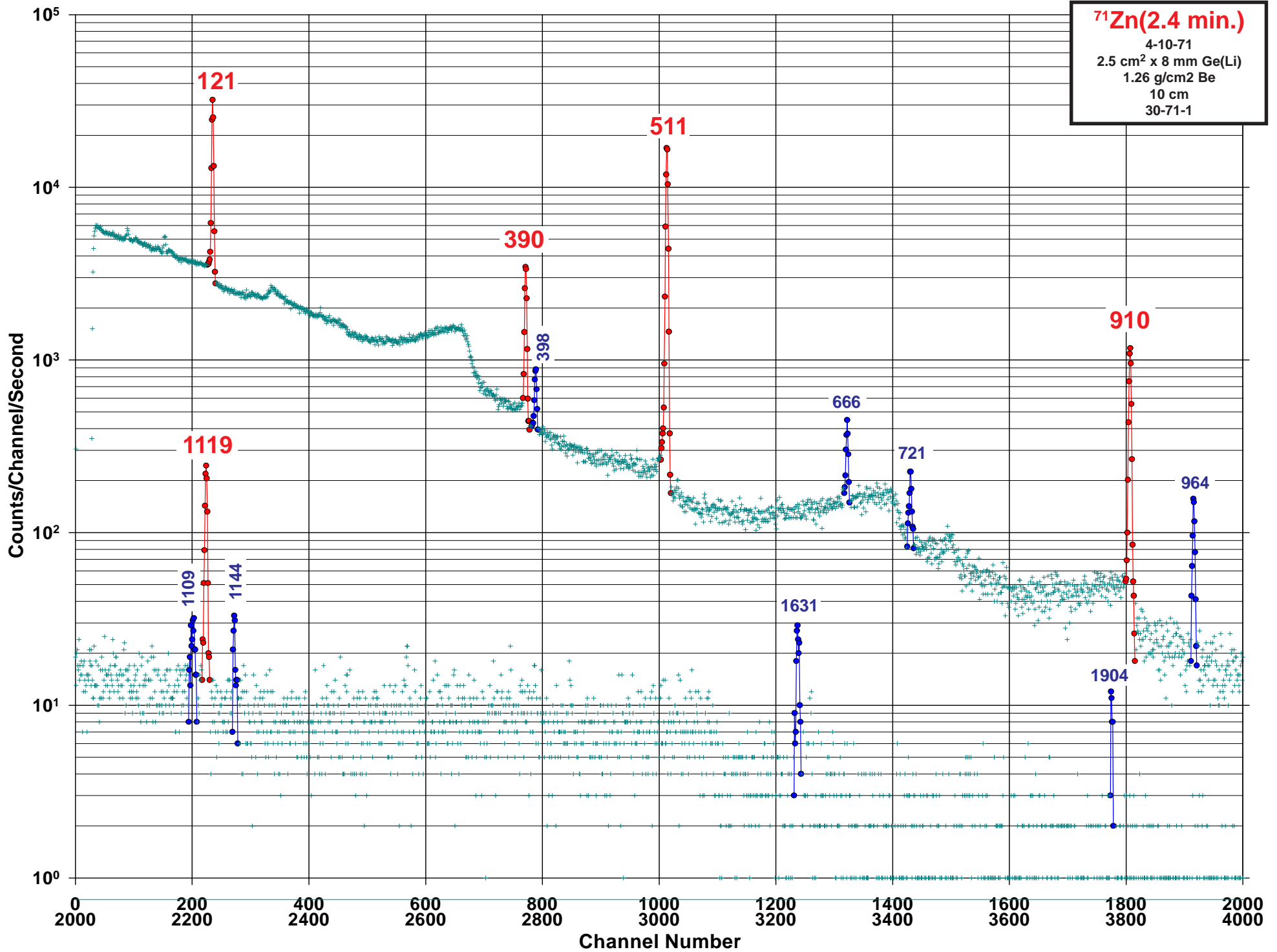
Half Life: 3.96(5) hr

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{70}\text{Zn}(n,\gamma)$

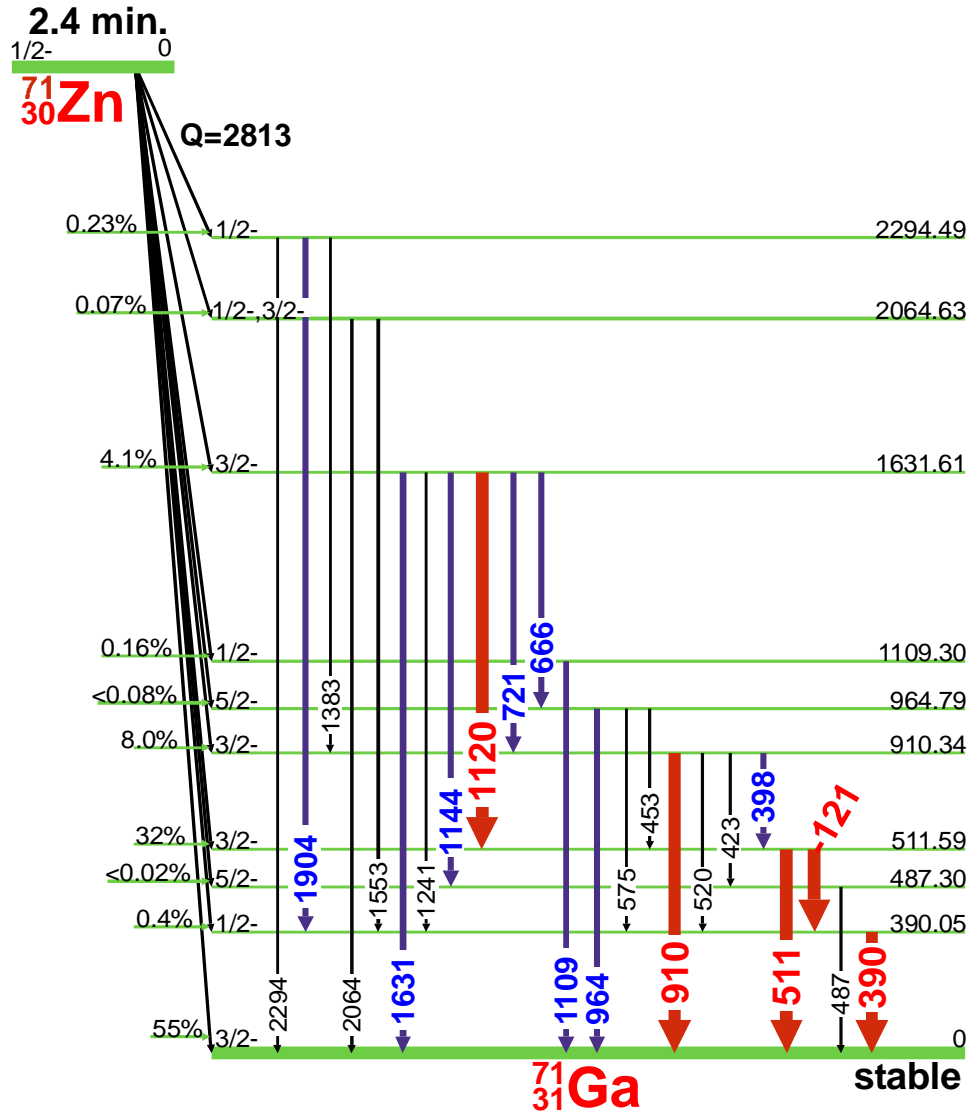
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
98.50	0.10	0.10	0.062	0.007	4
121.48	0.05	2.8	2.88	0.29	3
142.60	0.05	5.4	5.6	0.6	3
386.28	0.05	100	93.	3.	1
389.87	0.05	3.3	2.60	0.29	3
453.08	0.07	1.4	1.12	0.10	4
487.34	0.05	67.9	62.	3.	1
511.55	0.05	31.5	28.4	2.1	1
520.0	1.0	0.2	0.0186	0.0006	4
528.6	0.3	0.24	0.046	0.019	4
566.20	0.20	0.28	0.195	0.020	4
574.90	0.20	0.16	0.112	0.010	4
588.60	0.20		0.050	0.005	4
596.07	0.07	30.8	27.9	2.1	1
620.19	0.05	61.2	57.	3.	1
753.41	0.07	3.53	3.3	0.3	2
771.26	0.07	2.32	2.05	0.20	2
910.10	0.20	0.30	0.31	0.03	4
951.8	0.3	0.01	0.0102	0.0010	4
956.70	0.20	0.25	0.195	0.020	3
964.6	0.3	5.31	0.47	0.28	1
964.70	0.10		4.3	0.5	
974.70	0.20	0.39	0.35	0.04	3
988.60	0.20	1.42	1.21	0.10	2
994.6	0.6	0.08	0.030	0.004	4
1006.50	0.20	1.51	0.74	0.19	2
1011.40	0.20	0.82	0.68	0.07	3
1085.3	0.8	0.06	0.041	0.007	4
1107.0	1.0	3.85	0.7	0.4	1
1107.40	0.20		2.05	0.29	

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1139.8	0.3	0.26	0.205	0.029	3
1190.6	0.8		0.0112	0.0028	4
1208.00	0.05	0.04	0.021	0.004	4
1226.50	0.06	0.02	0.0186	0.0029	4
1232.80	0.06	0.04	0.028	0.004	4
1244.2	0.8	0.09	0.061	0.009	3
1282.7	0.3	0.29	0.270	0.029	3
1306.70	0.20	0.13	0.112	0.010	3
1311.40	0.20	0.13	0.102	0.010	3
1322.20	0.20	0.26	0.232	0.029	2
1339.7	0.4	0.03	0.0102	0.0019	4
1343.7	0.4	0.05	0.046	0.006	4
1380.80	0.20	0.39	0.36	0.04	1
1395.2	0.4	0.09	0.084	0.010	3
1409.1	1.0		0.0065	0.0019	4
1476.00	0.20	0.67	0.60	0.06	1
1485.8	0.4	0.05	0.046	0.005	3
1493.8	0.5	0.09	0.0502	0.0016	3
1493.8	0.4		0.0502	0.0016	
1503.8	0.5	0.01	0.0121	0.0028	4
1612.2	0.5	0.02	0.0121	0.0028	4
1697.6	0.7	0.01	0.0047	0.0009	4
1708.2	0.5	0.09	0.084	0.010	1
1719.2	0.7	0.05	0.037	0.009	3
1759.60	0.20	0.09	0.93	0.10	1
1840.0	0.4	0.05	0.046	0.005	2
1905.2	0.7	0.01	0.0045	0.0006	4
1963.8	0.7		0.0056	0.0009	4
2000.9	0.8		0.0037	0.0009	4
2317.7	0.6	0.08	0.065	0.010	1
2489.4	0.8	0.01	0.0047	0.0009	3





⁷¹Zn(2.4 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷¹Zn

Half Life: 2.45(10) min.

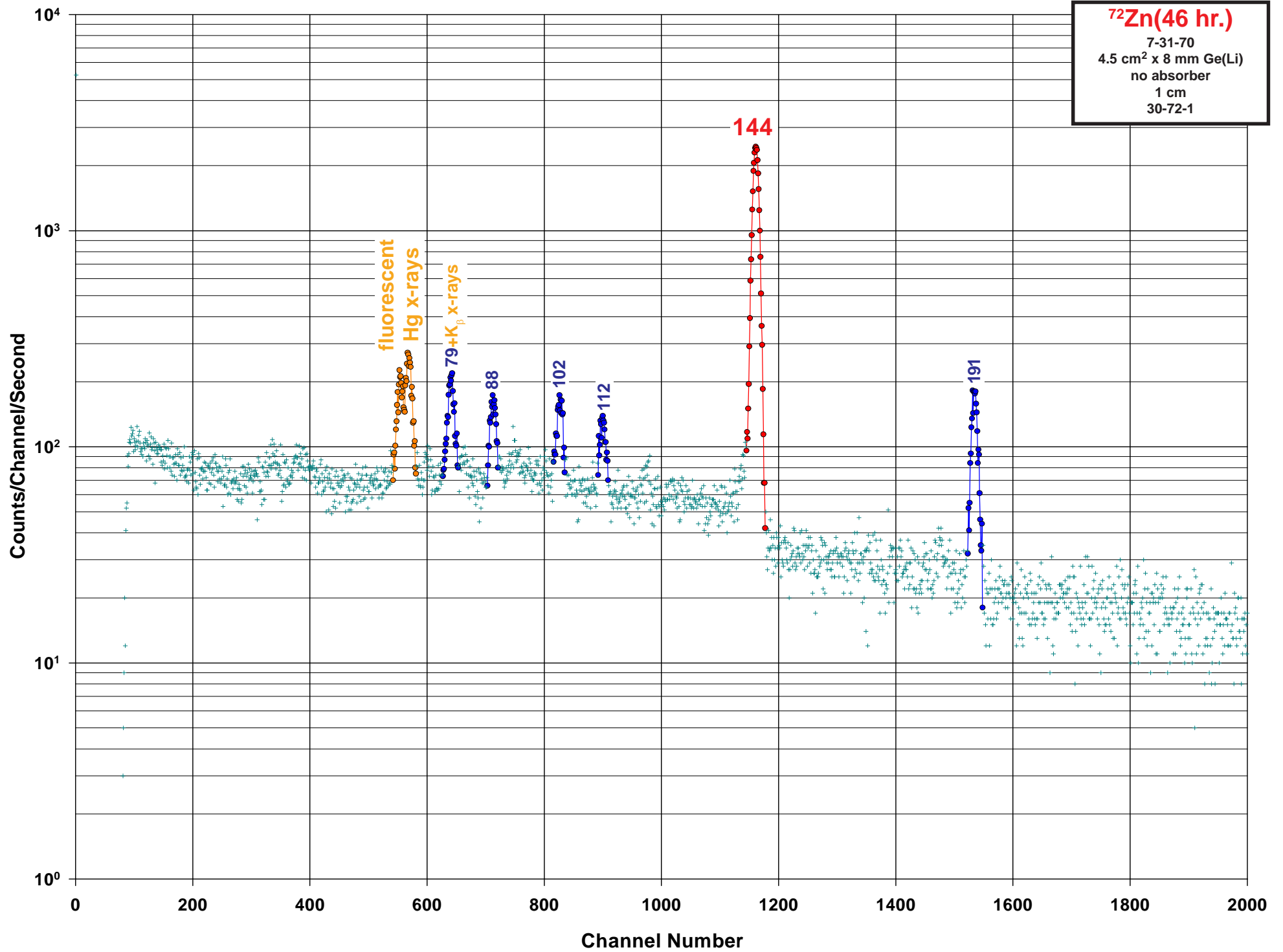
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁷⁰Zn(n,γ)

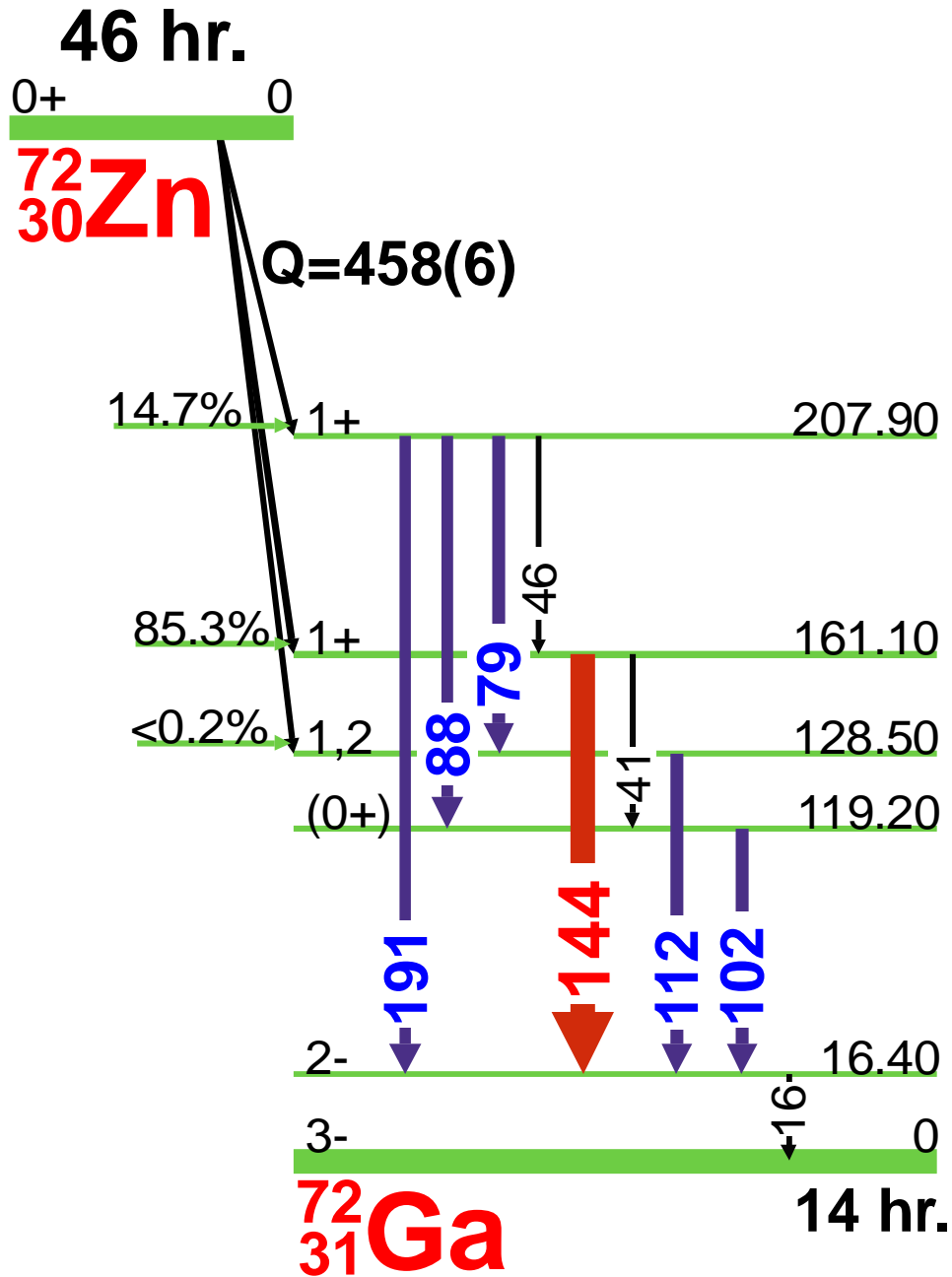
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
121.52	0.05	8.9	2.98	0.29	1
390.0	0.3	12.0	3.8	0.3	1
398.6	0.2	2.0	0.61	0.06	3
423.2	0.3		0.038	0.003	4
453.10	0.20	0.6	0.176	0.019	4
487.30	0.10	1.0	0.118	0.013	4
511.60	0.10	100	32.		1
520.50	0.20		0.080	0.006	4
575.1	0.5		0.029	0.003	4
666.80	0.20	2.8	0.90	0.10	3
721.4	0.3	1.8	0.54	0.06	3
910.30	0.10	21.0	7.8	0.6	1
964.80	0.20	2.7	0.77	0.06	2
1109.3	0.5	1.1	0.163	0.026	4
1120.00	0.10	5.8	2.18	0.22	1
1144.2	0.3	0.3	0.080	0.010	3
1241.5	0.5		0.032	0.003	4
1267.0	1.0		0.0090	0.0010	4
1383.8	0.5		0.035	0.003	4
1553.0	0.5		0.026	0.003	4
1631.60	0.20	1.5	0.38	0.03	3
1904.4	0.3	0.5	0.170	0.016	3
2064.60	0.20		0.045	0.006	4
2294.8	0.5		0.026	0.003	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁷²Zn(46 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷²Zn

Half Life: 46.5(1) hr.

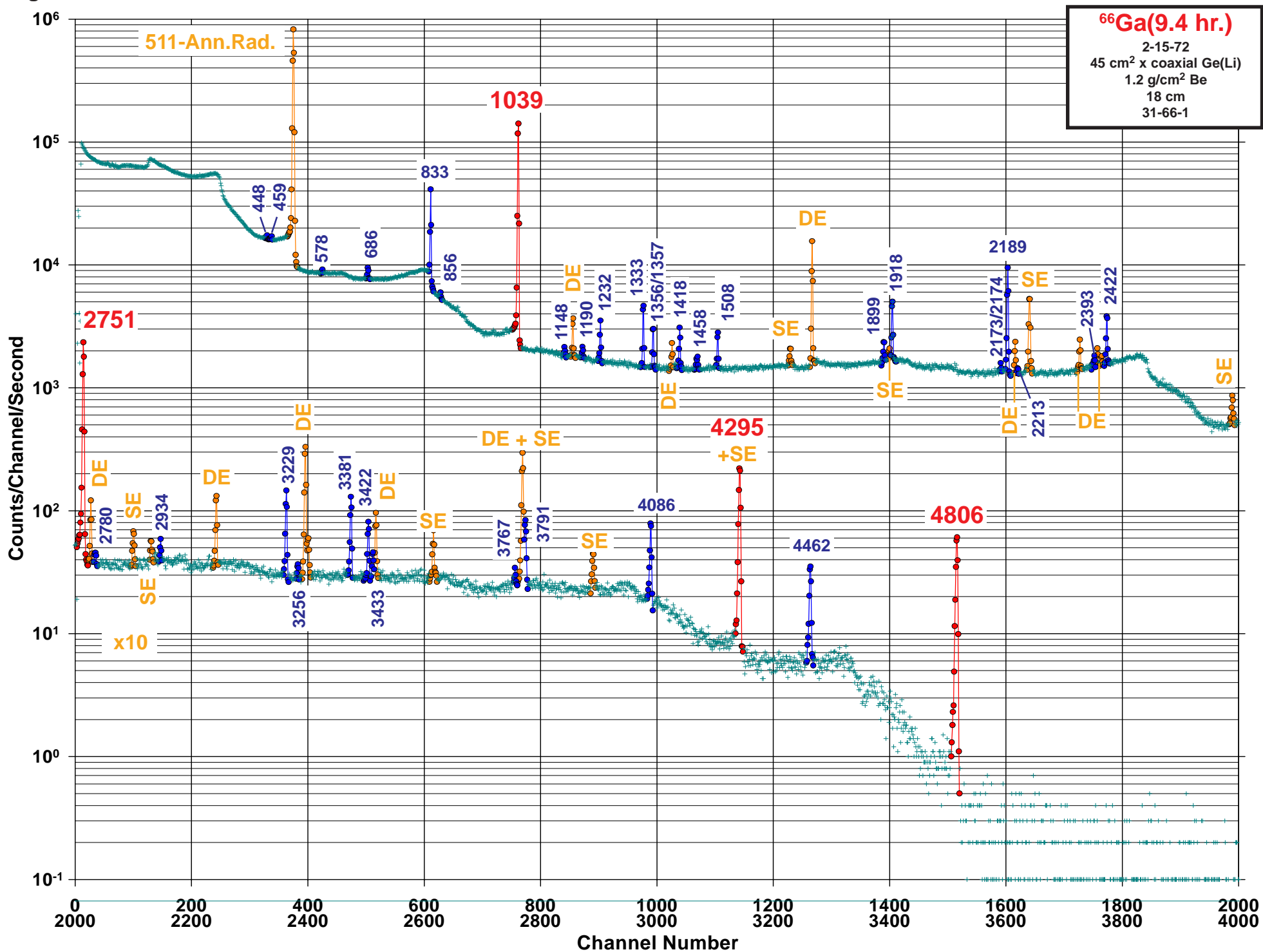
Detector: 4.5 cm² x 8 mm Ge (Li)

Method of Production: ⁷⁴Ge(γ,2p)

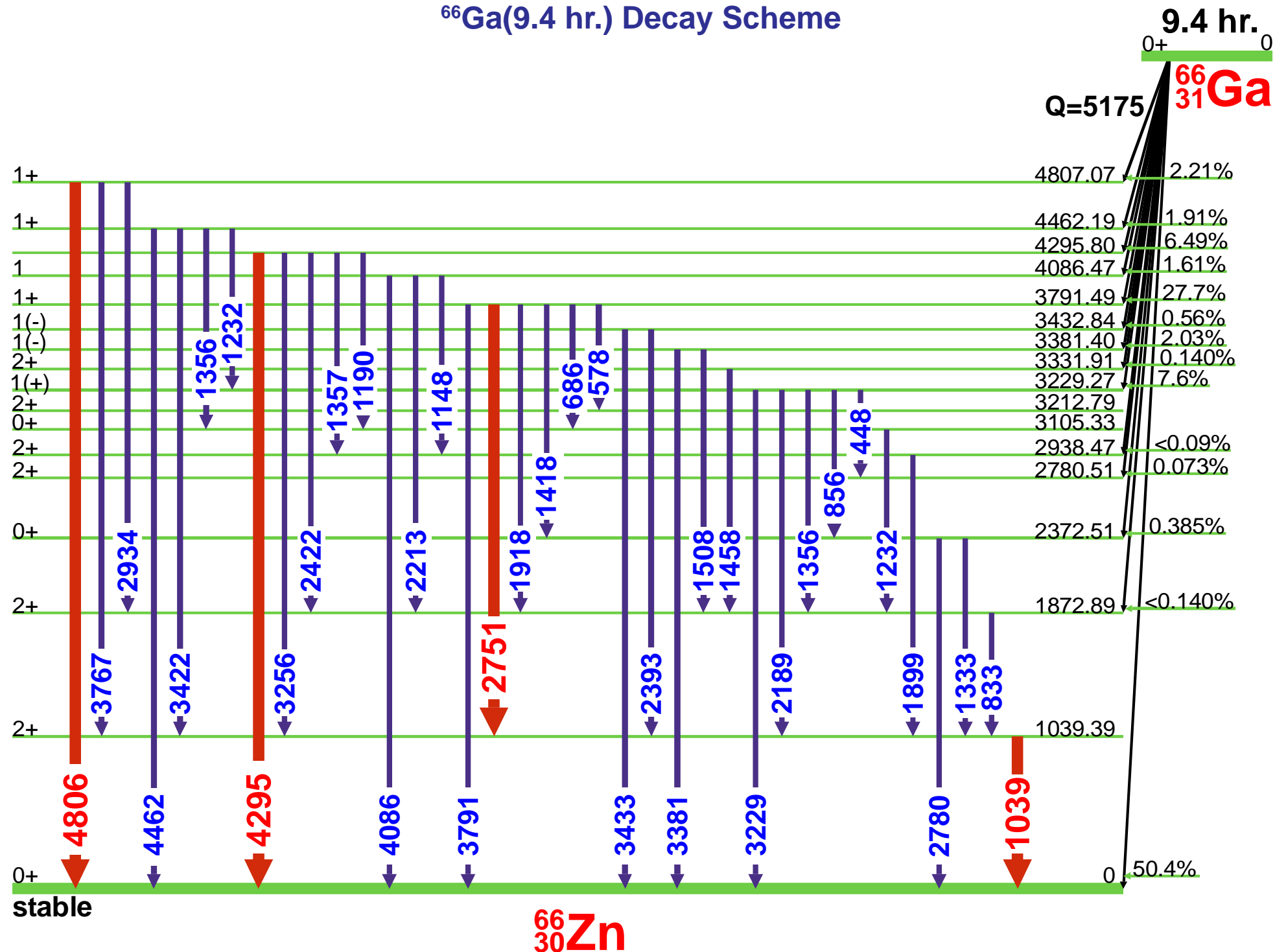
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
16.4	0.3		8.3	1.7	4
41.90	0.20		0.83	0.08	4
46.80	0.20		0.58	0.08	4
79.40	0.20	2.8	1.74	0.08	3
88.70	0.10	2.0	2.16	0.08	3
102.80	0.10	2.5	2.32	0.08	3
112.10	0.10	2.1	2.07	0.08	3
144.70	0.10	100	82.90	0.20	1
191.50	0.20	11.6	9.37	0.17	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁶Ga(9.4 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

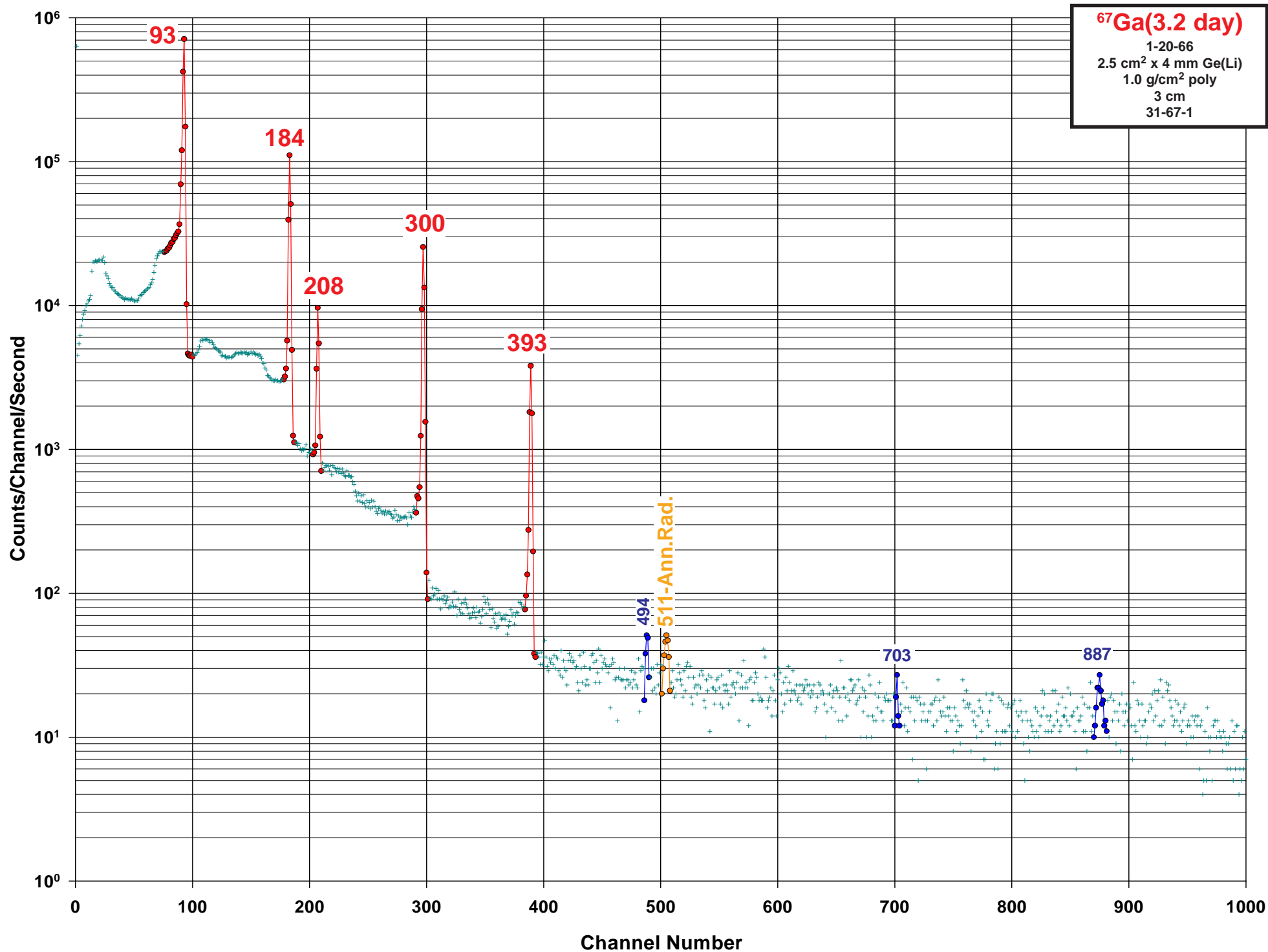
Nuclide: ^{66}Ga E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 9.49(7) hr.

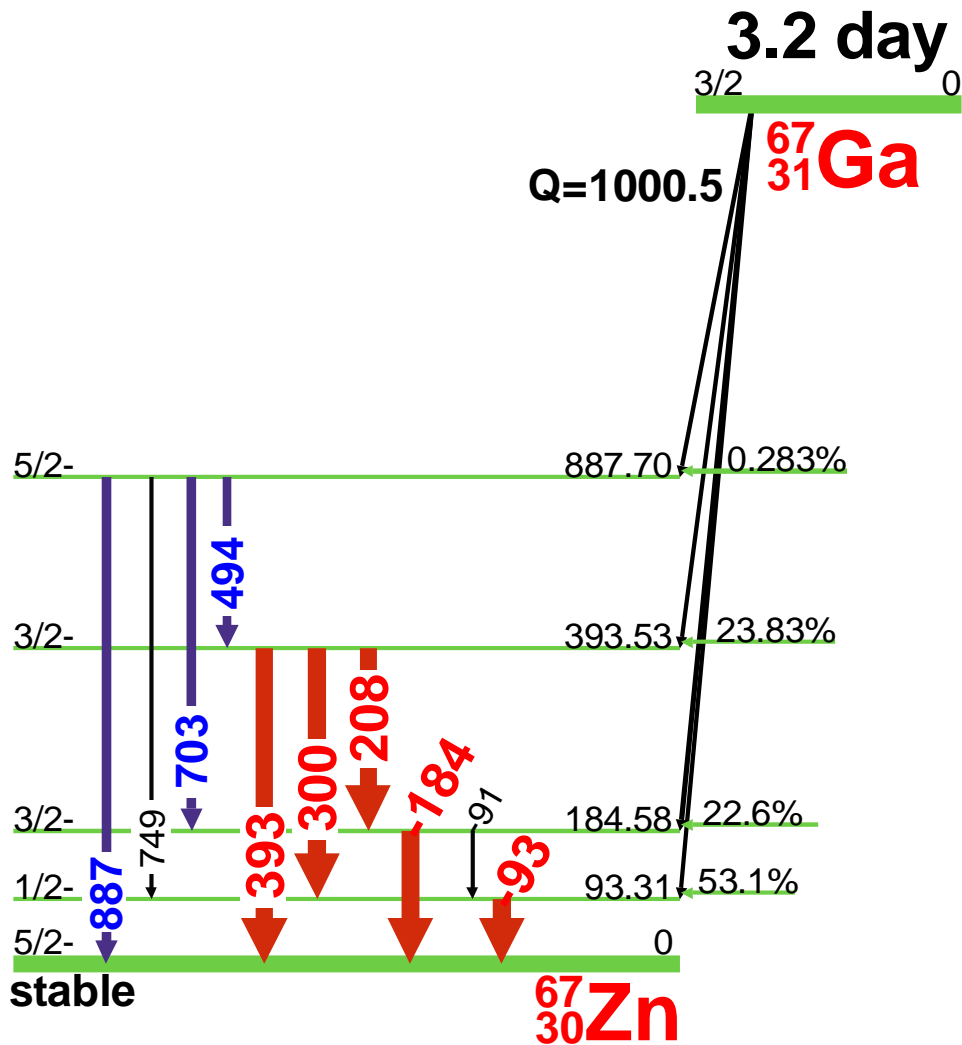
Detector: 45 cm³ coaxial Ge (Li)Method of Production: $^{66}\text{Zn}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	171.90	0.20		0.0104	0.0005	4
	290.10	0.10		0.052	0.004	4
	410.30	0.10		0.089	0.022	4
	448.90	0.10	0.34	0.107	0.005	4
	459.80	0.10	0.30	0.089	0.004	4
Ann.	511.006			111	3	1
	578.70	0.10	0.17	0.059	0.004	4
	686.22	0.06	0.80	0.255	0.011	4
	833.46	0.04	18.1	5.89	0.19	2
	853.08	0.08		0.0740	0.0029	4
	856.70	0.10	1.6	0.117	0.005	4
	907.0	0.3				4
	913.9	0.4				4
	981.02	0.10		0.0481	0.0023	4
	1009.35	0.14		0.060	0.009	4
	1039.24	0.05	100	37.0	1.1	1
	1060.5	0.4		0.012	0.004	4
	1148.05	0.14	0.26	0.078	0.007	4
	1190.44	0.10	0.51	0.141	0.015	4
D	1232.44		1.6	0.511	0.021	3
	1232.92			0.052	0.015	
	1333.00	0.06	3.8	1.20	0.04	3
	1356.38		1.8	0.30	0.11	4
D	1356.86			0.11	0.04	
	1357.33			0.26	0.07	
	1418.79	0.06	1.8	0.629	0.022	3
	1458.95	0.10	0.65	0.099	0.004	4
	1508.37	0.09	1.7	0.562	0.019	3
	1741.8	0.4		0.052	0.022	4
	1899.16	0.09	1.1	0.426	0.017	4
	1918.63	0.06	5.6	2.09	0.06	3
	2066.4	0.4		0.0318	0.0018	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	2173.80	0.20	0.23	0.115	0.003	4
	2174.00	0.15		0.115	0.003	
	2189.85	0.06	15.4	5.60	0.18	2
	2213.75	0.15	0.38	0.136	0.006	4
	2292.60	0.15		0.041	0.004	4
	2393.10	0.15		0.246	0.009	4
	2422.75	0.06	5.3	1.94	0.06	3
	2492.50	0.15		0.0237	0.0023	4
	2589.00	0.15		0.0278	0.0027	4
	2751.92	0.06	63.0	23.4	0.7	1
	2780.65	0.15	0.38	0.129	0.005	4
	2934.30	0.15	0.66	0.222	0.007	4
	2977.5	0.4		0.0241	0.0023	4
	2993.2	0.4		0.033	0.003	4
	3047.25	0.20		0.063	0.004	4
	3229.16	0.06	4.2	1.54	0.05	2
	3256.55	0.17	0.37	0.111	0.012	4
	3381.34	0.06	4.0	1.49	0.05	2
	3422.77	0.10	2.1	0.88	0.03	3
	3433.02	0.15	0.75	0.300	0.010	4
	3724.8	1.0		0.0026	0.0004	4
	3736.8	0.6		0.0133	0.0012	4
	3767.50	0.20	0.37	0.148	0.006	4
	3791.56	0.10	2.8	1.12	0.04	3
	3806.3	1.0		0.0026	0.0004	4
	3811.7	0.8		0.0089	0.0008	4
	3827.5	0.8		0.0070	0.0008	4
	4086.27	0.10		1.29	0.05	3
	4295.88	0.10		4.05	0.13	1
	4462.10	0.14		0.844	0.027	2
	4806.60	0.20		1.84	0.06	1



⁶⁷Ga(3.2 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁷Ga

Half Life: 3.2612(6) day

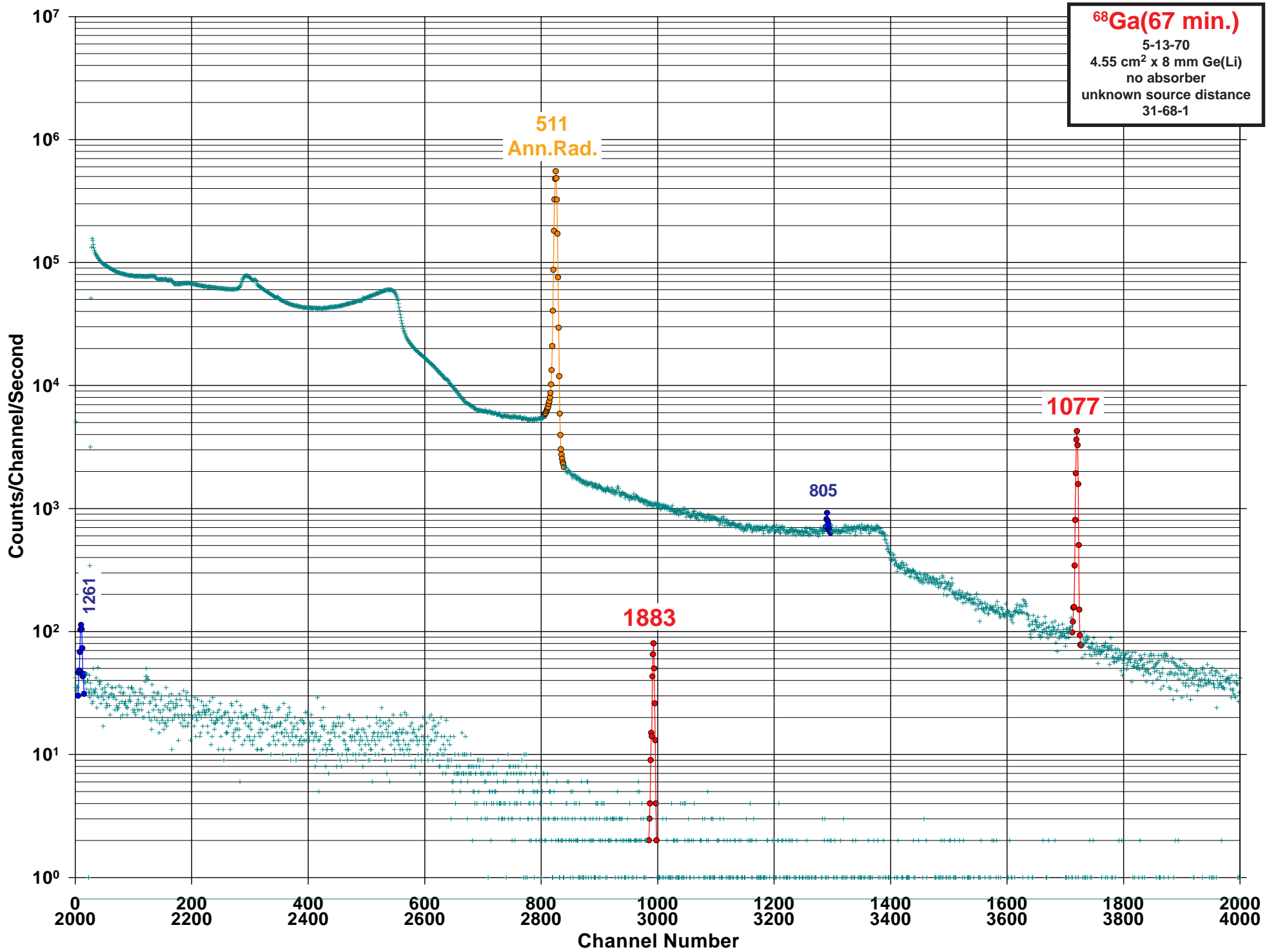
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ⁶⁸Zn(γ,2n)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
91.266	0.005	13.0	3.16	0.09	2
93.311	0.005	100	39.2	1.0	1
184.577	0.010	62	21.2	0.3	1
208.951	0.010	7.1	2.40	0.07	1
300.219	0.010	50	16.80	0.22	1
393.529	0.010	14.0	4.68	0.06	1
494.169	0.015	3.7	0.0691	0.0014	4
703.110	0.015		0.0106	0.0009	4
794.386	0.015	0.15	0.0540	0.0018	4
887.693	0.015	0.43	0.149	0.003	4

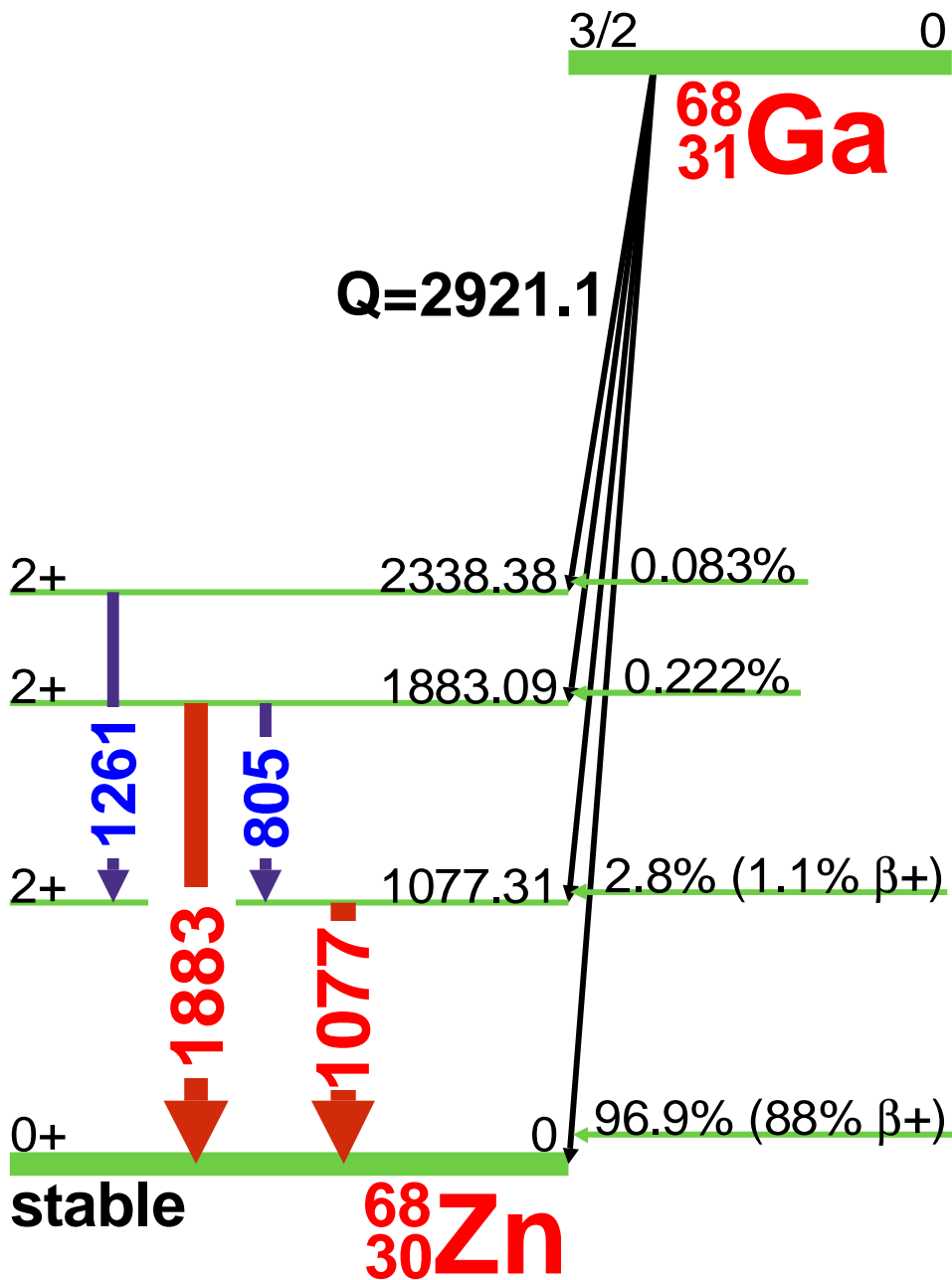
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁶⁸Ga(67 min.) Decay Scheme

67 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁶⁸Ga

Half Life: 67.629(24) min.

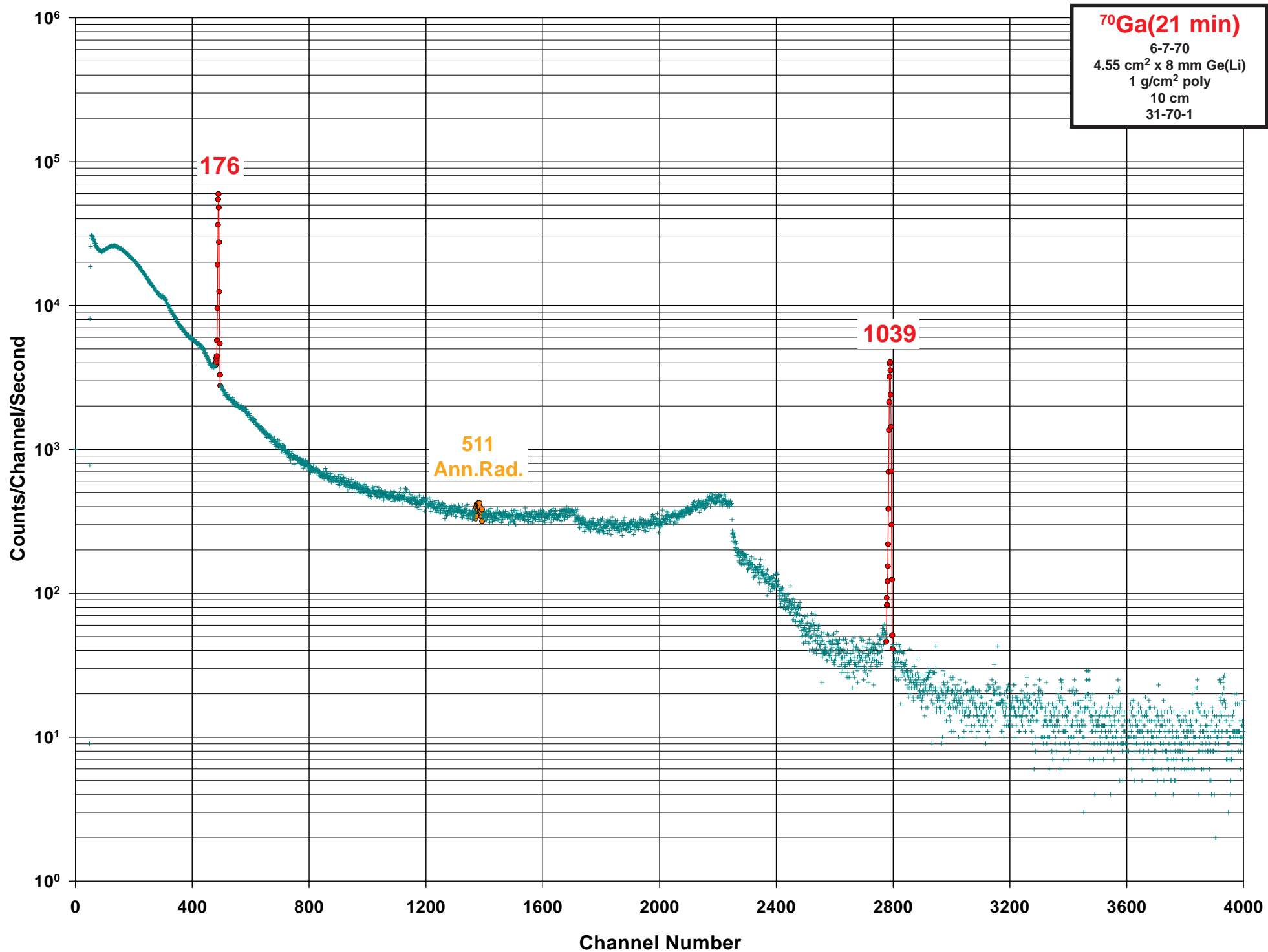
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁶⁹Ga(γ,n)

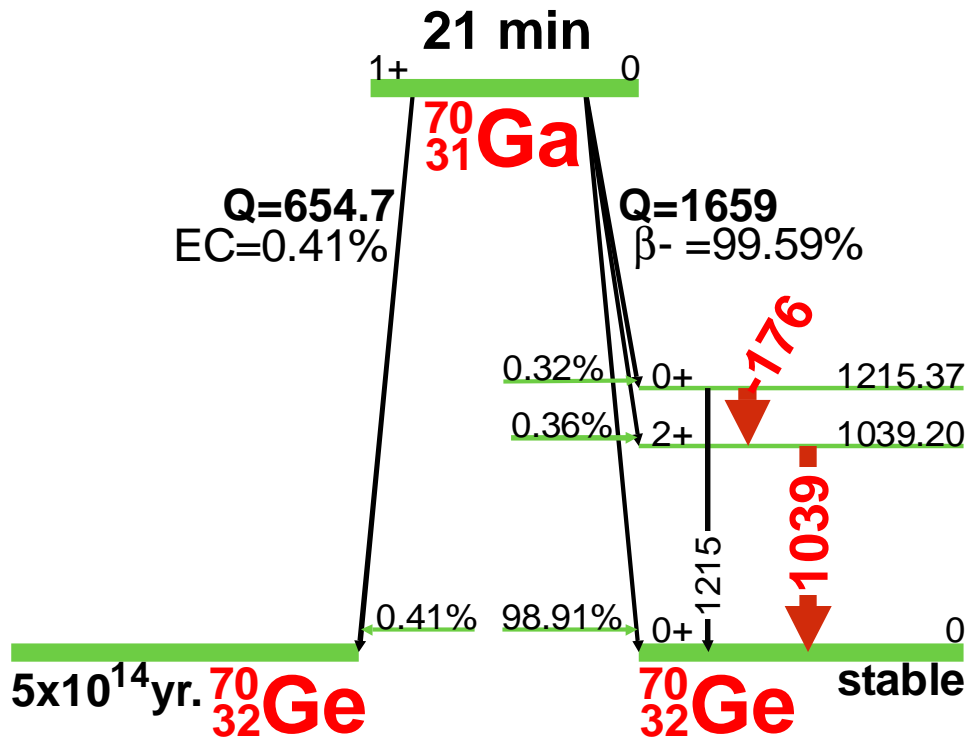
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	227.0	0.3		0.0001		4
	455.			0.0001		4
	483.41	0.05		0.0002		4
Ann.	511.006			176.4	1.0	1
	578.53	0.05		0.032	0.004	4
	682.63	0.07		0.0003		4
	805.83	0.05	3.2	0.084	0.009	4
	938.73	0.06		0.0002		4
	1077.33	0.05	100	3.0	0.3	1
	1166.10	0.20				4
	1261.02	0.05	2.7	0.082	0.009	3
	1659.	7.				4
	1744.42	0.08		0.0089	0.0010	4
	1883.00	0.08	4.5	0.138	0.015	1
	2338.40	0.20		0.0009	0.0001	4
	2821.60	0.20		0.0004	0.0001	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁷⁰Ga(21 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷⁰Ga

Half Life: 21.14(3) min.

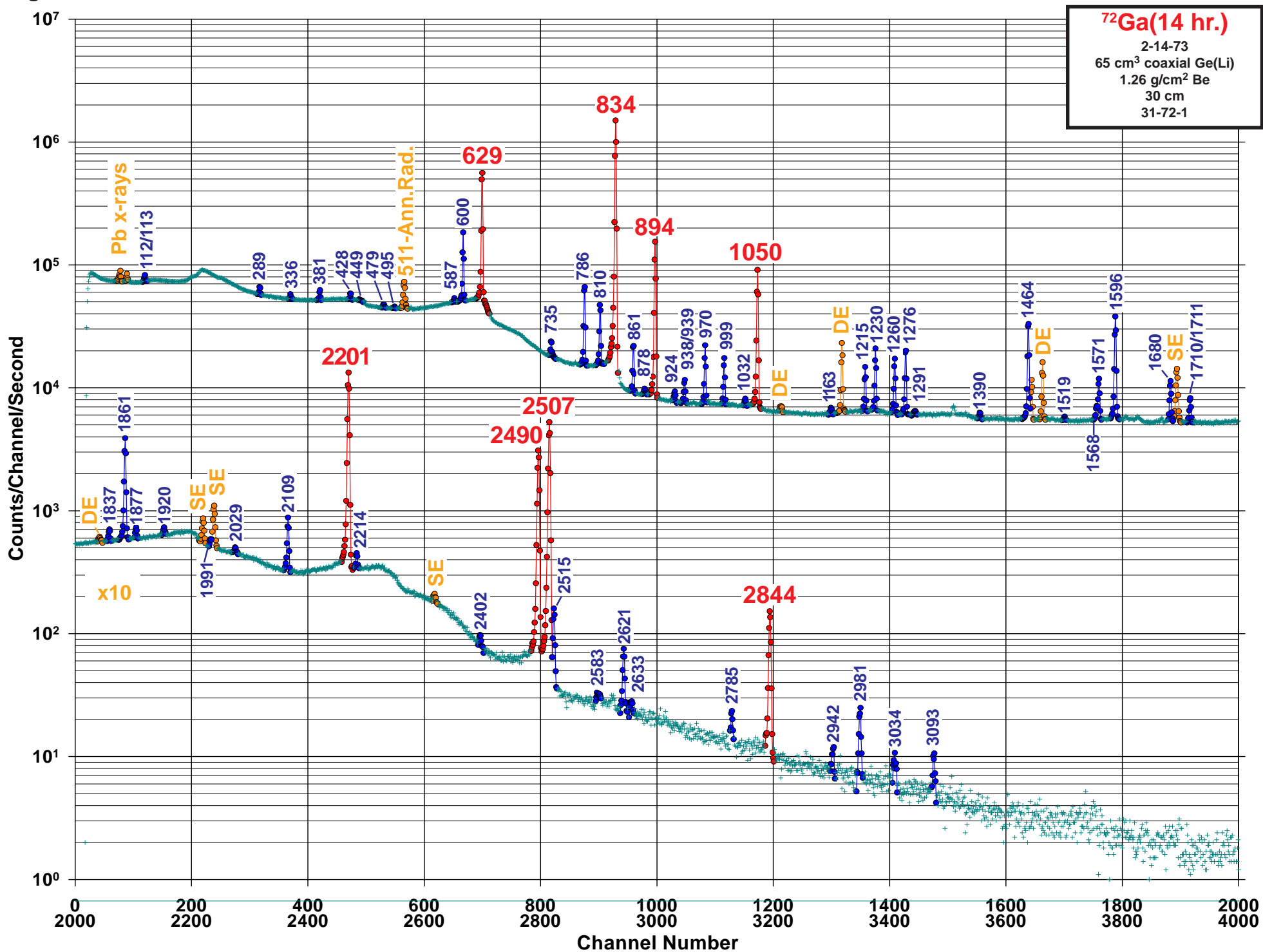
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁶⁹Ga(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
176.170	0.020		0.291	0.010	1
1039.20	0.08	100	0.65	0.05	1
1215.					4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

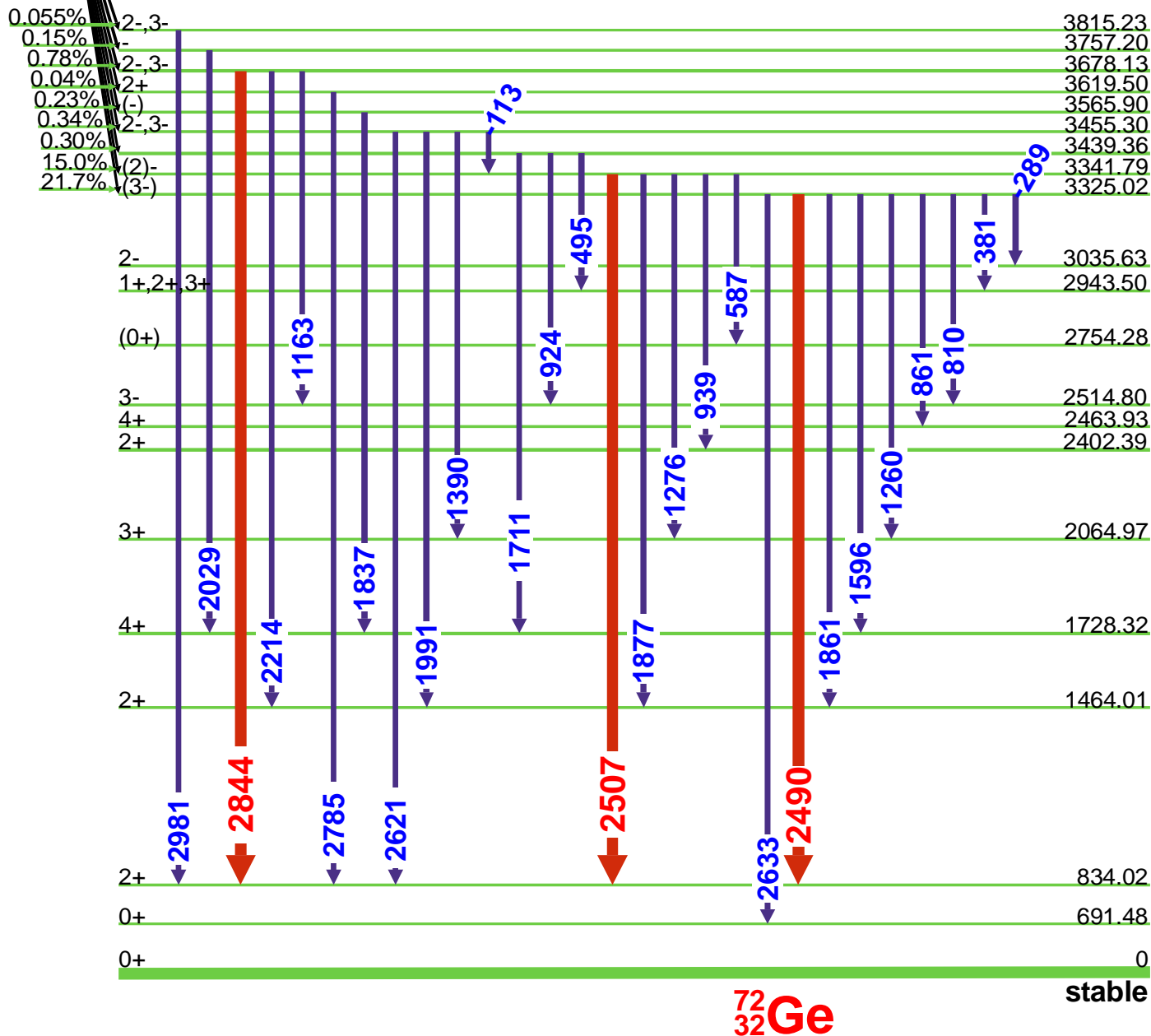




14 hr.
 $^{72}_{31}\text{Ga}$

$^{72}\text{Ga}(14 \text{ hr.})$ Decay Scheme gamma-rays emitted from high energy levels

Q=4001.1



$^{72}_{32}\text{Ge}$

stable



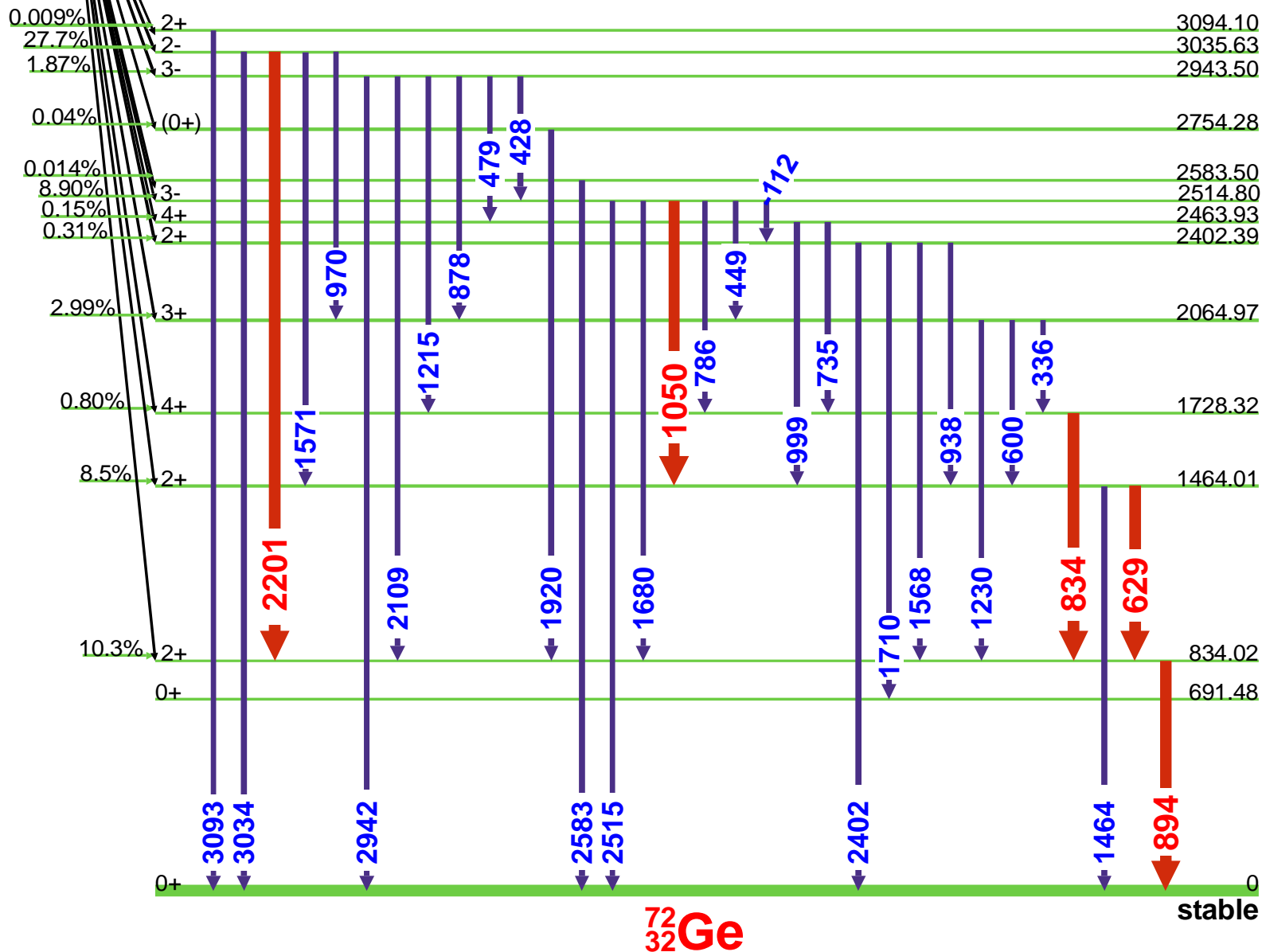
14 hr.

⁷²Ga(14 hr.) Decay Scheme

gamma-rays emitted from low energy levels



Q=4001.1



stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{72}Ga E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 14.10(2) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{71}\text{Ga}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	50.88	0.04		0.0100	0.0014	4
D	112.52	0.03	0.62	0.136	0.006	4
	113.50	0.10		0.0057	0.0010	
	142.53	0.05		0.0109	0.0009	4
	230.6	0.6		0.023	0.007	4
	289.31	0.07	0.27	0.191	0.013	4
	306.0	0.3		0.0210	0.0019	4
	317.5	0.4		0.0220	0.0019	4
	336.63	0.04	0.14	0.1071	0.0029	4
	381.24	0.08	0.03	0.272	0.006	4
	401.3	0.4		0.0325	0.0019	4
	428.42	0.18	0.23	0.198	0.018	4
	449.55	0.21	0.10	0.094	0.018	4
	479.23	0.10	0.15	0.091	0.009	4
	495.88	0.24	0.06	0.056	0.004	4
	520.74	0.24		0.054	0.005	4
	587.44	0.24	0.11	0.122	0.007	4
	600.95	0.03	5.75	5.54	0.11	3
	629.96	0.04	27.3	24.8	0.5	1
	691.2					4
	735.75	0.15	0.5	0.367	0.007	4
	738.5	0.4		0.054	0.004	4
	772.0	1.0		0.043	0.009	4
	786.44	0.08	3.48	3.20	0.06	2
	810.20	0.09	2.16	2.01	0.04	3
	834.03	0.03	100	95.63	0.07	1
	861.11	0.05	1.03	0.913	0.020	3
	878.32	0.18	0.08	0.073	0.005	4
	894.25	0.10	10.75	9.88	0.16	1
	924.22	0.18	0.18	0.142	0.004	4
D	938.40	0.20	0.384	0.0765	0.0029	4
	939.36	0.07		0.259	0.007	
	940.50	0.10				4
	970.55	0.06	1.20	1.104	0.016	3
	975.5	0.5		0.034	0.010	4
	999.86	0.06	0.89	0.798	0.014	3
	1032.3	0.4		0.065	0.006	4
	1037.2	0.6		0.0210	0.0019	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1050.69	0.05	7.60	6.91	0.11	1
	1155.7	0.6		0.0105	0.0019	4
	1163.12	0.18	0.07	0.075	0.007	4
	1192.4	0.4		0.035	0.008	4
	1215.15	0.07	0.90	0.789	0.013	3
	1230.86	0.07	1.60	1.454	0.019	3
	1260.10	0.07	1.30	1.128	0.029	3
	1276.76	0.07	1.74	1.564	0.016	3
	1291.3	0.4		0.056	0.005	4
	1390.42	0.18	0.11	0.085	0.006	4
	1464.00	0.07	4.08	3.55	0.06	2
	1500.9	0.5		0.0191	0.0010	4
	1519.4	0.5	0.07	0.032	0.006	4
	1541.2	0.6		0.0163	0.0010	4
	1568.10	0.20	0.27	0.199	0.007	4
	1571.60	0.14	0.95	0.818	0.020	3
	1596.68	0.08	5.11	4.24	0.09	2
	1613.6	0.4		0.039	0.006	4
	1630.0	1.0		0.032	0.006	4
	1680.77	0.07	1.08	0.90	0.05	3
D	1710.90	0.14	0.54	0.388	0.012	4
	1711.15	0.15		0.045	0.010	
	1837.6	0.3	0.27	0.209	0.012	4
	1861.09	0.06	6.36	5.25	0.08	2
	1877.90	0.21	0.28	0.231	0.006	4
	1920.20	0.17	0.18	0.158	0.005	4
	1991.3	0.3		0.1119	0.0029	4
	2029.4	0.5	0.30	0.123	0.006	4
	2109.50	0.09	1.31	1.042	0.019	3
	2201.66	0.07	31.66	25.92	0.48	1
	2214.3	0.3	0.27	0.178	0.013	4
	2402.2	0.4	0.13	0.0239	0.0019	4
	2404.3	0.8		0.015	0.004	4
	2490.98	0.07	9.02	7.68	0.23	1
	2507.79	0.07	15.63	12.78	0.23	1
	2515.0	0.5	0.41	0.250	0.009	3
	2583.4	0.4		0.0143	0.0029	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{72}Ga E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

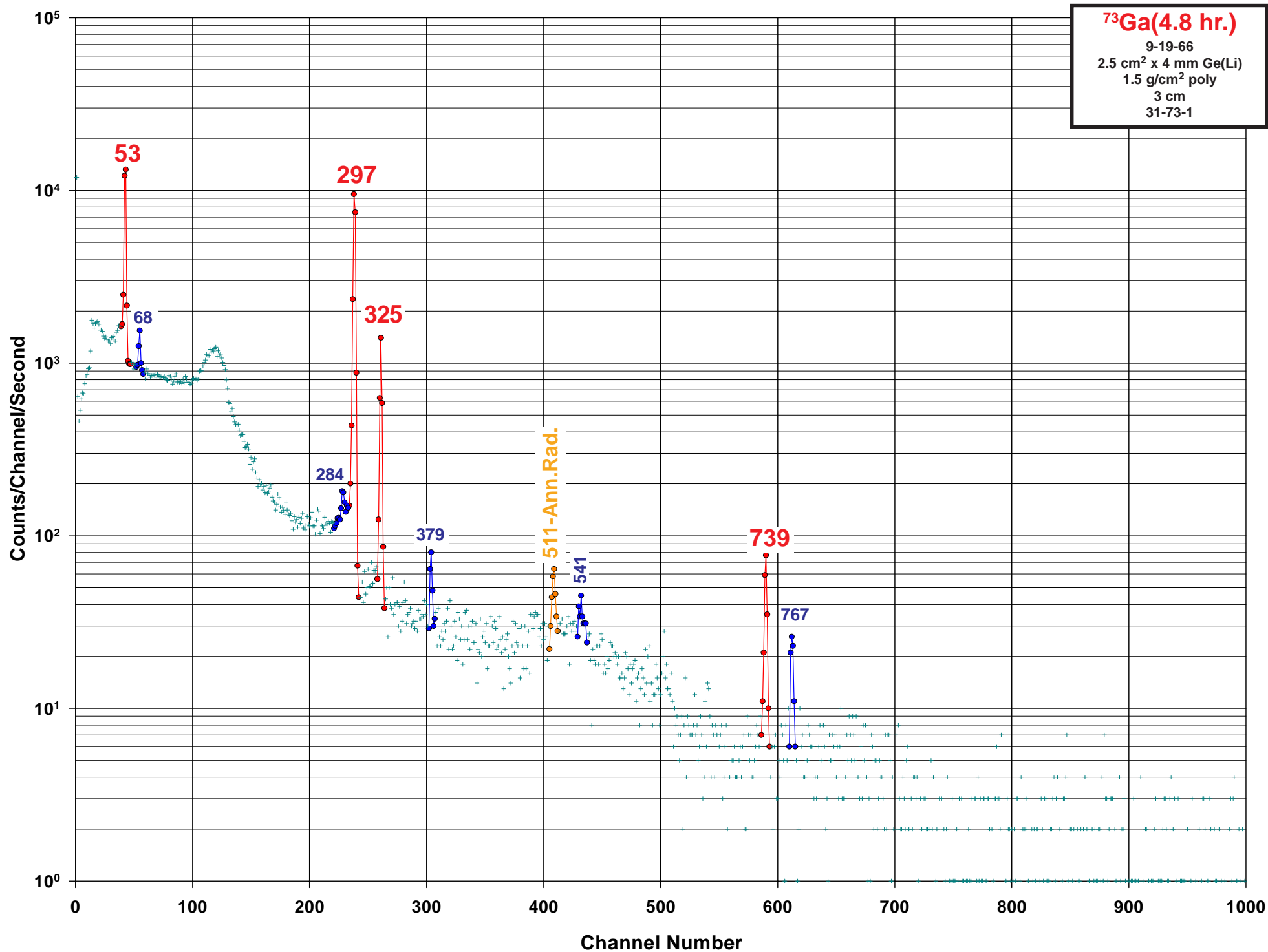
Half Life: 14.10(2) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{71}\text{Ga}(n,\gamma)$

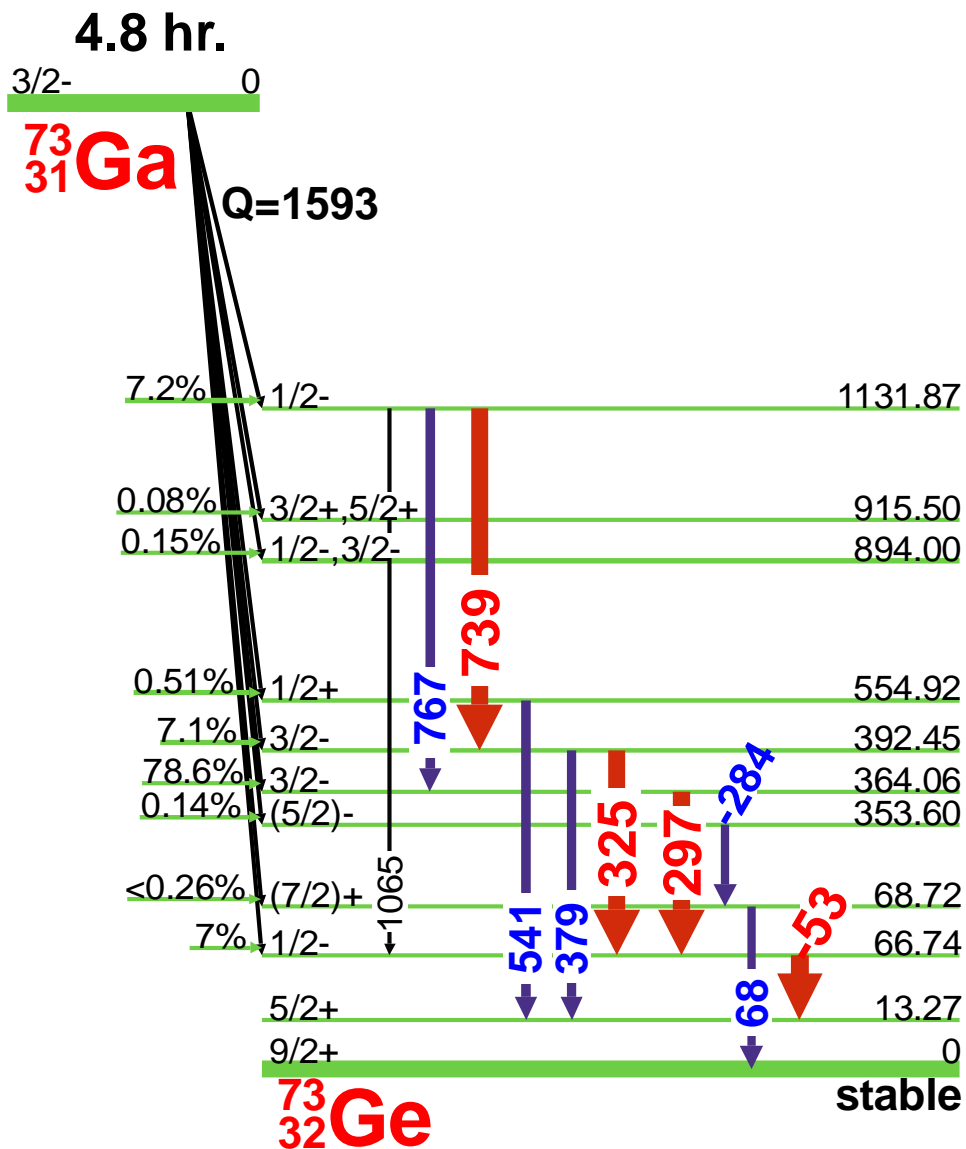
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2605.5	0.4		0.018	0.004	4
2621.06	0.24	0.18	0.132	0.004	3
2633.9	0.4	0.04	0.0145	0.0015	4
2785.1	0.4	0.05	0.0297	0.0018	4
2844.00	0.14	0.53	0.430	0.029	1
2897.1	0.8		0.0048	0.0010	4
2939.6	0.4	0.02	0.0105	0.0010	4
2942.4	0.9		0.026	0.006	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2950.0	0.5		0.0038	0.0010	4
2981.14	0.24	0.076	0.054	0.006	3
3034.6	0.4	0.04	0.0046	0.0009	4
3067.0	0.6		0.0029	0.0010	4
3093.7	0.3	0.035	0.0167	0.0020	4
3324.6	0.4		0.0031	0.0009	4
3338.3	0.7		0.0033	0.0009	4





⁷³Ga(4.8 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷³Ga

Half Life: 4.86(3) hr.

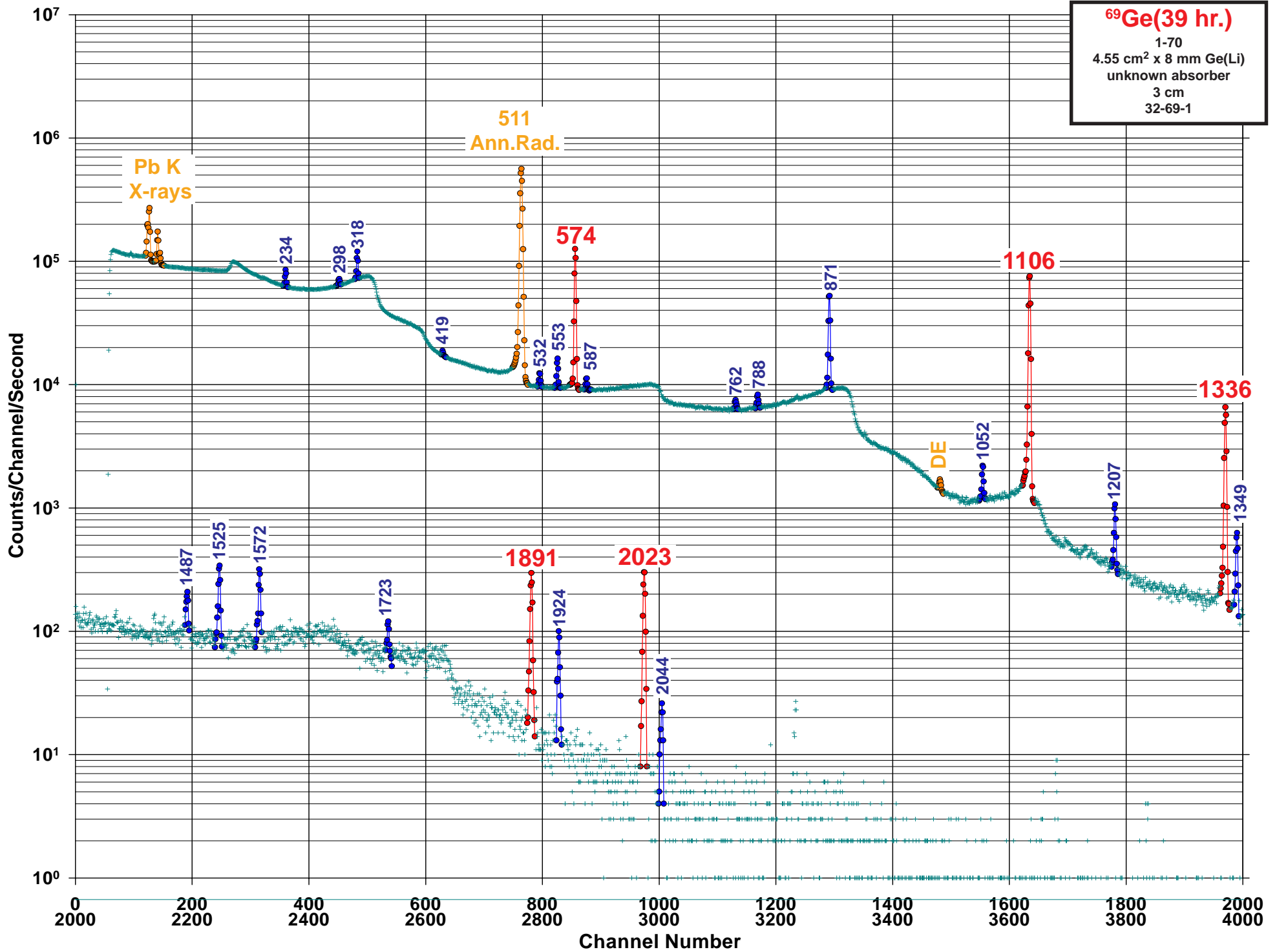
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ⁷⁴Ge(γ ,p)

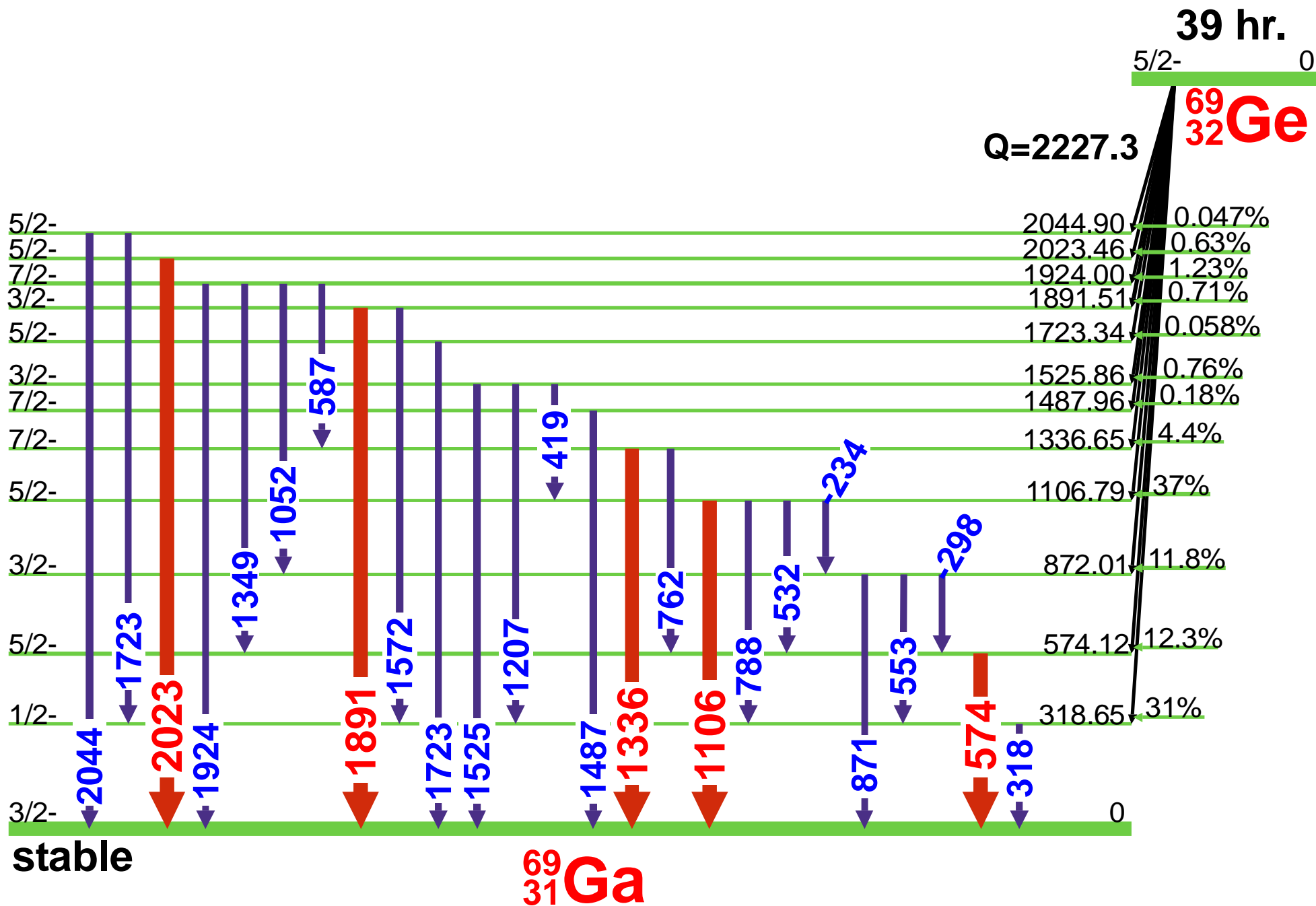
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
13.271	0.018				4
53.45	0.05	24.1			1
68.70	0.20	0.9	0.40	0.08	4
216.3	0.4		0.096	0.024	4
284.90	0.20		0.32	0.05	4
297.32	0.05	100	79.8	2.3	1
325.70	0.07	15.7	11.2	0.3	1
351.0	0.4		0.21	0.03	4
379.20	0.10	0.93	0.487	0.026	3
488.20	0.10		0.359	0.025	4
501.6	0.4		0.15	0.05	4
541.70	0.20		0.30	0.03	4
561.8	0.4		0.18	0.04	4
577.2	0.3		0.15	0.04	4
739.42	0.05	1.76	4.23	0.26	1
767.80	0.10	2.4	1.44	0.09	2
993.6	0.3		0.14	0.03	4
1065.10	0.10		1.28	0.08	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁶⁹Ge(39 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{69}Ge E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 39.05(10) hr.

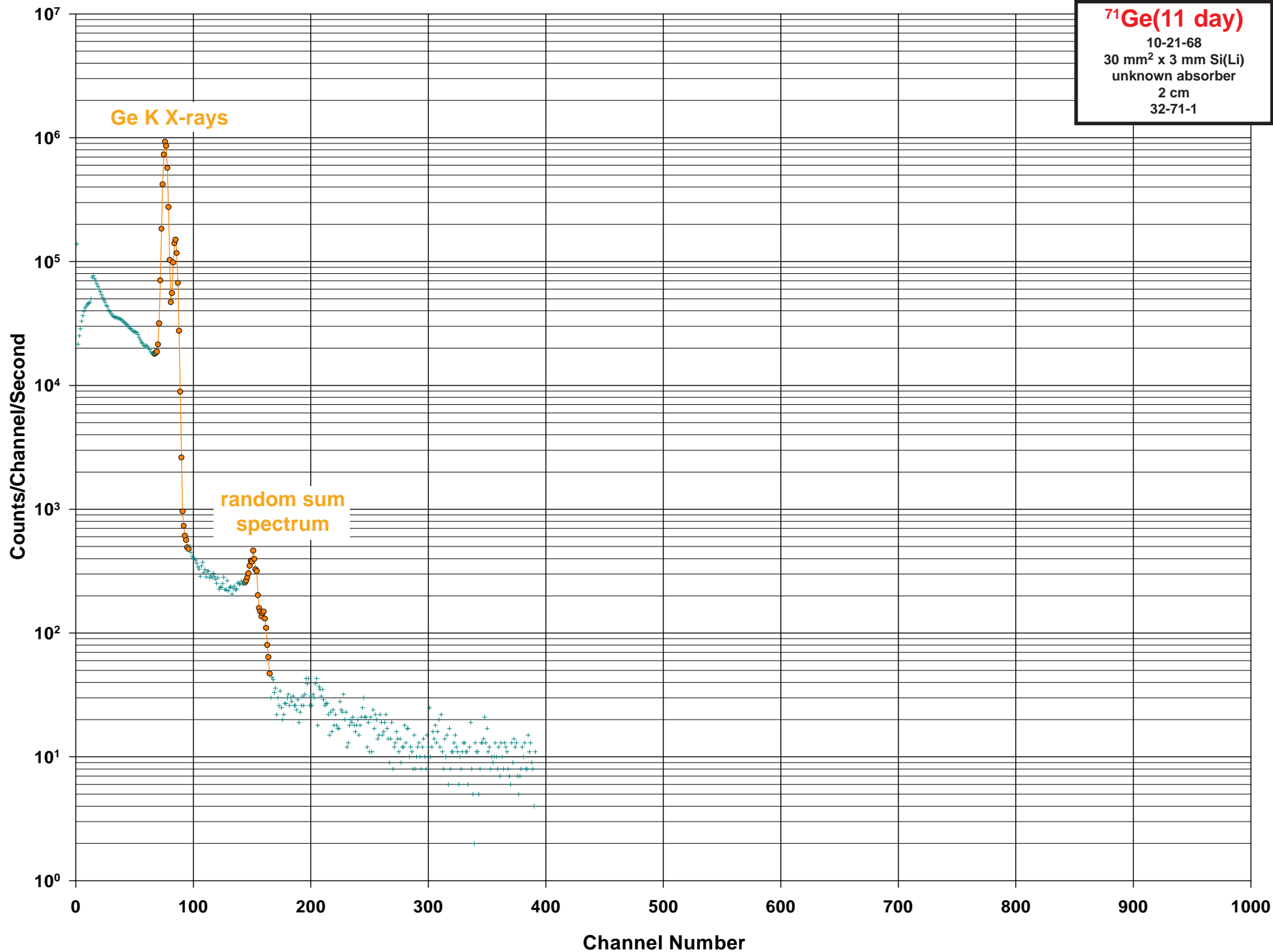
Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{70}\text{Ge}(\gamma, n)$

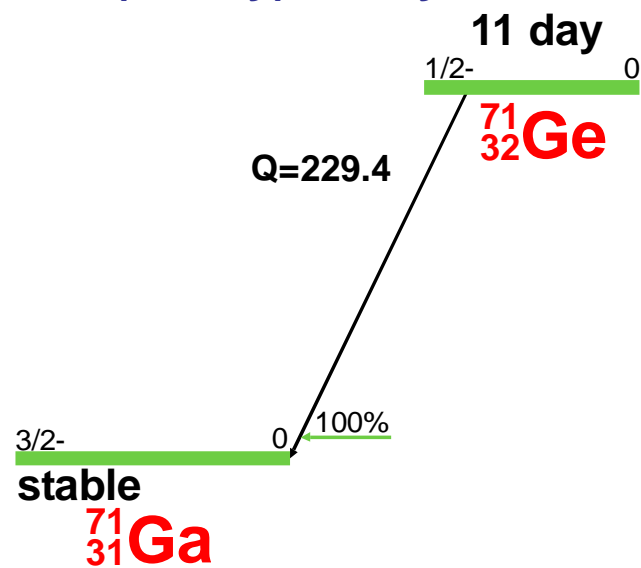
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	200.0	1.0		0.025	0.005	4
	234.79	0.10	3.0	0.37	0.05	4
	255.4	0.5		0.025	0.008	4
	298.3	0.5	0.5	0.025	0.008	4
	318.63	0.20	5.3	1.55	0.20	4
	380.9	1.0		0.025	0.015	4
	419.07	0.10	0.9	0.072	0.011	4
Ann.	511.006			48	12	1
	532.66	0.10	1.1	0.27	0.04	4
	553.35	0.10	2.7	0.69	0.09	4
	574.11	0.10	46.0	13.3	1.8	1
	587.10	0.20	1.0	0.30	0.04	4
	762.49	0.10	1.0	0.23	0.03	4
	788.14	0.10	1.2	0.34	0.05	4
	816.9	1.0		0.036	0.005	4
	871.98	0.10	42	11.9	1.6	2
	912.7	0.9		0.061	0.016	4
	951.73	0.10		0.029	0.005	4
	1052.02	0.10	1.3	0.43	0.06	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1106.77	0.10	100	36.	4.	1
	1149.6	0.5		0.043	0.009	4
	1207.21	0.10	1.3	0.39	0.05	3
	1317.1	1.0		0.0029	0.0015	4
	1336.60	0.10	11.0	4.5	0.6	1
	1349.89	0.10	1.0	0.32	0.05	3
	1404.7	0.3		0.018	0.004	4
	1449.5	0.3		0.047	0.006	4
	1470.3	1.0		0.011	0.004	4
	1487.96	0.10	0.38	0.097	0.013	3
	1525.84	0.10	0.065	0.27	0.04	3
	1572.85	0.10	0.55	0.23	0.03	3
	1615.1	1.0		0.011	0.004	4
	1723.3	0.3		0.040	0.004	4
D	1723.3	0.3	0.21	0.0108	0.0012	4
	1891.48	0.10	1.0	0.48	0.06	1
	1924.00	0.20	0.35	0.151	0.020	2
	2023.65	0.20	1.2	0.54	0.07	1
	2044.9	0.4	0.11	0.036	0.005	2



^{71}Ge (11 day)
10-21-68
30 mm² x 3 mm Si(Li)
unknown absorber
2 cm
32-71-1



^{71}Ge (11 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{71}Ge

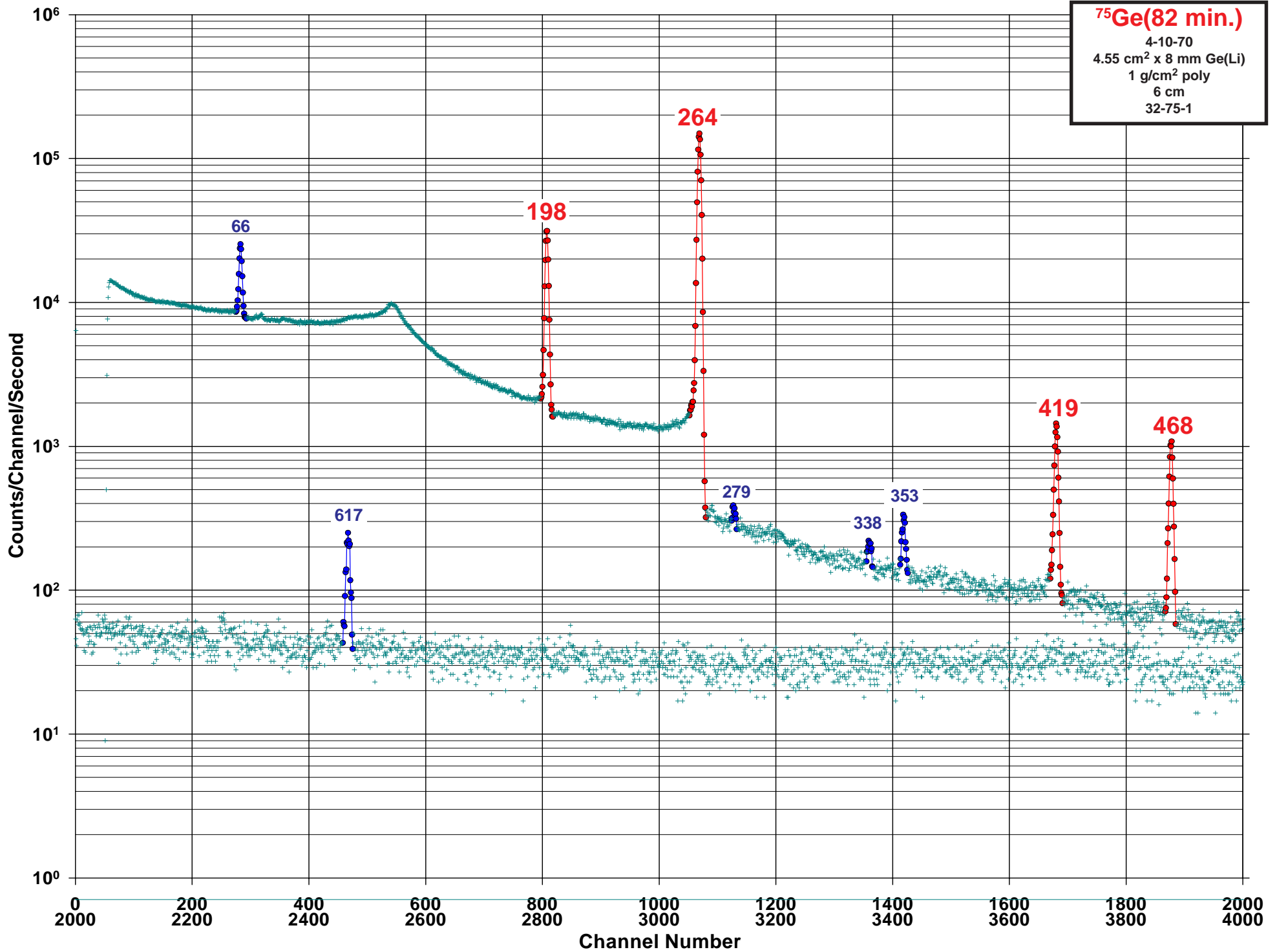
Half Life: 11.43(3) day

Detector: 30 mm² x 3 mm Ge (Li)Method of Production: $^{70}\text{Ge}(n,\gamma)$

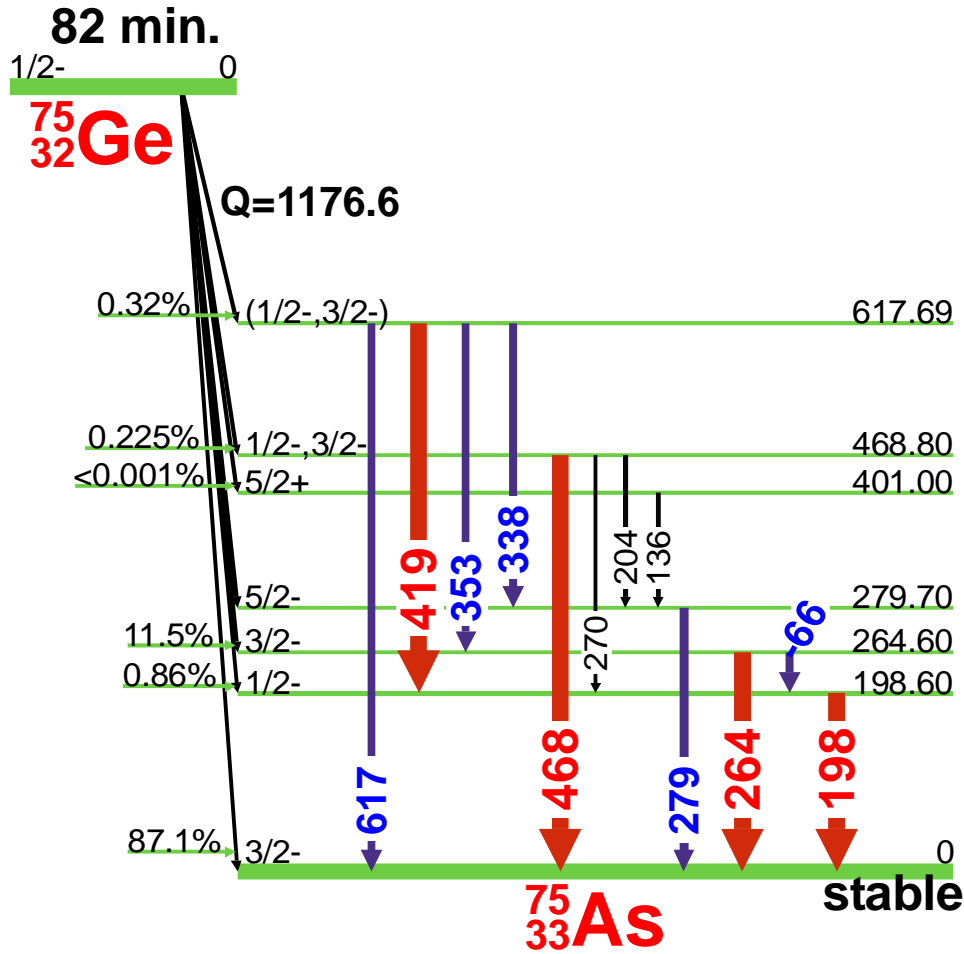
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
No Gamma-rays					

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁷⁵Ge(82 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷⁵Ge

Half Life: 82.78(4) min.

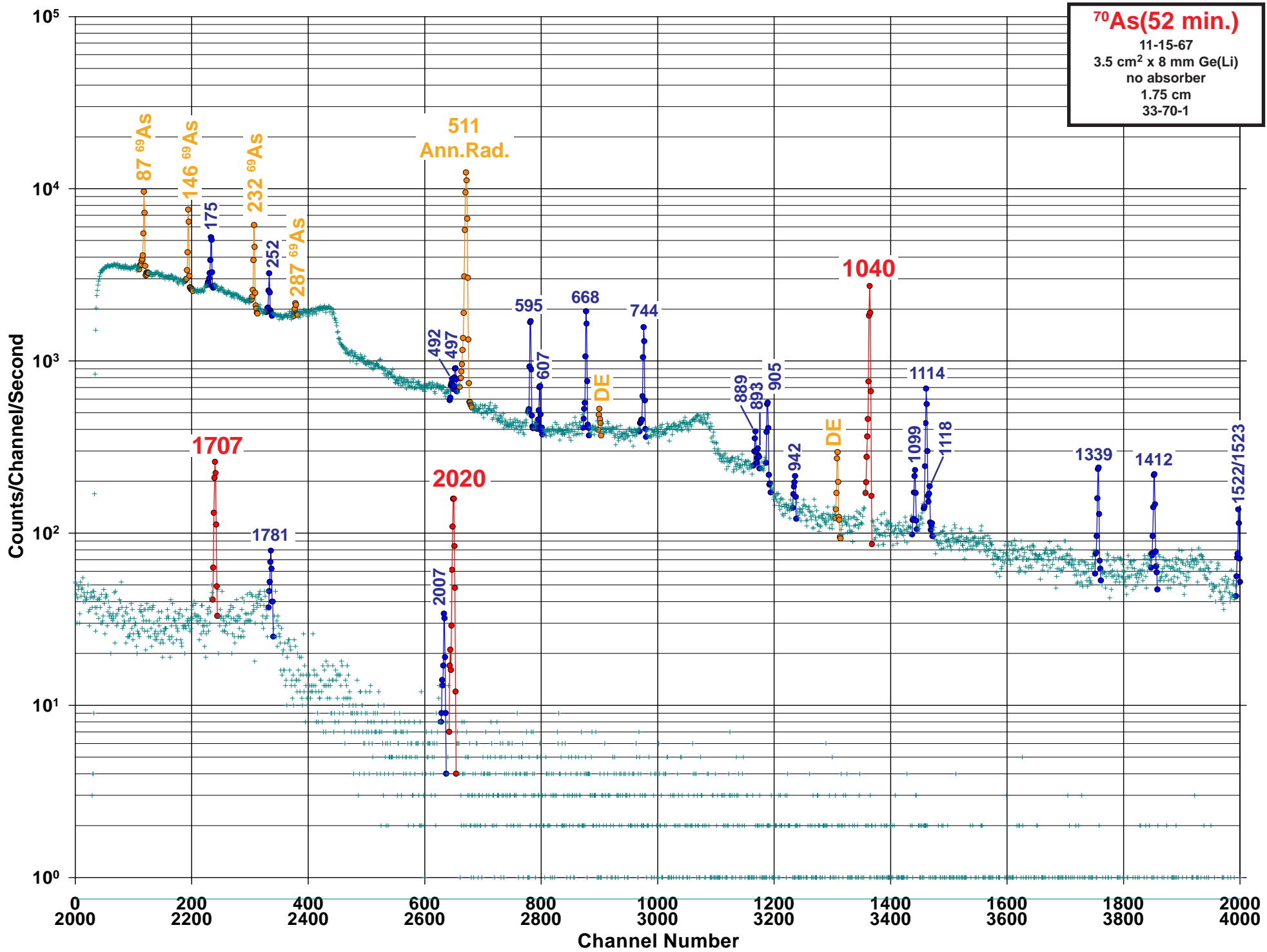
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁷⁴Ge(n,γ)

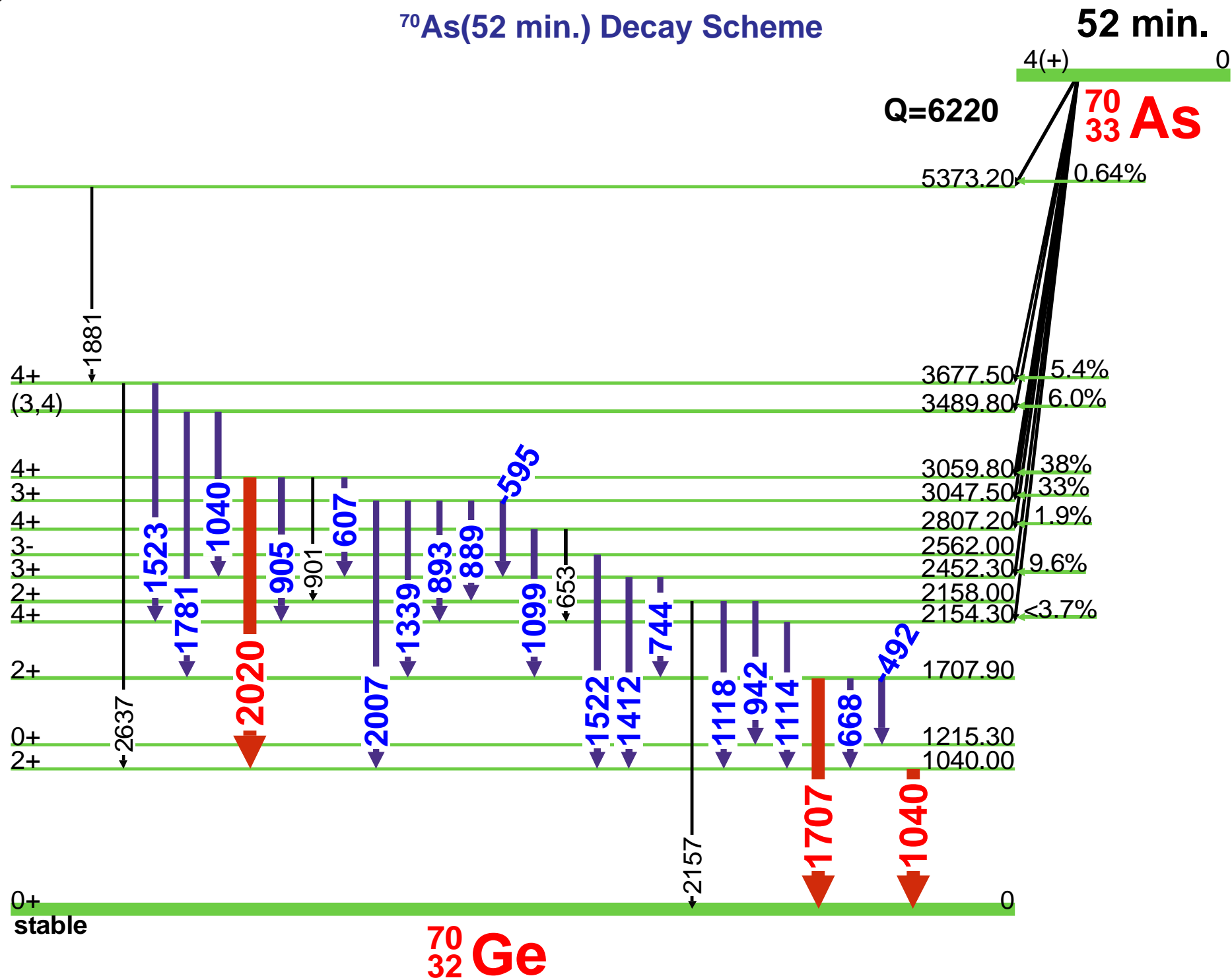
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
66.00	0.20	2.0	0.114	0.012	3
136.0			0.0008	0.0001	4
198.60	0.10	10.9	1.19	0.12	1
204.26			0.0011	0.0001	4
264.60	0.10	100	11.4	1.1	1
270.2	0.4		0.0034	0.0012	4
279.7	0.4	0.14	0.0057	0.0013	4
338.0	0.4	0.14	0.0046	0.0012	4
353.0	0.5	0.30	0.020	0.003	3
419.1	0.2	2.4	0.185	0.019	1
468.80	0.20	2.3	0.223	0.023	1
617.70	0.20	0.84	0.114	0.012	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁷⁰As(52 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{70}As E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

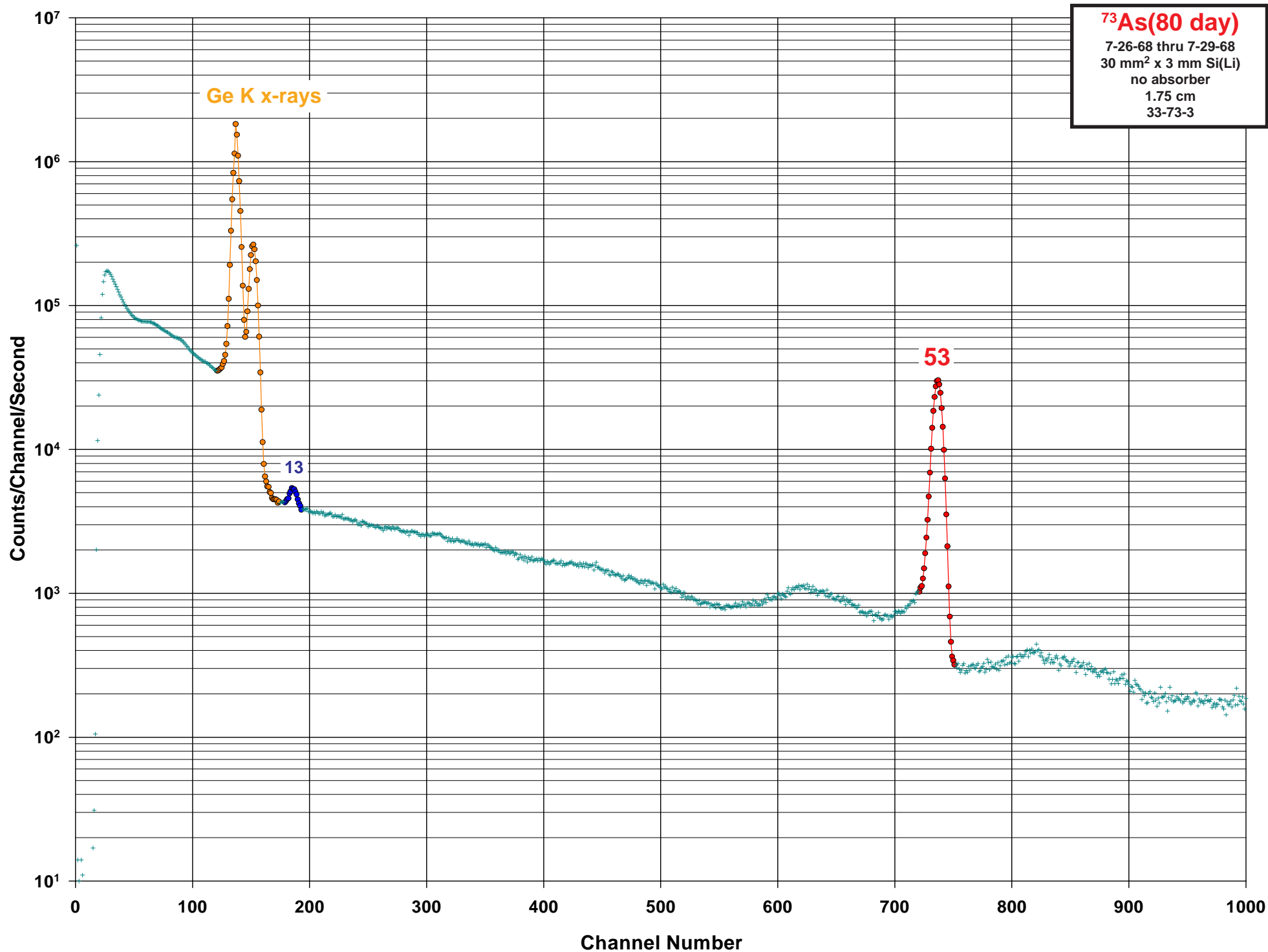
Half Life: 52.6 (3) min.

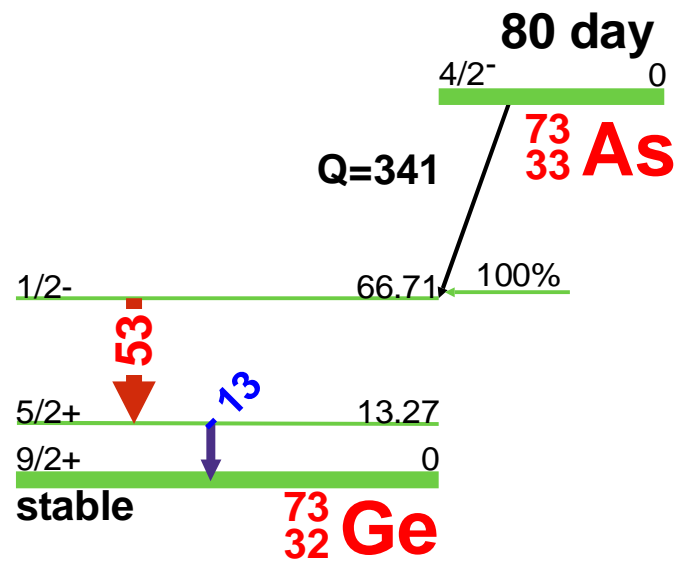
Detector: 3.5 cm² x 8 mm Ge (Li)Method of Production: $^{70}\text{Ge}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	175.3	0.5	2.6	2.69	0.28	3
	240.5	0.5	0.20	0.22	0.04	4
	252.3	0.5	2.4	3.0	0.4	3
	294.2	0.5		0.19	0.04	4
	298.8	0.5	0.4	0.40	0.08	4
	373.0	2.0		1.26	0.05	4
	448.0	1.0		0.17	0.03	4
	450.9	1.0		0.110	0.026	4
	492.2	0.5	0.9	1.01	0.09	4
	497.0	0.5	2.4	2.61	0.27	4
Ann.	511.006			174.	14.	1
	595.2	0.5	21.7	16.8	1.8	2
	607.6	0.5	4.5	4.0	0.5	3
	615.0	1.0		4.1	0.6	4
	653.0	0.5	0.4	0.61	0.13	4
	668.4	0.5	24.5	21.8	2.4	2
	686.0	1.0		2.1	0.8	4
	696.0	1.0		1.68	0.07	4
	744.8	0.5	26.2	21.5	2.4	2
	760.2	0.5		0.25	0.13	4
	828.1	0.5		0.36	0.08	4
	889.3	0.5	3.6	3.2	0.4	4
	893.1	0.5	2.1	2.02	0.19	4
	901.9	0.5	4.2	1.43	0.18	3
	905.7	0.5		12.5	1.4	4
	942.1	0.5	2.4	1.43	0.18	4
	953.8	0.5		0.49	0.10	4
D	1040.0	0.5	100.	81.	5.	1
	1040.0	0.5		6.74	0.27	
	1099.3	0.5	5.1	4.5	0.5	3
	1114.3	0.5	25.2	21.8	2.4	2
	1118.1	0.5	3.7	3.3	0.4	4
	1184.0	2.0		1.9	0.8	4
	1218.3	0.5		0.19	0.03	4
	1250.	20.		4.0	1.3	4
	1296.1	0.5		0.18	0.08	4
	1332.2	0.5		0.63	0.13	4
	1336.0	0.5		0.63	0.13	4
	1339.4	0.5	11.5	9.2	1.0	2
	1351.8	0.5		0.61	0.12	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1412.5	0.5	11.0	8.8	1.0	2
	1418.3	0.5		0.51	0.17	4
	1496.1	0.5		1.60	0.18	4
	1507.1	0.5		0.40	0.25	4
	1512.1	0.5		0.29	0.17	4
D	1522.5	1.0	6.5			3
	1523.3	0.5		5.2	0.5	
	1566.6	0.5		0.29	0.17	4
	1587.9	0.5		0.45	0.09	4
	1707.9	0.5	22.8	18.4	2.0	1
	1781.3	0.5	5.3	4.0	0.5	3
	1883.1	0.5	0.9	0.53	0.11	3
	1945.0	0.5		0.08	0.08	4
	1949.0	0.5		0.17	0.03	4
	2007.7	0.5	3.4	3.0	0.4	3
	2020.0	0.5	21.2	17.2	1.8	1
	2064.7	3.0		0.126	0.005	4
	2095.5	3.0		0.19	0.15	4
	2157.6	1.0	0.6	0.38	0.08	4
	2219.3	1.0		0.11	0.06	4
	2256.1	1.0		0.13	0.07	4
	2326.6	1.0		0.12	0.06	4
	2333.4	1.0		0.08	0.06	4
	2421.2	1.0		0.08	0.08	4
	2425.0	1.0		0.08	0.08	4
	2425.0	1.0		0.08	0.08	4
	2449.3	1.0		0.36	0.08	4
	2519.5	3.0		0.08	0.08	4
	2637.2	1.0	0.5	0.31	0.06	4
	2780.4	3.0		0.08	0.08	4
	2852.3	3.0		0.04	0.04	4
	2964.9	3.0		0.08	0.08	4
	3125.6	1.0		0.07	0.07	4
	3290.	40.		0.19	0.04	4
	3470.	40.		0.15	0.03	4
	3920.	30.		0.16	0.03	4
	4090.6	3.0		0.017	0.017	4
	4327.9	3.0		0.017	0.017	4
	4434.5	3.0		0.008	0.008	4
	4700.	50.		0.017	0.008	4





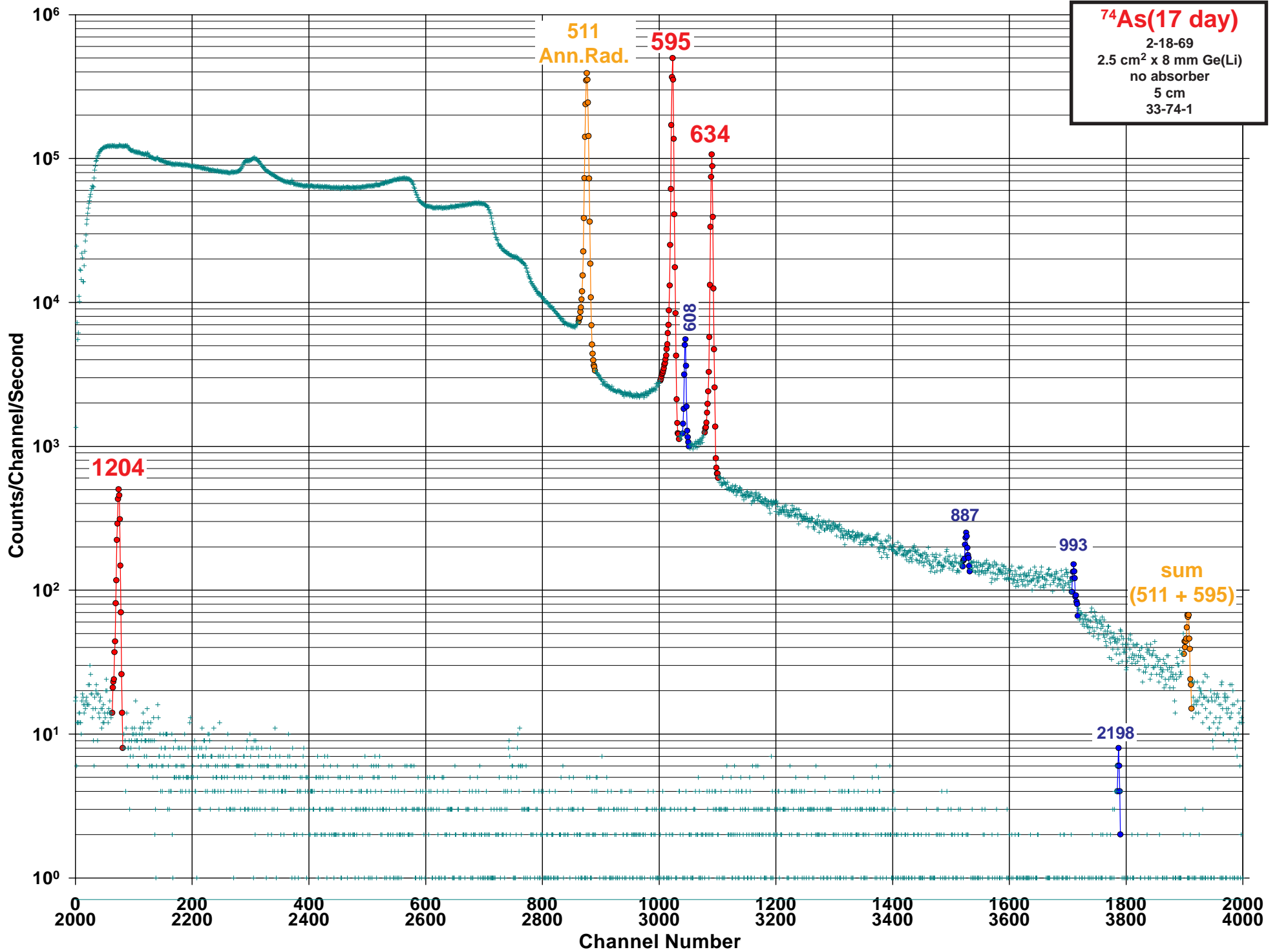
^{73}As (80 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{73}As

Half Life: 80.30(6) day

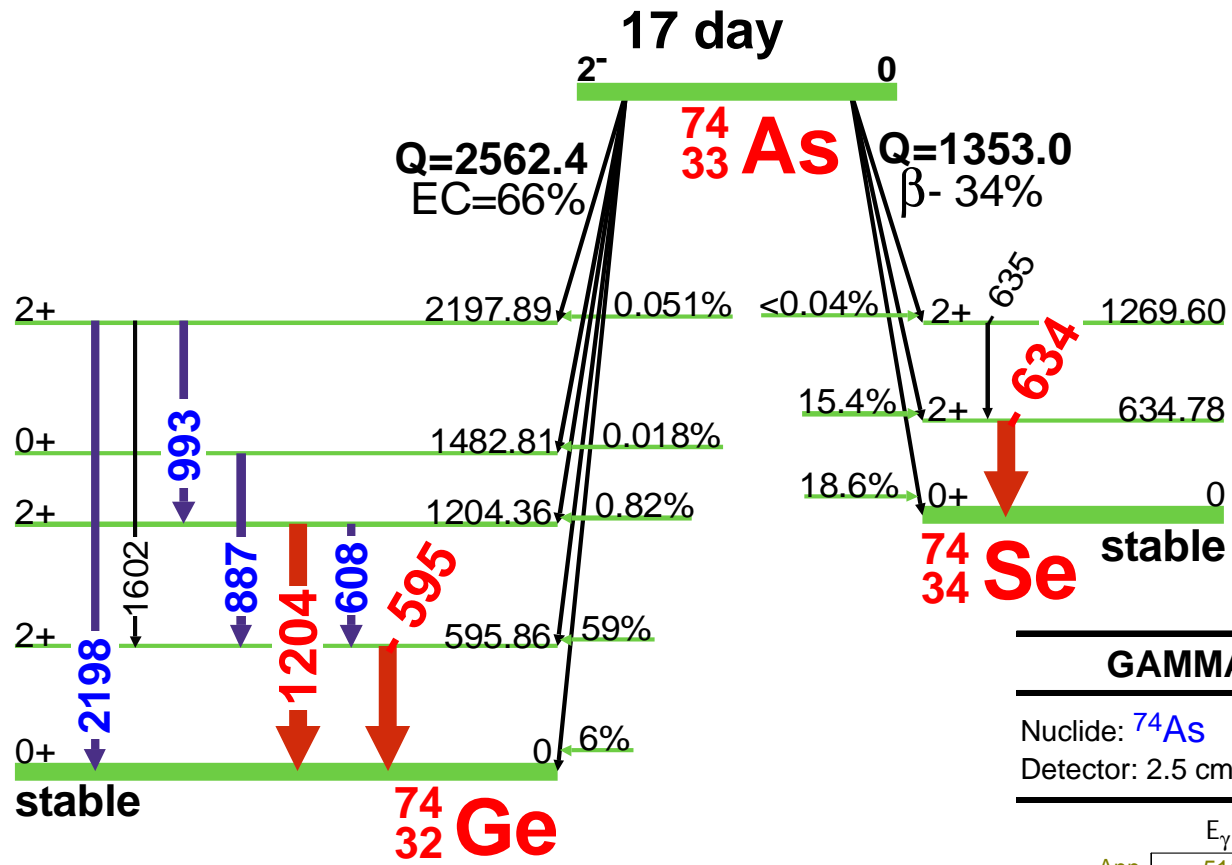
Detector: 30 cm² x 3 mm Si (Li)Method of Production: $^{73}\text{Ge}(n,p)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
13.263	0.015	0.4	0.089		4
53.437	0.009	100.	10.34		1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



⁷⁴As(17 day) Decay Scheme



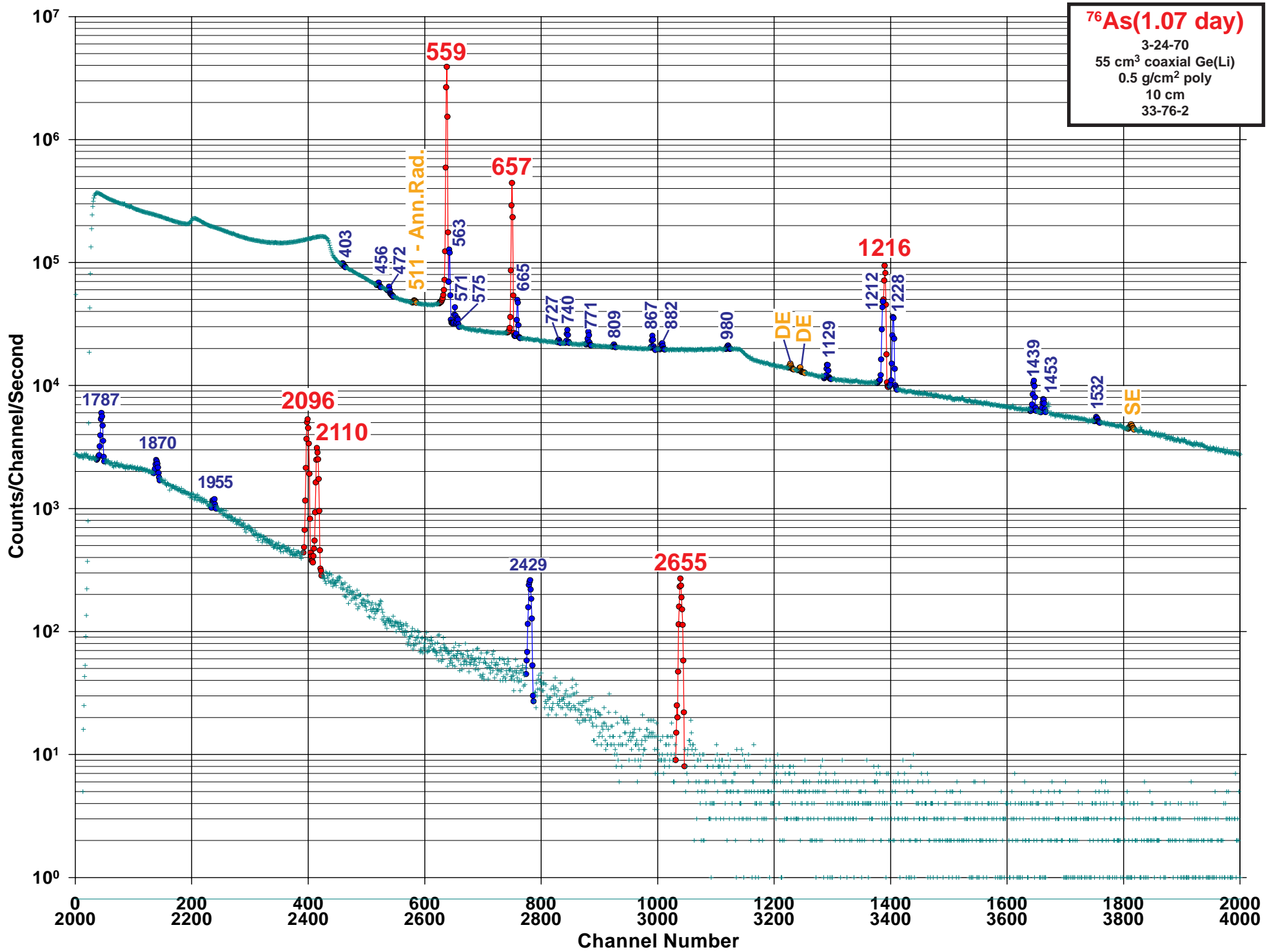
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷⁴As Half Life: 17.77(2) day
 Detector: 2.5 cm² x 8 mm Ge (Li) Method of Production: ⁷⁵As(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			57.	6.	1
	595.83	0.08	100	59.	4.	1
	608.43	0.08	1.0	0.552	0.021	2
	634.78	0.08	25.7	15.4	1.1	1
	635.0	2.0		0.0357	0.0021	4
	715.30	0.20		0.0071	0.0024	4
	734.2	0.3		0.0036	0.0012	4
	867.2	0.7		0.00457	0.00023	4
	887.00	0.10	0.066	0.0255	0.0015	4
	993.46	0.08	0.04	0.0184	0.0019	4
	1101.10	0.20		0.0071	0.0018	4
	1204.35	0.08	0.48	0.285	0.020	1
	1269.6	0.6		0.0018	0.0006	4
	1482.6					4
	1602.5	0.5		0.0071	0.0007	4
	2198.2	0.3	0.03	0.0149	0.0019	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





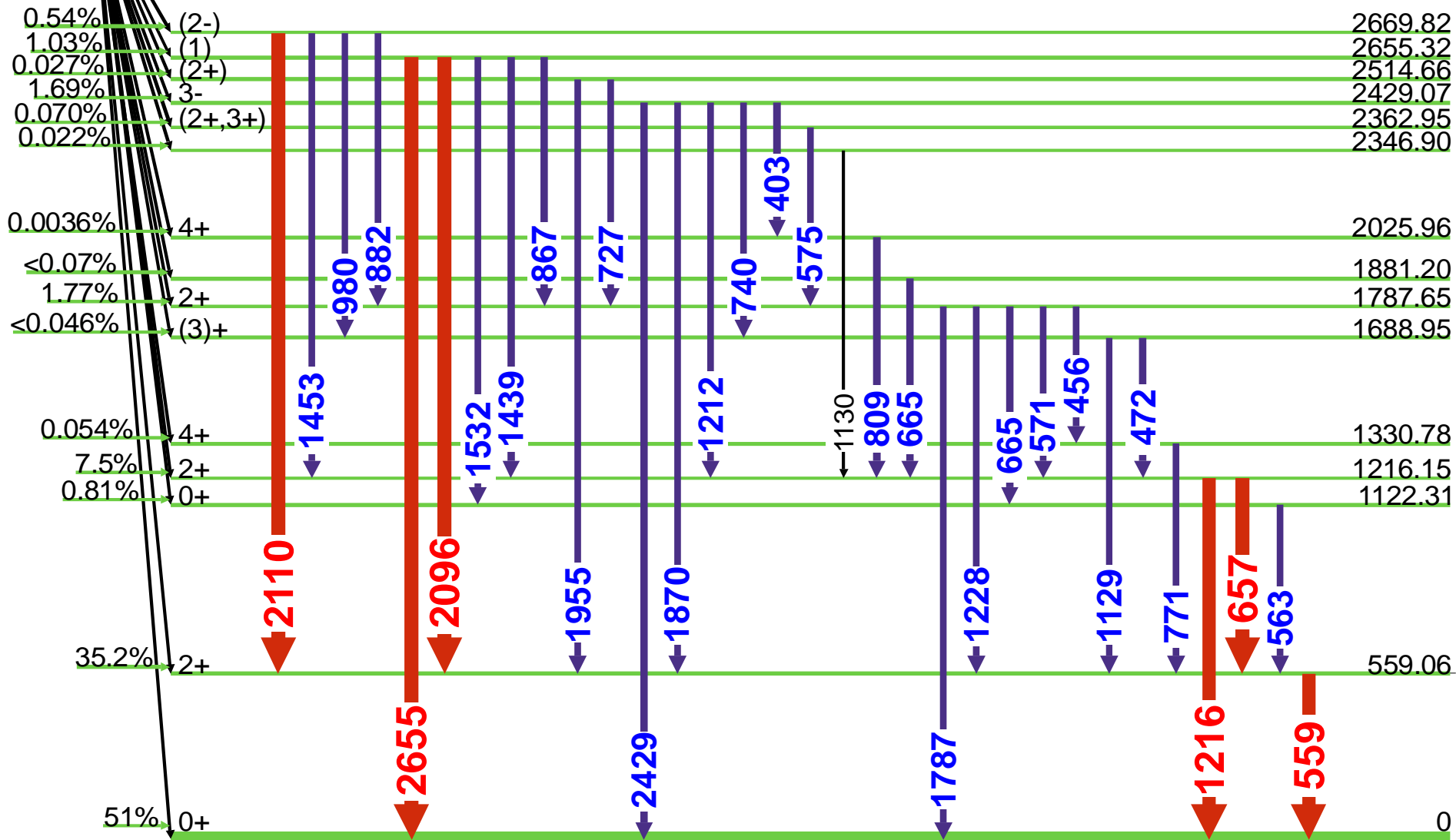
⁷⁶As(1.07 day) Decay Scheme

1.07 day

2- 0



Q=2962.0



stable



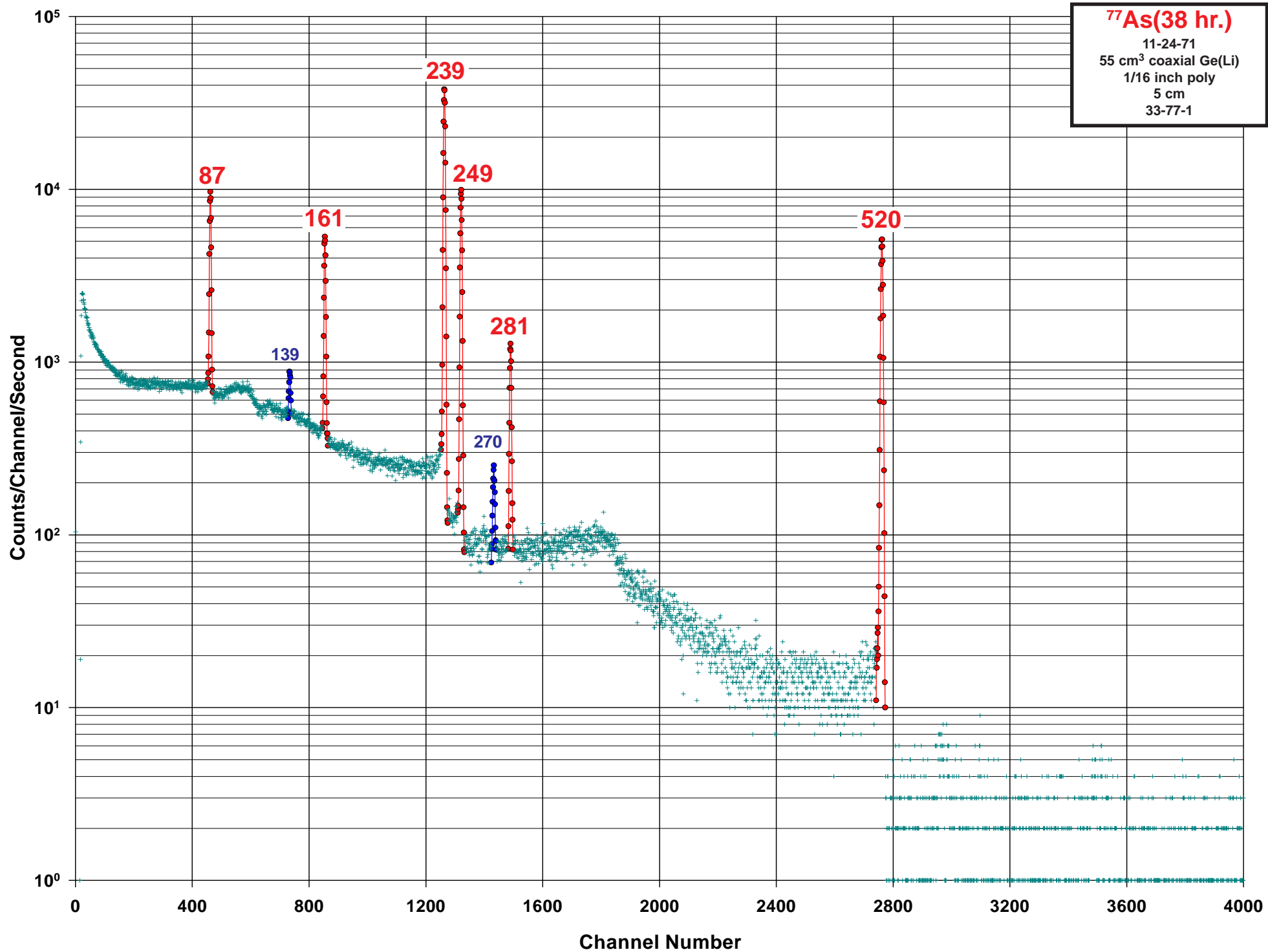
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{76}As E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1.0778(20) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{75}\text{As}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
302.20	0.20		0.0090	0.0014	4	921.6	0.4		0.0009	0.0005	4
358.4	0.7		0.0135	0.0006	4	954.6	0.3		0.0018	0.0014	4
403.20	0.20	0.08	0.0234	0.0017	4	957.6	0.5		0.0018	0.0009	4
437.3	1.0		0.0014	0.0005	4	980.90	0.10	0.09	0.041	0.003	4
456.90	0.10	0.32	0.036	0.003	4	1030.6	1.0		0.0009	0.0005	4
463.6	0.7		0.0009	0.0005	4	1060.6	0.3		0.0018	0.0005	4
466.5	1.0		0.005	0.004	4	1098.20	0.20		0.0036	0.0005	4
472.80	0.10	0.48	0.050	0.005	4	1129.87	0.05	0.34	0.126	0.015	4
484.8	0.3		0.0059	0.0014	4	1130.0	1.0		0.018	0.014	4
559.10	0.05	100	45.0	2.0	1	1212.92	0.05	3.4	1.44	0.11	2
563.23	0.05	2.7	1.20	0.09	3	1216.08	0.05	7.2	3.42	0.24	1
571.50	0.10	0.39	0.140	0.011	4	1228.52	0.05	2.6	1.22	0.11	2
575.30	0.05	0.18	0.068	0.006	4	1393.0	2.0				4
602.5	0.4		0.0009	0.0005	4	1439.10	0.05	0.62	0.279	0.19	3
639.5	1.0		0.0036	0.0014	4	1453.62	0.05	0.29	0.108	0.11	4
657.05	0.05	14.0	6.2	0.5	1	1467.0	1.0		0.0009	0.0005	4
665.0	1.0	0.96	0.04	0.04	3	1532.80	0.20	0.10	0.0243	0.0018	4
665.34	0.05		0.36	0.04		1563.0	1.0		0.0018	0.0005	4
695.20	0.10		0.0090	0.0010	4	1567.90	0.10		0.0077	0.0006	4
727.00	0.07	0.08	0.0185	0.0016	4	1611.2	0.4		0.0077	0.0006	4
740.10	0.05	0.27	0.117	0.011	4	1787.66	0.08	0.73	0.293	0.023	3
755.0	0.5		0.0005	0.0005	4	1805.0	2.0		0.0014	0.0009	4
771.74	0.05	0.27	0.122	0.011	4	1870.00	0.05	0.28	0.054	0.006	4
776.5	0.5		0.0009	0.0005	4	1881.3	0.4		0.0009	0.0005	4
797.0	0.4		0.005	0.004	4	1955.7	0.3	0.04	0.0090	0.0010	4
809.80	0.10	0.03	0.0171	0.0012	4	2096.30	0.05	1.3	0.55	0.04	1
852.8	1.0		0.0023	0.0014	4	2110.80	0.05	0.76	0.33	0.03	1
857.0	0.8		0.0009	0.0009	4	2127.0	0.5		0.0014	0.0005	4
863.8	0.4		0.0113	0.0011	4	2429.00	0.08	0.10	0.032	0.003	2
867.64	0.08	0.28	0.131	0.011	4	2655.30	0.08	0.10	0.044	0.003	1
882.13	0.05	0.14	0.059	0.006	4	2669.7	0.5		0.0003	0.0000	4
907.5	0.4		0.0018	0.0014	4						



GAMMA-RAY ENERGIES AND INTENSITIES

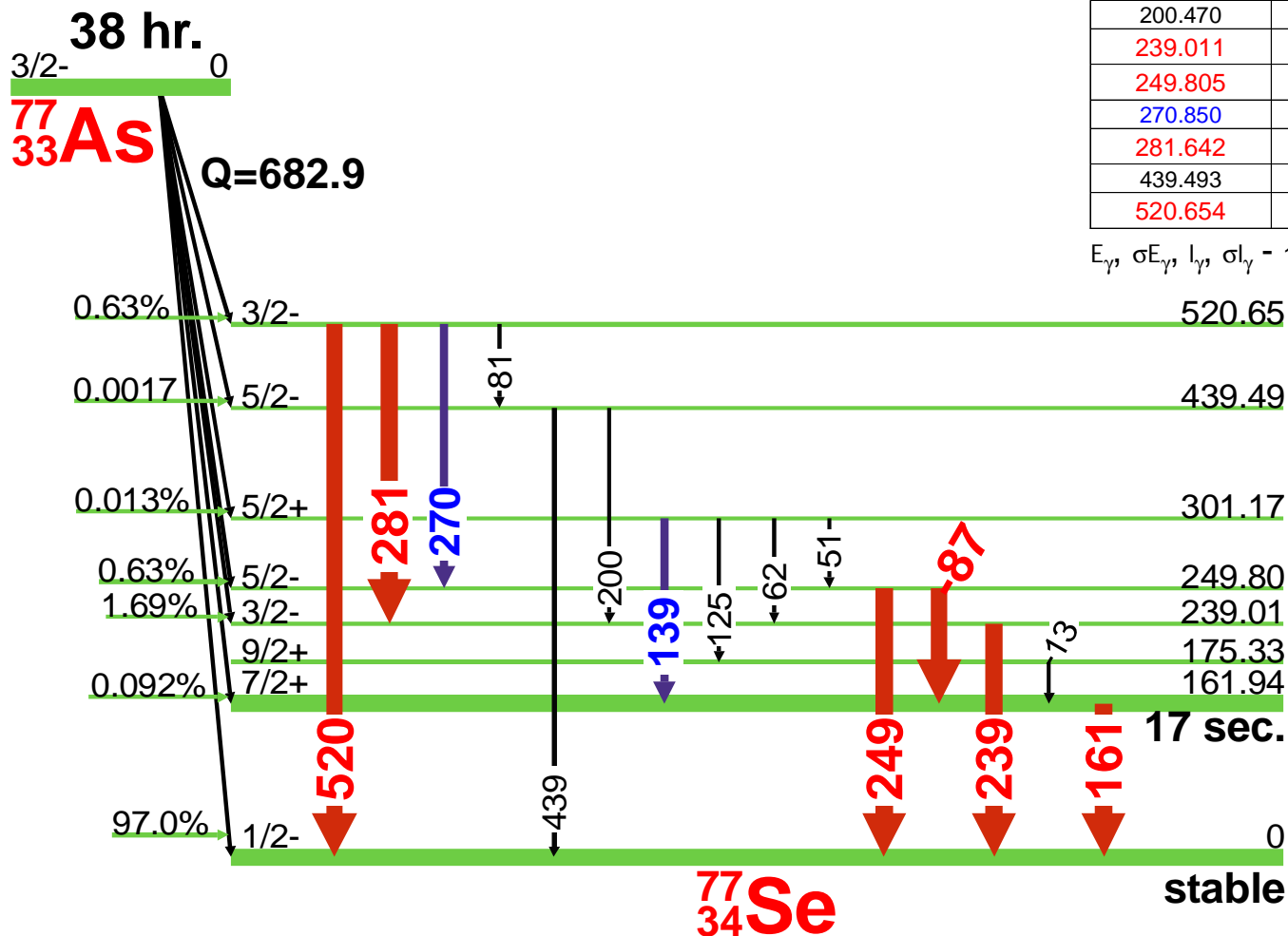
Nuclide: ⁷⁷As

Half Life: 38.83(5) hr.

Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁷⁶Se(γ,p)

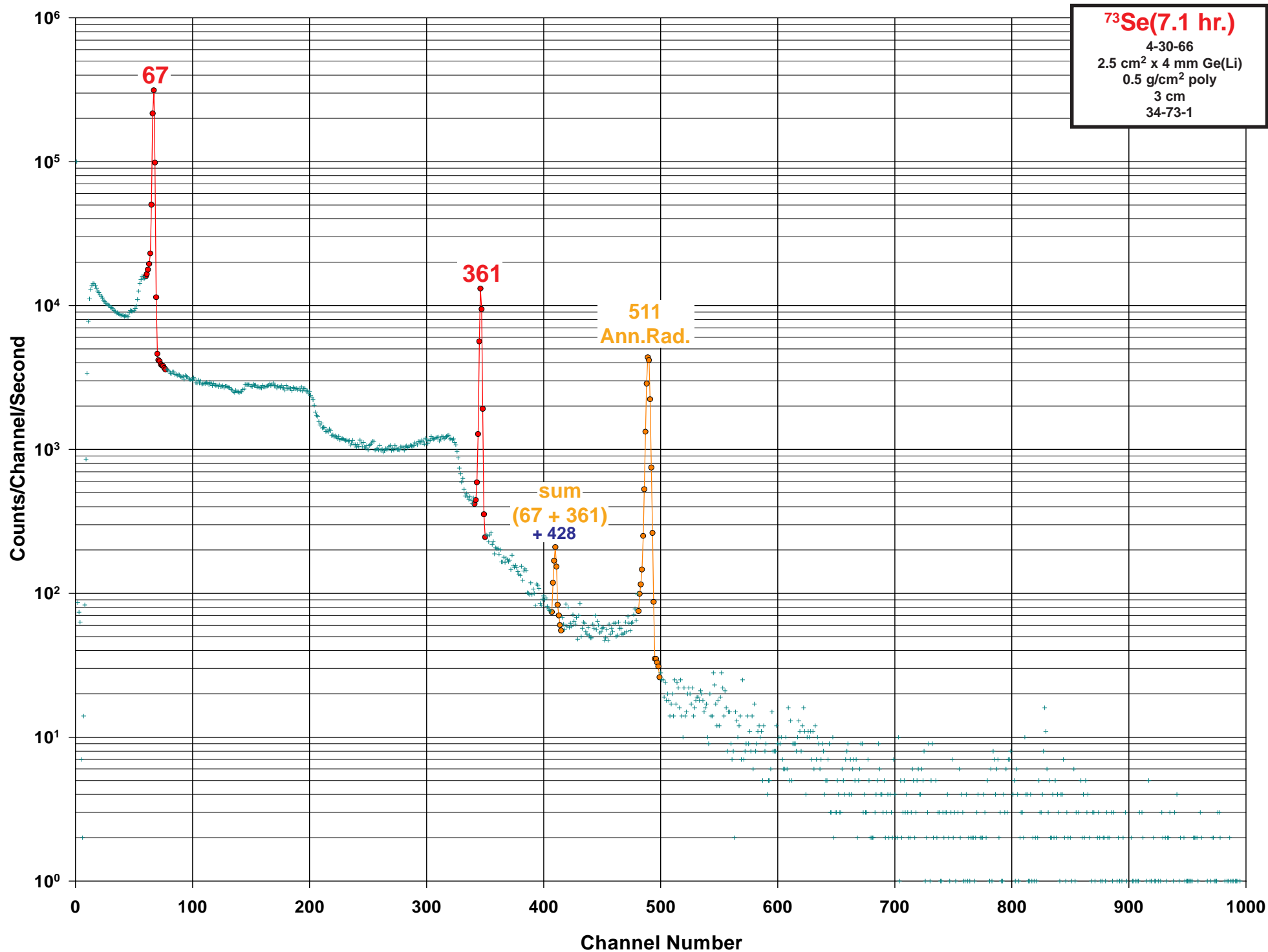
⁷⁷As(38 hr.) Decay Scheme



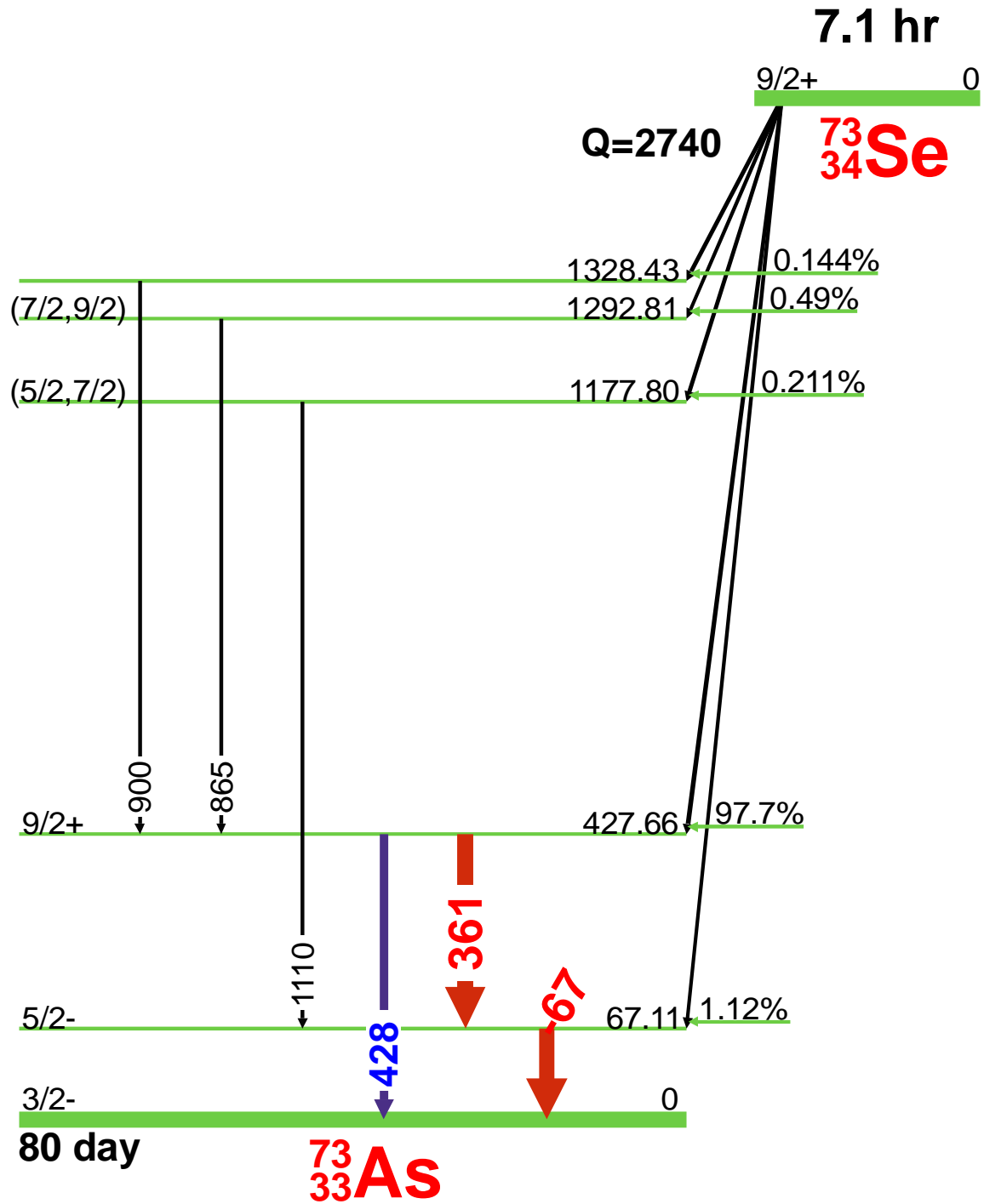
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
13.4			0.0002		4
51.340	0.020		0.0007	0.0001	4
62.2	0.4		0.0001		4
81.150	0.020		0.0004	0.0001	4
87.854	0.005	13.0	0.20	0.04	1
125.840	0.020		0.00119	0.00022	4
139.243	0.015	1.0	0.0099	0.0017	3
161.932	0.010	8.1	0.146	0.024	1
200.470	0.020		0.00107	0.00020	
239.011	0.006	100	1.59	0.24	1
249.805	0.008	27.0	0.39	0.07	1
270.850	0.012	0.7	0.0083	0.0014	3
281.642	0.008	3.9	0.058	0.010	1
439.493	0.020		0.00102	0.00019	4
520.654	0.015	39.0	0.56	0.09	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁷³Se(7.1 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

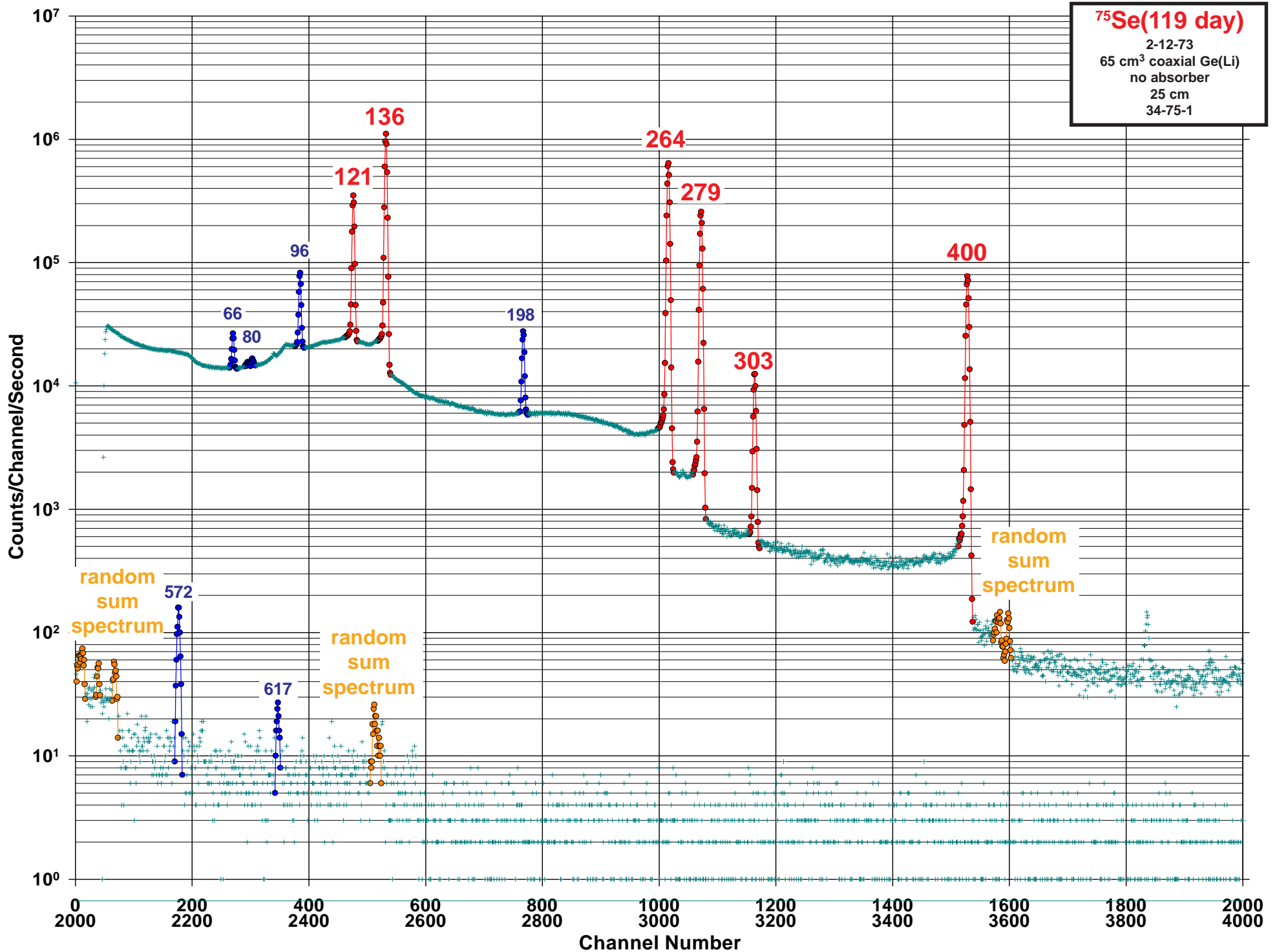
Nuclide: ^{73}Se E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 7.15(8) hr.

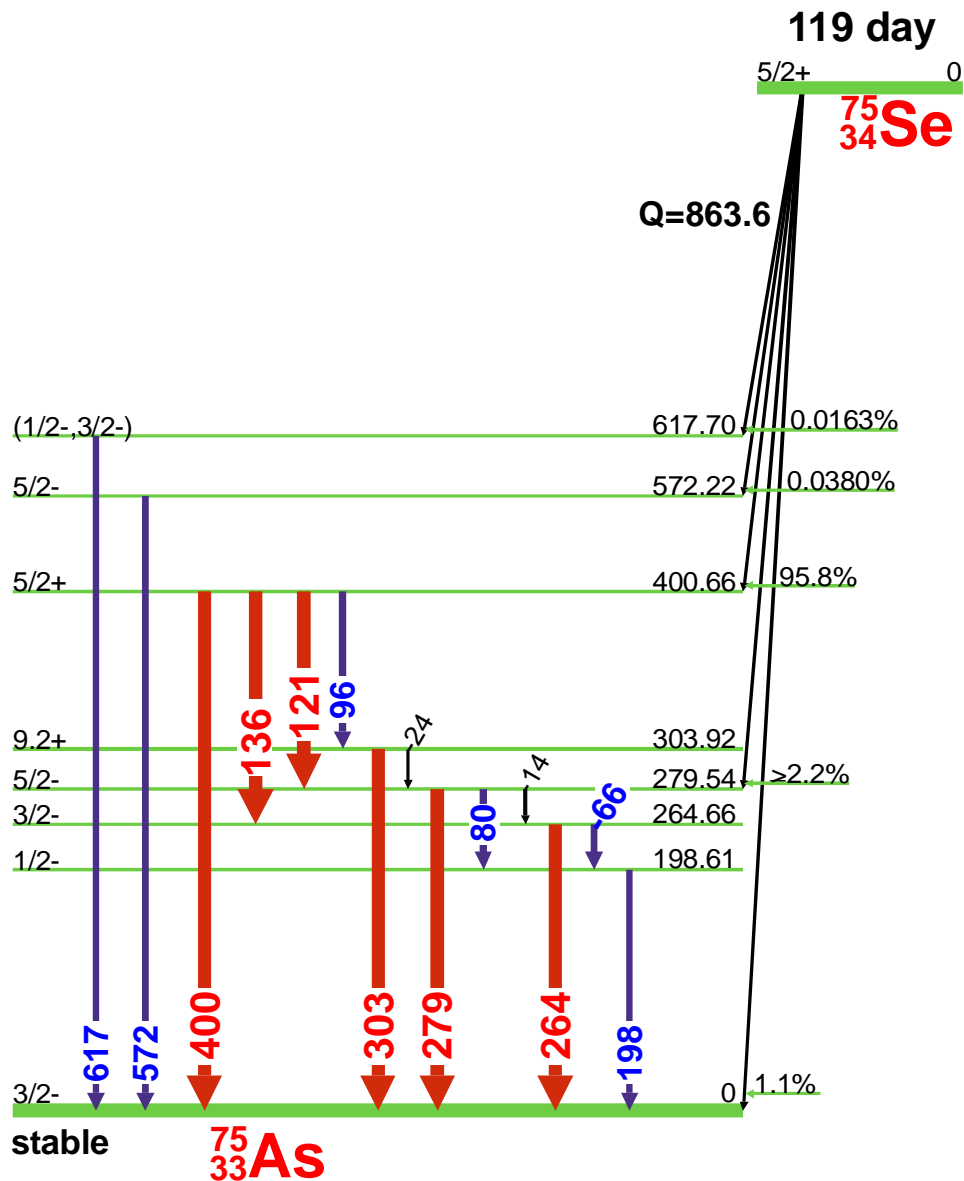
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ^{76}As (p,3n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	67.07	0.10	100	71	8	1		1153.9	0.3		0.0049	0.0010	4
	361.2	0.3	50.7	98.8	0.6	1		1158.2	0.4		0.0029	0.0010	4
	428.3	0.3	1.1	0.079	0.016	3		1207.9	0.3		0.0039	0.0010	4
	442.3	0.3		0.051	0.004	4		1215.4	0.8		0.059	0.010	4
	510.0			0.270	0.008	4		1226.6	0.9		0.0029	0.0020	4
Ann	511.006			129.5	1.8	1		1249.90	0.20		0.0039	0.0010	4
	557.9	0.5		0.0543	0.0020	4		1274.39	0.21		0.0069	0.0010	4
	575.9	0.5		0.148	0.007	4		1308.90	0.20		0.0039	0.0010	4
	600.3	0.3		0.021	0.004	4		1317.75	0.21		0.0059	0.0010	4
	609.17	0.19		0.050	0.005	4		1323.81	0.20		0.0069	0.0010	4
	682.25	0.20		0.0197	0.0020	4		1340.50	0.07		0.0701	0.0021	4
	700.0	0.5		0.0455	0.0020	4		1406.3	0.4		0.0020	0.0010	4
	765.07	0.12		0.1294	0.0022	4		1422.68	0.07		0.138	0.005	4
	783.7	0.3		0.0593	0.0020	4		1439.10	0.17		0.002	0.001	4
	793.0	0.5		0.0652	0.0021	4		1451.60	0.20		0.006	0.002	4
	813.4	0.3		0.0089	0.0010	4		1482.29	0.12		0.023	0.001	4
	818.65	0.15		0.0375	0.0020	4		1547.45	0.12		0.032	0.001	4
	847.16	0.17		0.082	0.006	4		1670.81	0.16		0.005	0.001	4
	857.0	0.3		0.024	0.006	4		1738.4	0.5		0.002	0.001	4
	865.09	0.12		0.533	0.017	4		1752.88	0.20		0.011	0.001	4
	872.6	0.3		0.038	0.007	4		1801.36	0.14		0.020	0.005	4
	887.46	0.18		0.011	0.008	4		1847.8	0.3		0.0079	0.0010	4
	900.73	0.10		0.1373	0.0022	4		1883.85	0.15		0.0306	0.0020	4
	926.19	0.15		0.0039	0.0010	4		1889.57	0.20		0.0029	0.0010	4
	930.09	0.15		0.0049	0.0010	4		1973.4	0.4		0.0010	0.0010	4
	968.1	0.8		0.020	0.010	4		2006.2	0.4		0.0020	0.0010	4
	982.75	0.13		0.0346	0.0010	4		2023.9	0.3		0.0020	0.0010	4
	993.52	0.12		0.0049	0.0010	4		2048.1	0.8		0.0010	0.0010	4
	1001.90	0.20		0.0039	0.0010	4		2053.8	0.6		0.0029	0.0010	4
	1018.52	0.13		0.0543	0.0020	4		2156.04	0.14		0.0049	0.0010	4
	1036.38	0.09		0.0148	0.0010	4		2170.5	0.3		0.0020	0.0010	4
	1110.64	0.06		0.205	0.003	4		2517.3	0.3		0.0049	0.0010	4





⁷⁵Se(119 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁷⁵Se

Half Life: 119.79(4) day.

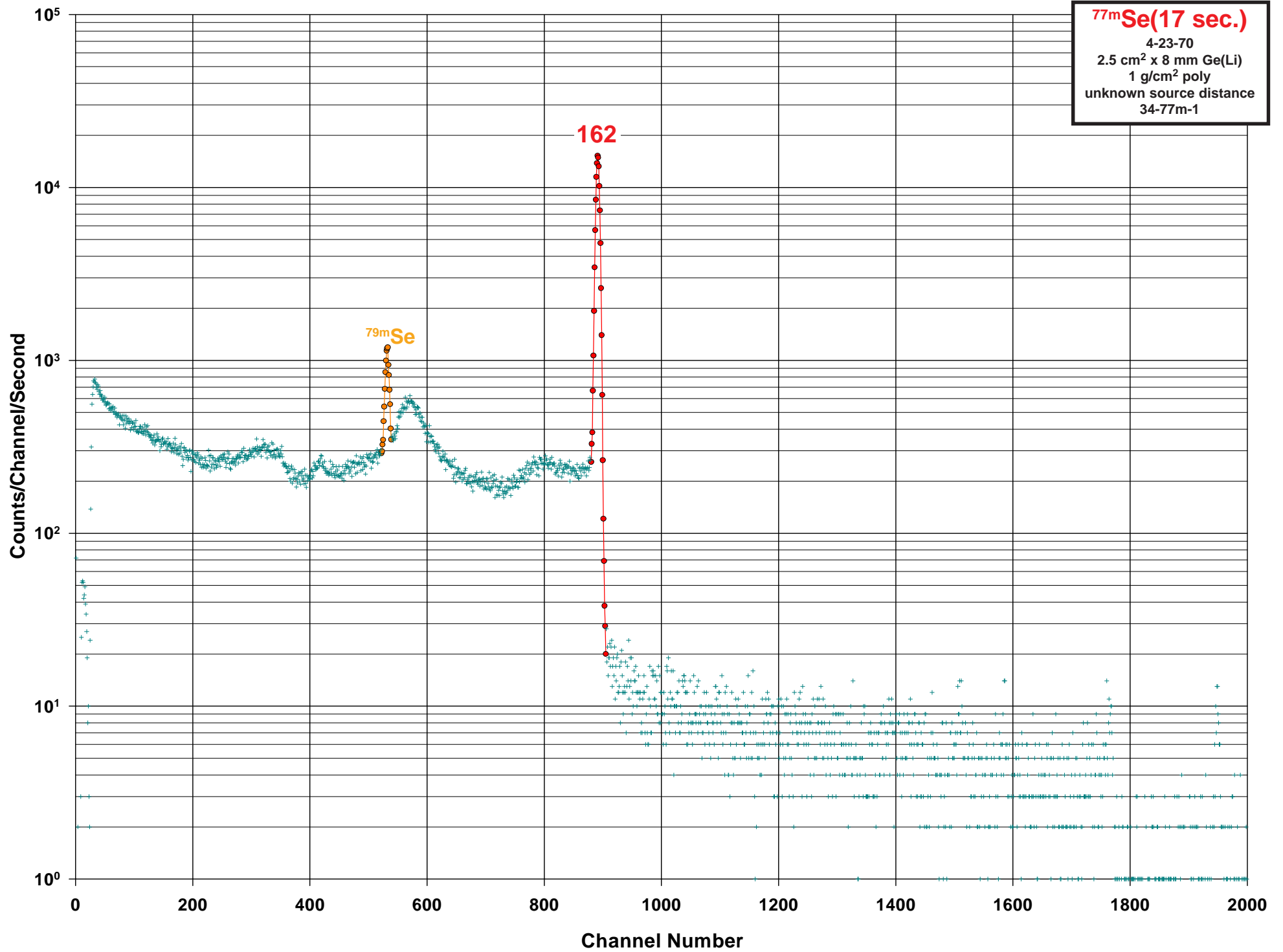
Detector: 65 cm³ coaxial Ge (Li)

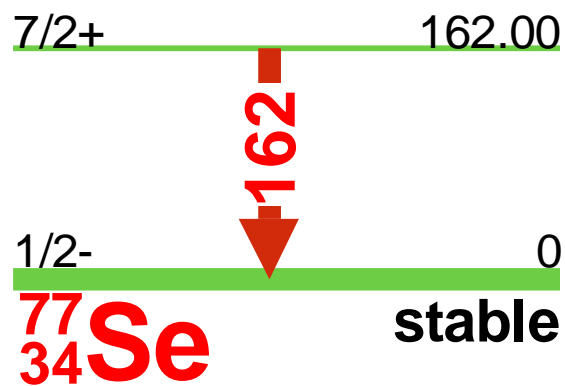
Method of Production: ⁷⁴Se(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
14.8846	0.0012		0.0012	0.0006	4
24.3815	0.0014		0.0270	0.0012	4
66.0518	0.0008	1.9	1.112	0.012	4
80.9364	0.0015		0.0077	0.0024	4
96.7340	0.0010	5.4	3.42	0.03	3
121.1155	0.0011	27.4	17.2	0.4	1
136.0001	0.0006	93.1	58.3	0.8	1
198.6060	0.0012	2.44	1.48	0.05	2
249.3	0.3		0.0001		4
264.6576	0.0009	100	58.9	0.4	1
279.5422	0.0010	42.88	24.99	0.14	1
303.9236	0.0010	2.27	1.316	0.009	1
373.61	0.24		0.0024		4
400.6572	0.0008	19.95	11.47	0.09	1
419.1	0.3		0.0118	0.0003	4
468.6	0.4		0.0003	0.0001	4
542.02	0.17		0.0001		4
556.90	0.17				4
572.22	0.24	0.65	0.0356	0.0005	3
617.8	0.3		0.0044		4
821.56	0.17		0.0001		4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





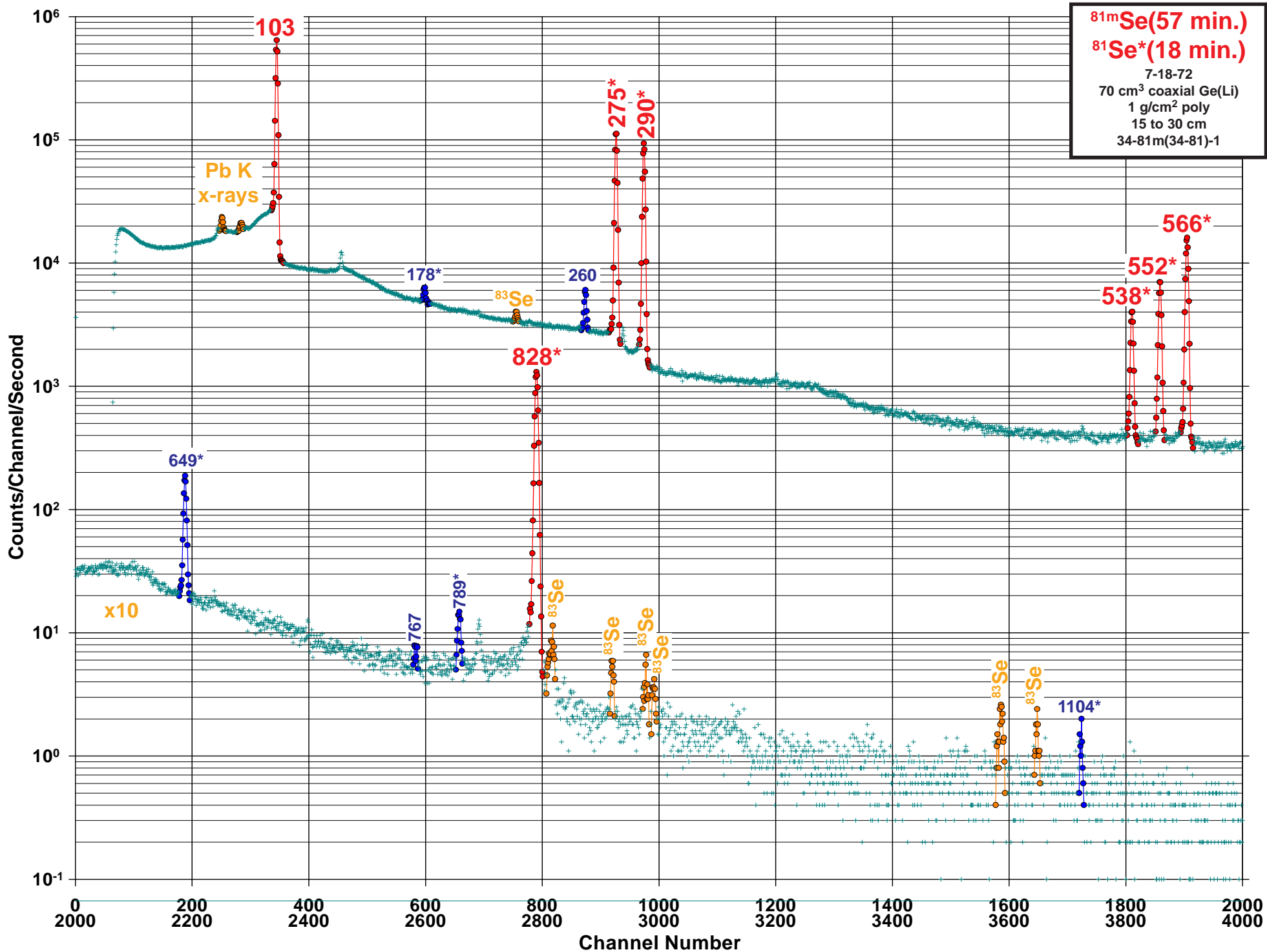
^{77m}Se (17 sec.) Decay Scheme**17 sec.****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{77m}Se

Half Life: 17.36(5) sec.

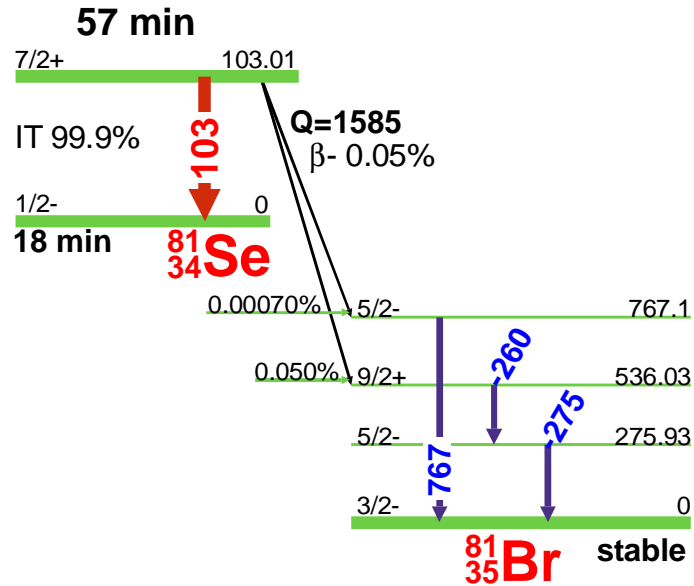
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{76}\text{Se}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
162.00	0.10	100	53.2	0.7	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



^{81m}Se(57 min.) Decay Scheme



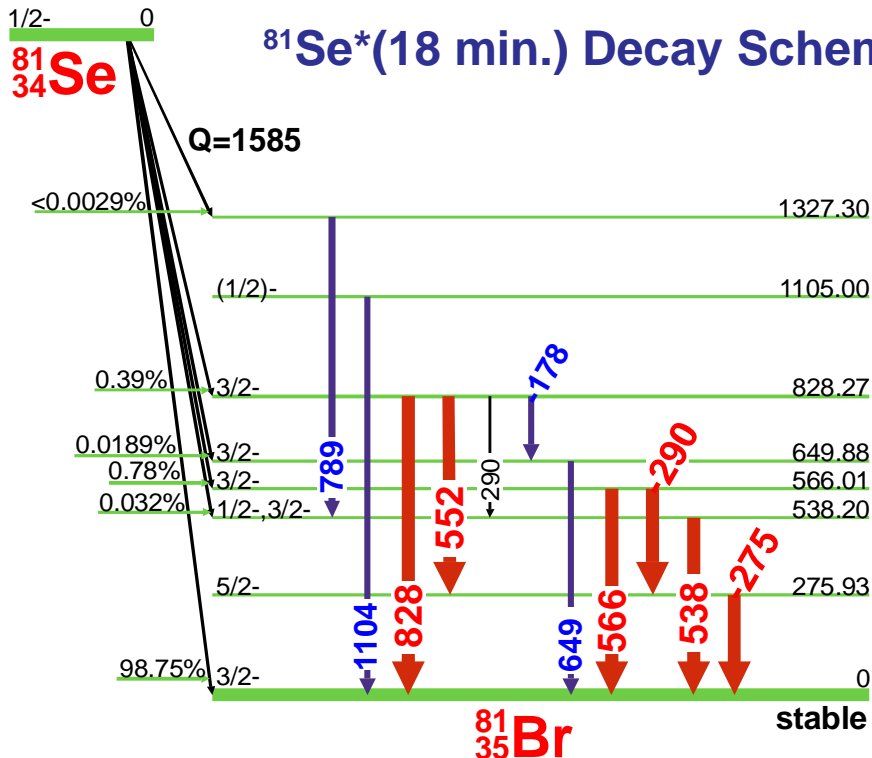
GAMMA-RAY ENERGIES AND INTENSITIES

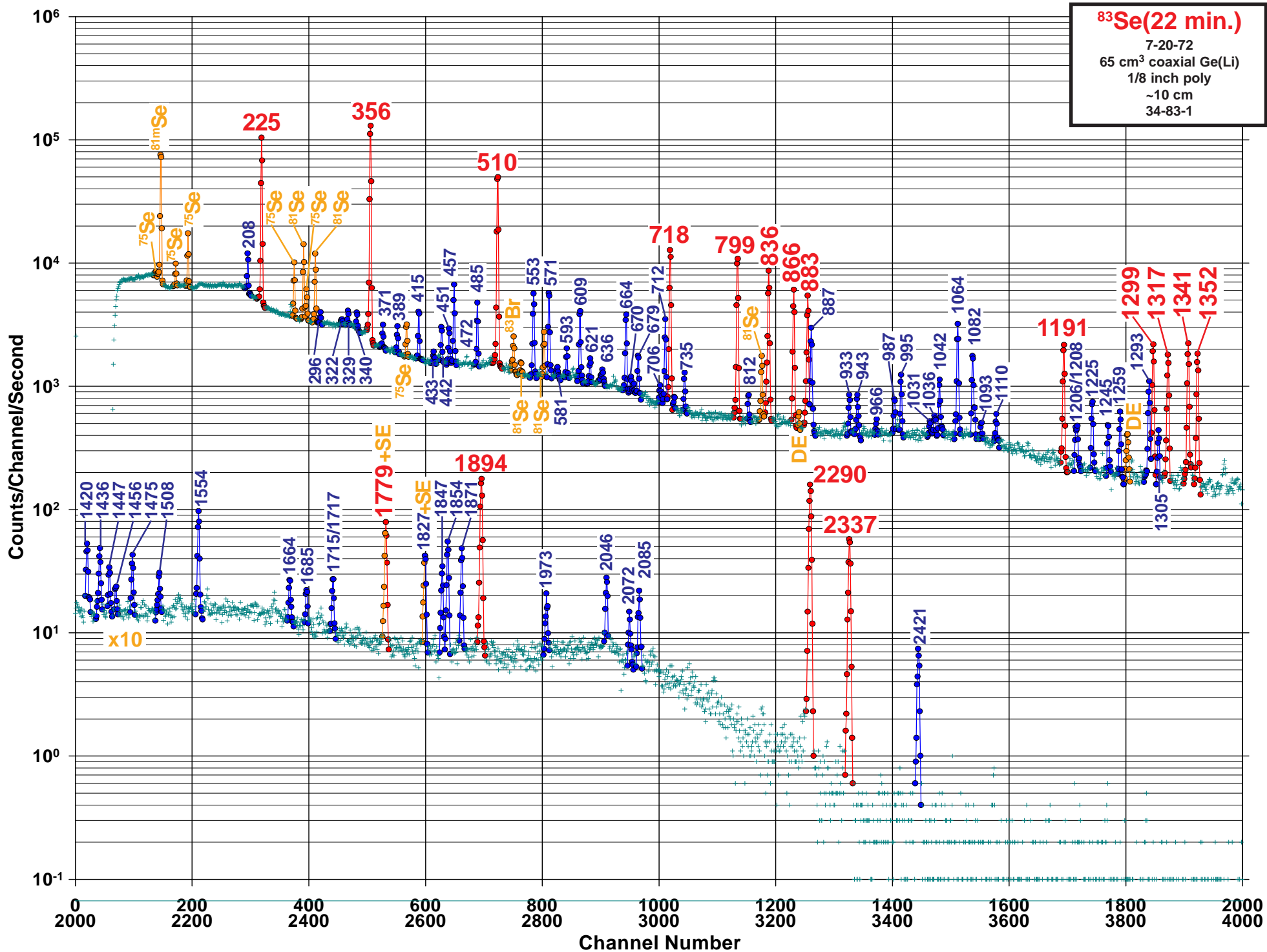
Nuclide: ^{81m}Se - ⁸¹Se* Half Life: 57.28(2) min. - 18.45(12) min.*
 Detector: 70 cm³ coaxial Ge (Li) Method of Production: ⁸⁰Se(n,γ)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	103.01	0.06	100	13.0	0.3	1
*	178.26	0.12	1.1	0.0058	0.0008	4
	201.0					4
	260.10	0.14	0.90	0.000025	0.000012	2
D	275.93	0.04	100	0.050	0.018	1
*	275.93	0.04		0.72	0.05	
*D	290.04	0.07	82.0	0.57	0.06	1
	290.1	0.7		0.0157	0.0019	
	491.3			0.000090	0.000026	4
*	538.20	0.09	8.0	0.049	0.005	1
*	552.42	0.09	14.5	0.087	0.010	1
D	566.03	0.05	35.0	0.220	0.022	1
	566.8					
*	649.79	0.09	4.3	0.025	0.003	2
	767.1	0.5		0.00062	0.00017	4
*	789.1	0.5	0.33	0.0028	0.0004	3
*	828.27	0.05	46.0	0.28	0.03	1
*	1104.8	0.5	0.04	0.00035	0.00003	4
	1352.			0.0014	0.0005	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

⁸¹Se*(18 min.) Decay Scheme





22 min.

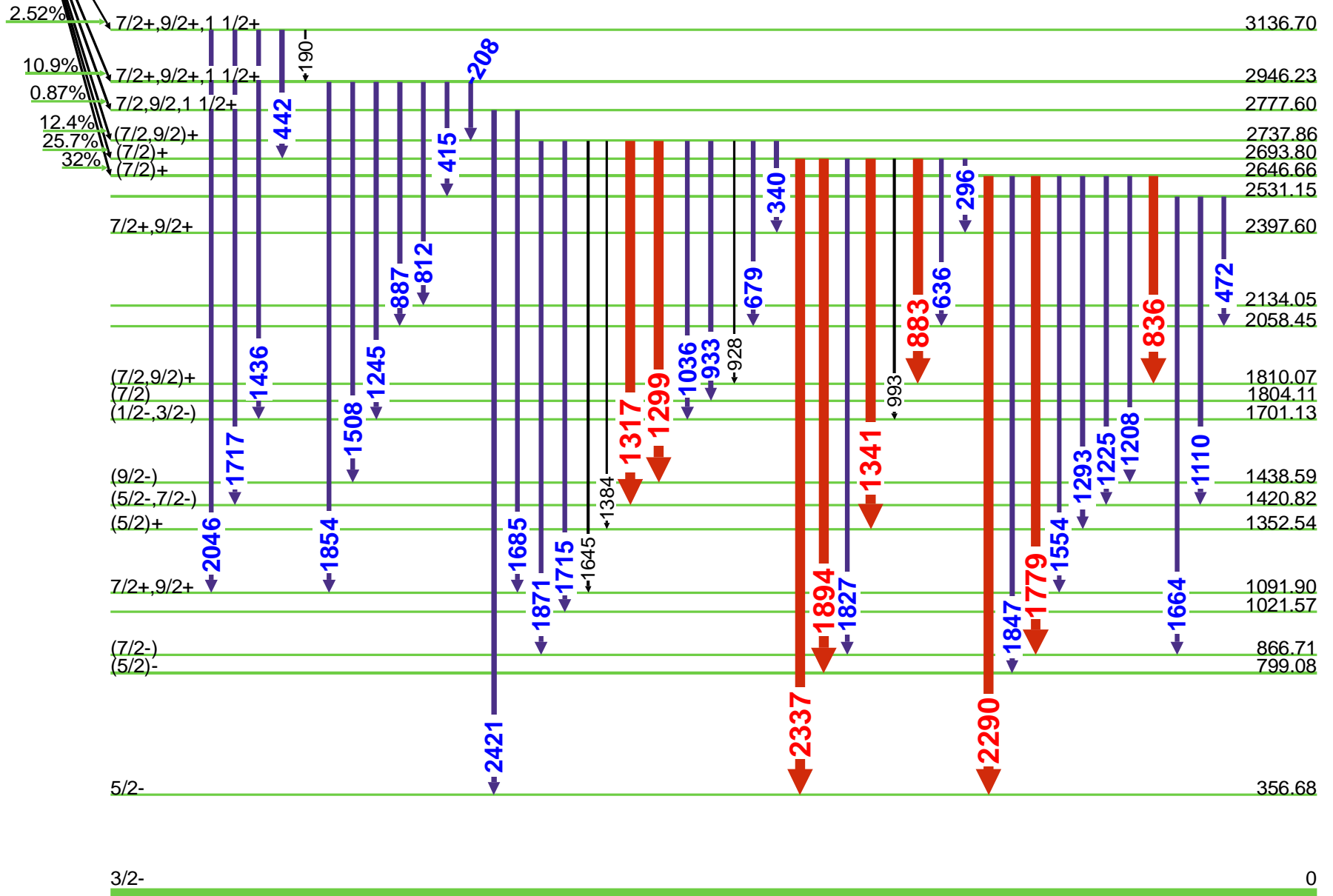
9/2+ 0

⁸³₃₄Se

Q=3668

⁸³Se(22 min.) Decay Scheme

gamma-rays emitted from high energy levels



⁸³₃₅Br

2.4 hr.



22 min.

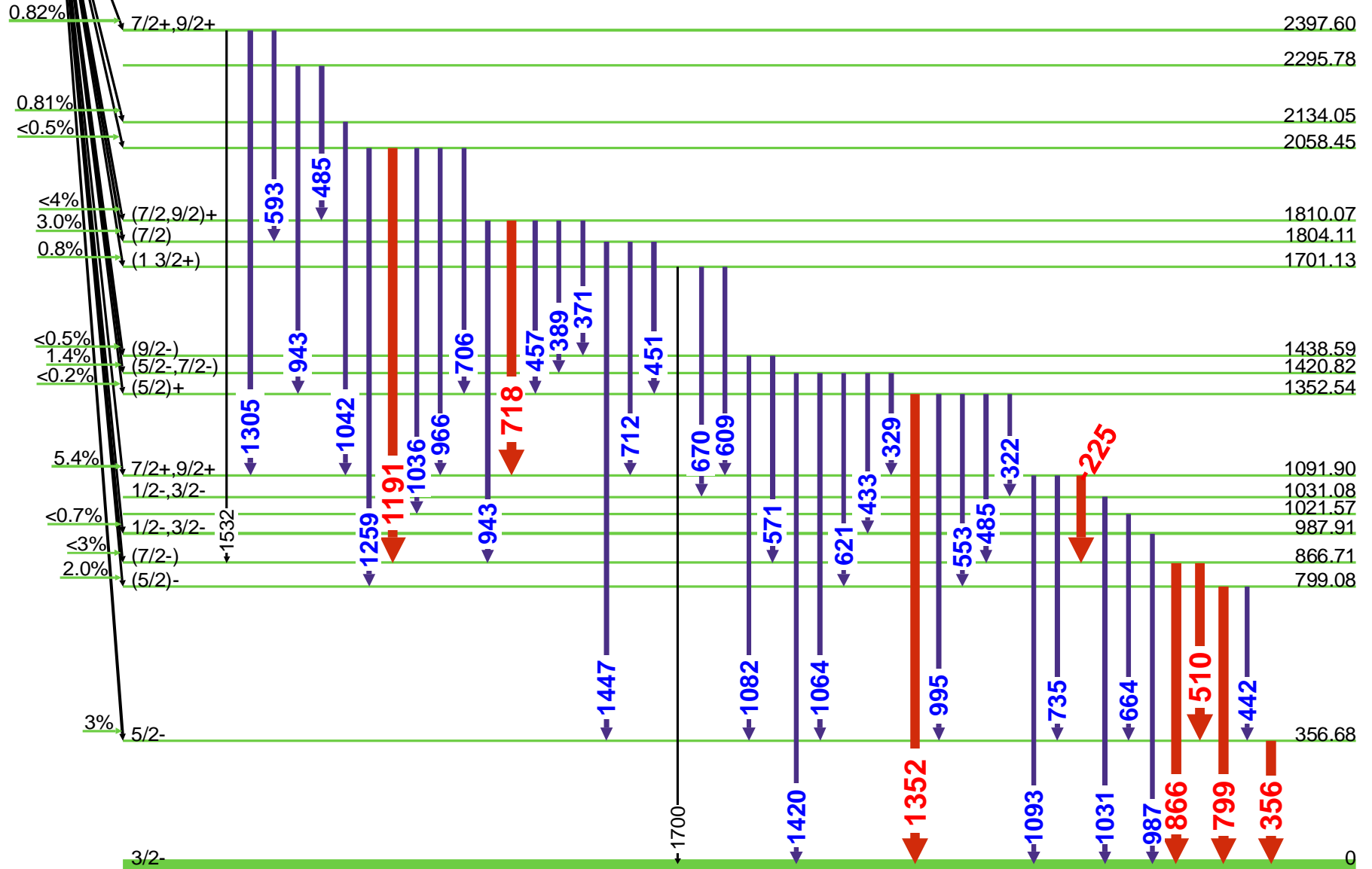
⁸³Se(22 min.) Decay Scheme

gamma-rays emitted from low energy levels

9/2+ 0

⁸³₃₄Se

Q=3668



⁸³₃₅Br

2.4 hr.



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ⁸³SeE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 22.3(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: ⁸²Se(n,γ)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	190.0	1.0		0.22	0.11	4
	208.30	0.09	3.0	1.94	0.13	3
	225.18	0.05	43.1	32.7	1.4	1
	296.06	0.21	0.50	0.29	0.07	4
	322.0	0.6	0.20	0.20	0.04	4
	329.5	0.3	0.60	0.60	0.08	4
	340.16	0.18	0.90	0.46	0.05	4
	356.70	0.04	100	70.0	1.0	1
	371.61	0.10	1.0	0.60	0.05	4
	389.20	0.10	1.1	0.64	0.05	4
	415.2	0.5	2.3	1.62	0.11	3
	433.0	1.0	0.4	0.16	0.05	4
D	442.40	0.10	1.50	0.3	0.4	3
	442.5	0.6		0.770	0.011	
	451.63	0.19	1.50	0.91	0.08	3
	457.41	0.10	4.8	3.47	0.17	2
	472.70	0.20		0.15	0.4	4
D	485.70	0.10	3.5	1.2	12	3
	485.72	0.10		2.36	13	
	510.06	0.07	60.0	43.	3.	1
	553.20	0.21	6.4	3.36	0.22	3
	571.91	0.09	6.4	4.3	0.3	3
	581.60	0.20		0.35	0.07	4
	593.41	0.10	1.1	0.74	0.04	4
	609.22	0.10	4.5	2.88	0.15	3
	621.63	0.19	1.0	0.57	0.10	4
	636.0	1.0	0.7	0.42	0.21	4
	664.80	0.10	4.8	3.29	0.22	3
	670.9	0.8	0.4	0.34	0.07	4
	679.40	0.10	1.8	1.03	0.08	3
	706.2	0.3	0.4	0.36	0.10	4
	712.11	0.10	4.4	3.1	0.3	2
	718.03	0.10	21.7	15.0	1.7	1
	735.12	0.11	1.20	0.76	0.07	3
	799.04	0.09	21.4	14.8	1.6	1
	812.0	1.0	0.7	0.38	0.05	4
	836.52	0.09	15.7	13.	3.	1

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	866.64	0.09	11.7	8.2	0.9	1
	883.61	0.10	10.3	7.21	0.24	1
	887.81	0.10	5.6	4.3	0.6	2
	928.0	1.0		0.22	0.08	4
	933.73	0.19	0.90	0.71	0.05	3
D	943.3	0.3	1.30	0.5	0.5	3
	943.4	0.3		0.87	0.04	
	966.0	2.0	0.3	0.27	0.08	4
	987.90	0.10	1.10	0.67	0.06	4
	993.0	2.0		0.32	0.22	4
	995.93	0.19	2.1	1.31	0.09	3
	1031.10	0.10	0.3	0.22	0.09	4
D	1036.5	0.3	0.60	0.38	0.08	4
	1036.5	0.3		0.11	0.11	
	1042.13	0.19	2.1	1.19	0.12	3
	1064.11	0.10	7.8	5.5	0.5	2
	1082.06	0.18	4.4	2.65	0.10	3
	1093.0	1.0	0.60	0.27	0.09	4
	1110.3	0.3	0.80	0.42	0.07	3
	1191.75	0.14	6.4	4.14	0.17	1
	1206.88	0.19	1.0	0.91	0.08	3
	1208.0	1.0	1.4	0.4	0.4	3
	1225.95	0.19	2.2	1.30	0.06	3
	1239.0	1.0		0.22	0.05	4
	1245.2	0.3	1.20	0.68	0.04	3
	1259.4	0.3	1.60	0.91	0.05	3
	1293.8	0.3	3.3	1.7	0.4	2
	1299.15	0.19	7.6	5.3	0.6	1
	1305.9	0.4	1.0	0.62	0.06	3
	1317.05	0.21	6.3	3.99	0.22	1
	1341.29	0.17	7.9	5.4	0.5	1
	1352.59	0.17	6.6	4.62	0.22	1
	1384.0	1.0		0.38	0.10	4
	1420.6	0.3	2.0	1.13	0.06	3
	1436.0	1.0	1.50	0.90	0.07	3
	1447.4	0.3	0.90	0.48	0.05	3
	1456.0	2.0	0.5	0.30	0.08	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{83}Se E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

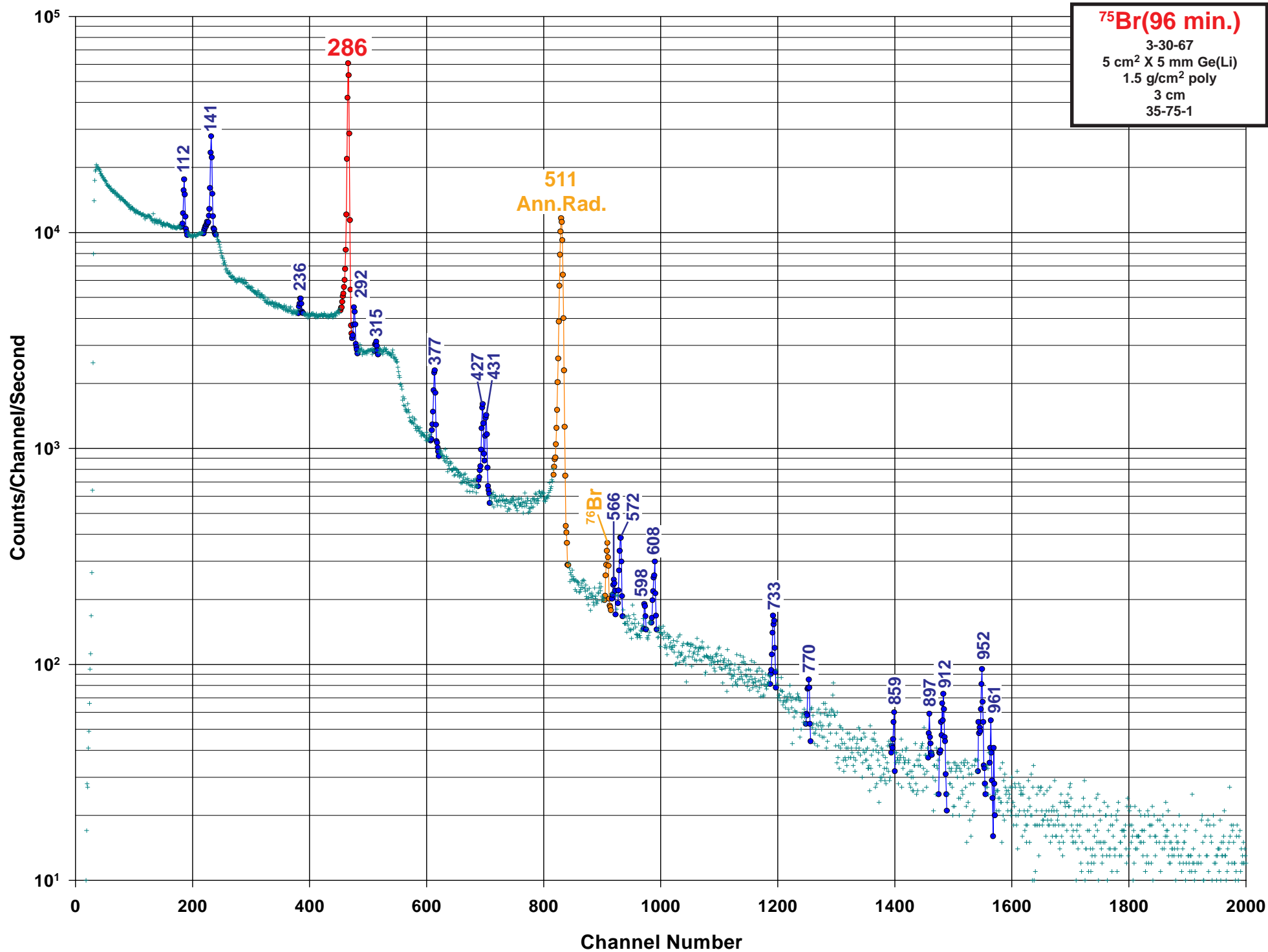
Half Life: 22.3(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{82}\text{Se}(n,\gamma)$

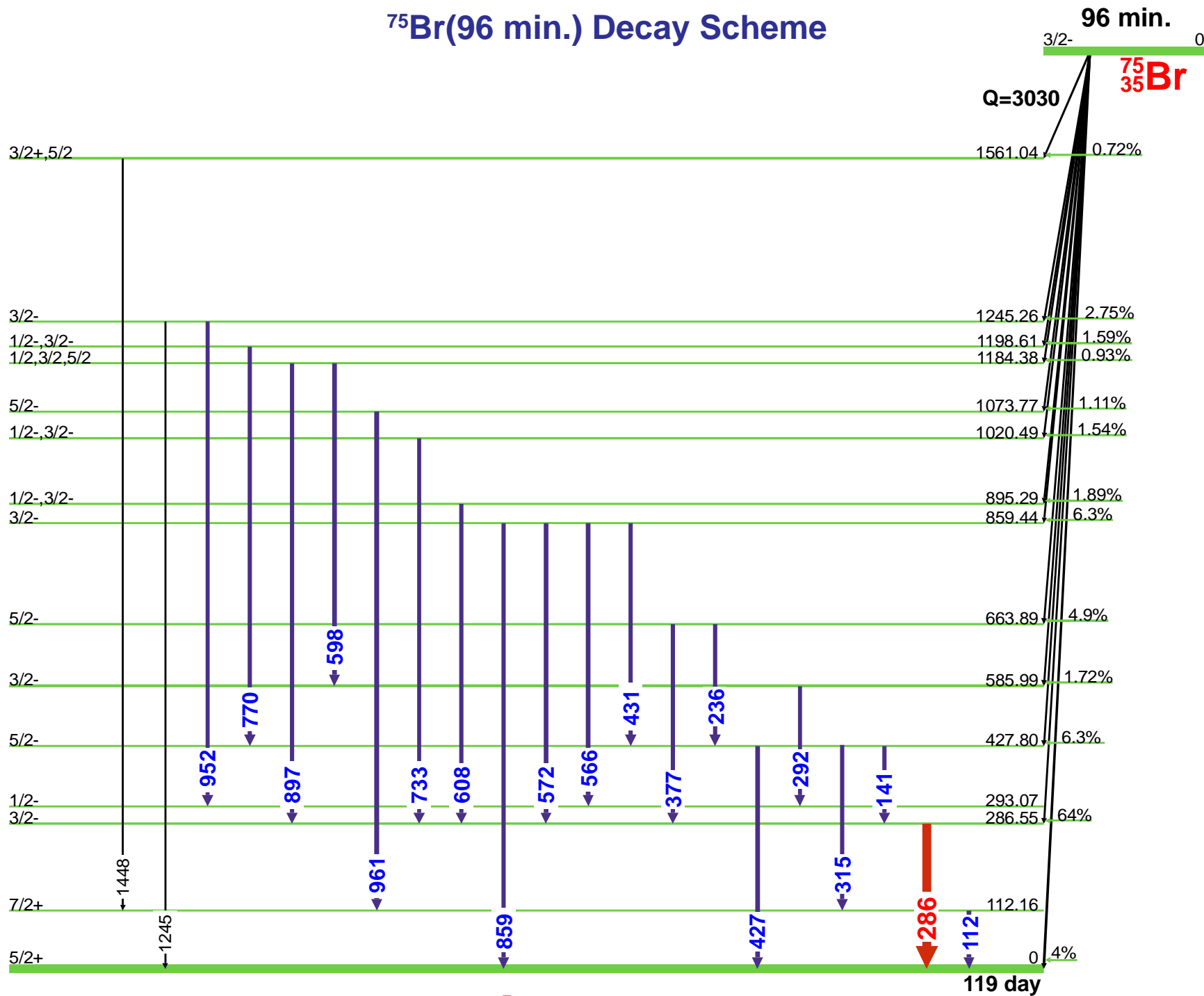
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1475.2	0.3	1.30	0.76	0.06	3
1508.0	2.0	0.80	0.51	0.06	3
1532.0	2.0		0.22	0.05	4
1554.81	0.20	3.7	2.53	0.13	2
1645.0	2.0		0.46	0.08	4
1664.6	0.6	1.0	0.56	0.07	3
1685.0	2.0	0.70	0.46	0.06	4
1700.0	2.0		0.22	0.06	4
1715.9	0.3	1.00	0.63	0.21	3
1717.0	2.0		0.66	0.07	
1779.96	0.19	4.3	2.09	0.18	1
1827.12	0.19	2.3	1.33	0.09	2

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1847.7	0.4	1.60	0.91	0.21	3
1854.5	0.3	2.80	1.68	0.22	2
1871.3	0.3	2.40	1.57	0.09	2
1894.88	0.21	10.8	7.8	0.3	1
1973.3	0.4	0.90	0.64	0.05	3
2046.0	1.0	1.40	0.97	0.11	3
2072.7	0.8	0.60	0.32	0.05	3
2085.3	0.4	1.20	0.59	0.06	3
2167.3	0.4		0.35	0.07	4
2290.3	0.3	12.9	9.3	0.4	1
2337.5	0.3	4.7	3.43	0.22	1
2421.0	1.0	0.60	0.42	0.06	2





⁷⁵Br(96 min.) Decay Scheme



⁷⁵₃₄Se

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GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{75}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

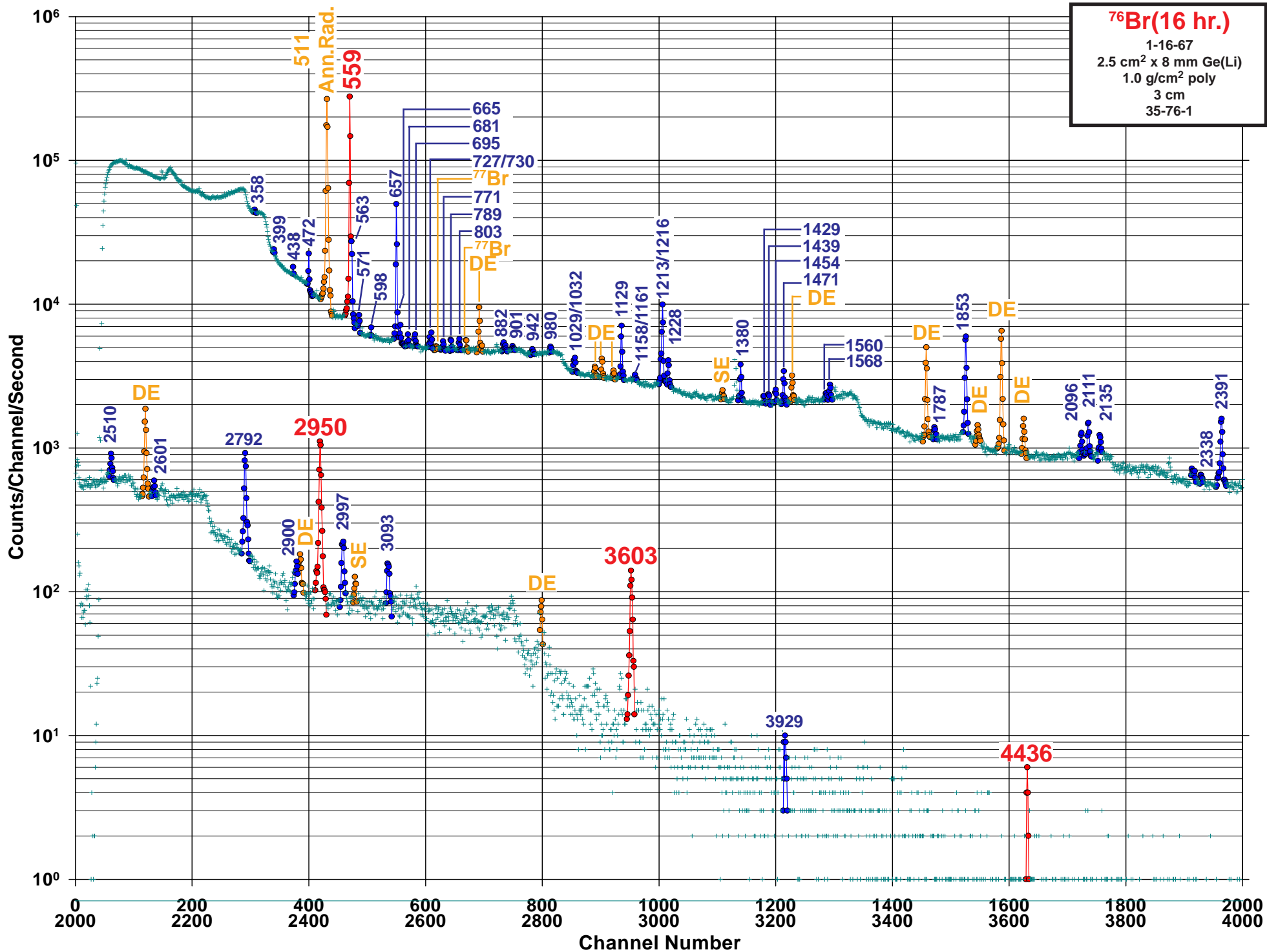
Half Life: 96.7(13) min..

Detector: 5 cm² x 5 mm Ge (Li)

Method of Production: Se(p,xn)

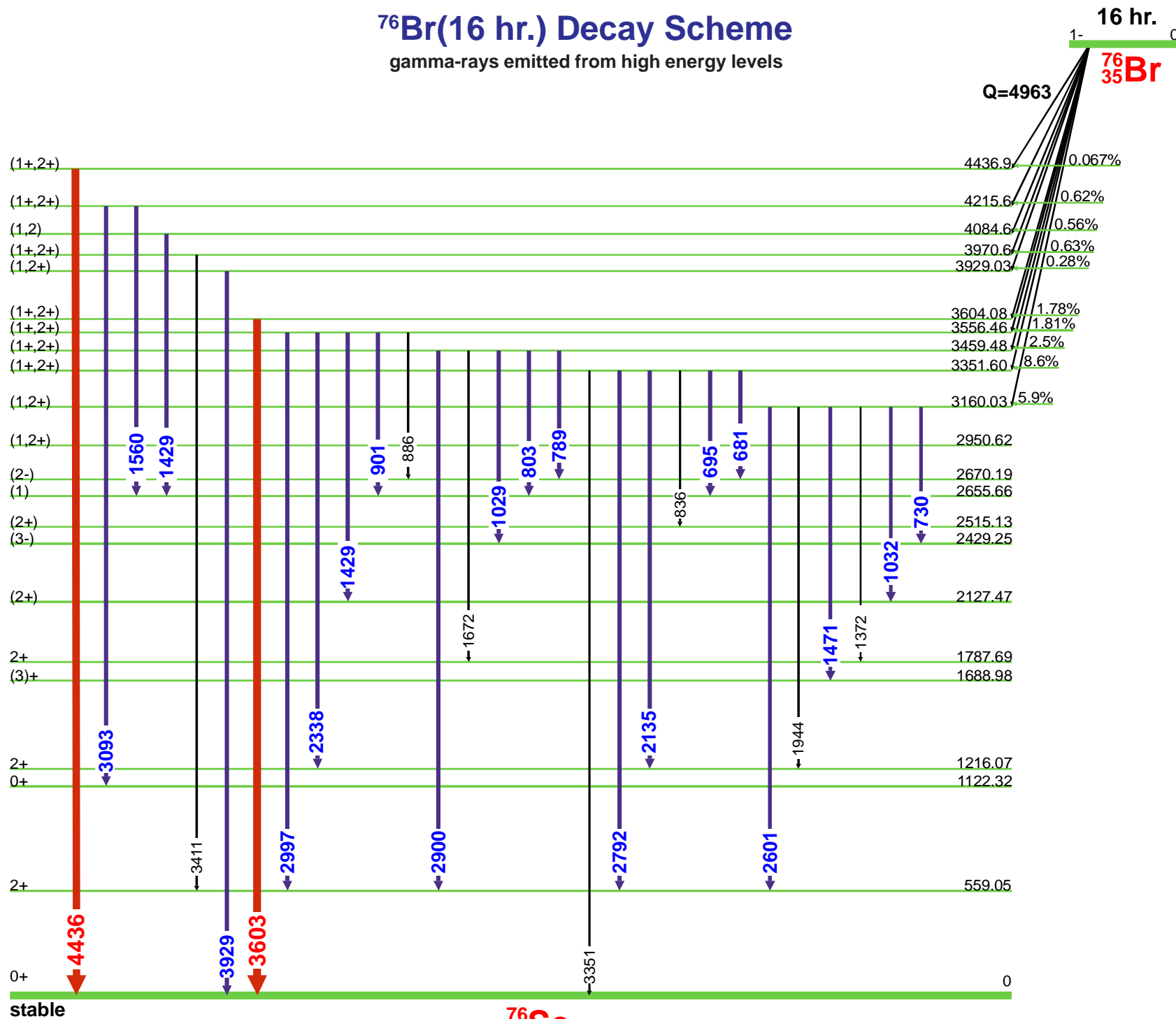
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
6.530	0.020				4	586.10	0.20		0.18	0.11	4
112.10	0.10	1.9	1.7	1.0	4	598.20	0.20	0.36	0.33	0.19	4
141.19	0.10	6.58	6.6	3.8	3	608.9	1.2	1.3	1.7	1.0	3
195.5	0.5		0.09	0.06	4	646.1	0.3		0.15	0.09	4
236.10	0.10	1.0	0.8	0.5	4	652.2	0.3		0.14	0.08	4
286.50	0.20	88.9	88.	50.	1	659.10	0.20		0.35	0.20	4
292.85	0.10	2.8	2.7	1.5	4	663.8	0.3		0.11	0.07	4
299.40	0.20		0.24	0.14	4	676.6	0.3		0.11	0.07	4
309.4	0.3		0.09	0.05	4	701.60	0.20		0.18	0.11	4
315.61	0.15	0.7	0.6	0.4	4	733.94	0.12	1.3	1.5	0.9	3
319.7	0.3		0.10	0.06	4	770.80	0.15	W	0.47	0.27	4
325.40	0.20		0.11	0.07	4	781.0	0.3		0.11	0.06	4
325.40	0.20		0.13	0.08	4	788.70	0.20		0.33	0.19	4
349.20	0.20		0.18	0.11	4	859.30	0.20	W	0.24	0.14	4
377.39	0.11	4.2	3.9	2.2	3	890.7	0.3		0.25	0.14	4
427.79	0.13	4.2	4.4	2.5	3	897.60	0.18		0.5	0.3	4
431.75	0.13	3.5	3.9	2.2	3	912.05	0.15	1.3	1.0	0.6	3
460.9	0.4		0.11	0.07	4	946.2	0.3		0.14	0.08	4
467.3	0.4		0.12	0.07	4	952.10	0.15	1.09	1.7	1.0	3
484.40	0.20		0.28	0.16	4	959.0	0.4		0.26	0.16	4
488.1	0.3		0.18	0.11	4	961.4	0.3	0.4	0.44	0.26	4
490.70	0.20		0.33	0.19	4	974.9	0.4		0.09	0.05	4
Ann. 511.006		100	143	12	1	1074.2	0.4		0.11	0.06	4
514.0	0.5		0.09	0.07	4	1144.50	0.20		0.18	0.11	4
534.8	0.3		0.11	0.07	4	1245.50	0.20		0.48	0.28	4
534.8	0.3		0.018	0.013	4	1380.5	0.3		0.11	0.07	4
551.65	0.15		0.30	0.17	4	1448.90	0.20		0.33	0.19	4
566.43	0.12	1.2	0.45	0.26	4	1515.8	0.3		0.11	0.07	4
572.93	0.10	1.9	2.0	1.2	3	1561.0	0.3		0.12	0.07	4
579.8	0.3		0.09	0.05	4						





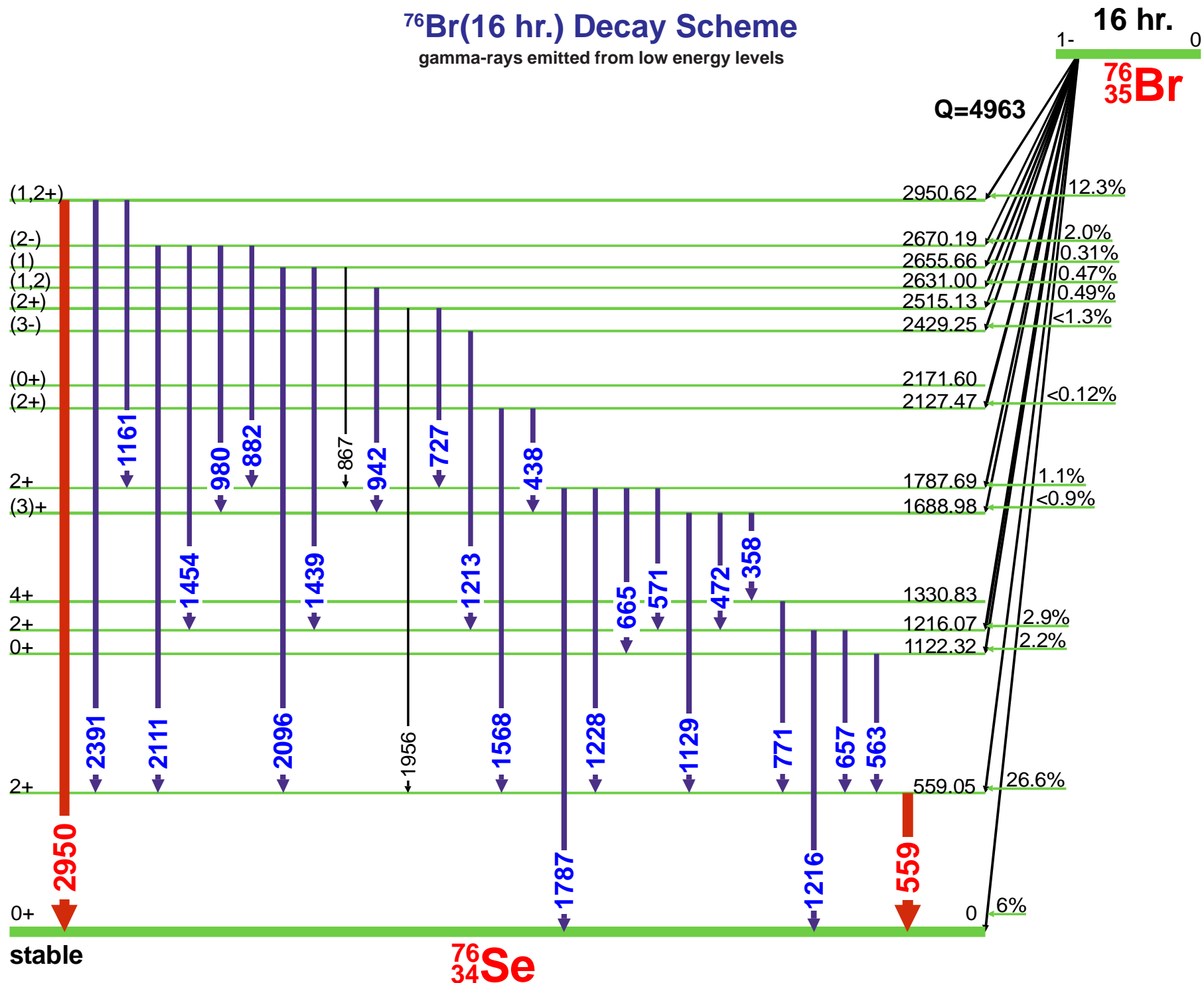
⁷⁶Br(16 hr.) Decay Scheme

gamma-rays emitted from high energy levels



⁷⁶Br(16 hr.) Decay Scheme

gamma-rays emitted from low energy levels



⁷⁶Se



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{76}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 16.2(2) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: Br(γ ,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	209.7	0.2		0.0592	0.0016	4		901.0	0.7		0.155	0.015	4
	281.4	0.2		0.163	0.004	4		913.0	2.0		0.05	0.03	4
	309.2	0.2		0.141	0.004	4		923.0	0.0				4
	318.4	0.2		0.133	0.004	4		934.2	1.0		0.074	0.015	4
	358.0	0.3	1.3	0.37	0.15	4		942.3	0.5	0.63	0.185	0.005	4
	399.5	0.2				4	942.3	0.5	0.185		0.005		
	399.5	0.2	4.3	0.34	0.04	4		980.9	0.2		0.33	0.03	4
	438.0	0.3		0.274	0.007	4		1029.9	0.5	2.9	0.57	0.06	3
	457.3	0.5		0.067	0.015	4	1032.6	0.5	0.58		0.06		
	472.89	0.06	3.6	1.86	0.10	3		1040.7	1.0		0.07	0.04	4
	489.9	0.2	0.36	0.36	0.05	4		1060.0	2.0		0.044	0.022	4
	498.0	1.0		0.16	0.07	4		1122.3	0.3				4
	505.0	0.5		0.229	0.016	4		1129.85	0.06	7.1	4.59	0.25	3
Ann.	511.006			109	6	1		1145.0	2.0		0.059	0.015	4
	546.5	0.5		0.163	0.023	4		1158.2	0.5		0.148	0.015	4
	559.09	0.05	100	74.0	2.0	1		1161.0	2.0		0.163	0.023	4
	563.20	0.05	12.0	3.6	0.6	3		1179.0	1.0		0.09	0.04	4
	571.4	0.5		0.44	0.22	4		1193.0	2.0		0.10	0.04	4
	598.9	0.2	1.1	0.41	0.16	4		1213.1	0.1	16.0	1.7	0.5	3
	604.5	0.3		0.22	0.07	4	1216.10	0.05	8.8		0.5		
	636.0	1.0		0.074	0.022	4		1224.3	0.5		0.28	0.10	4
	641.0	1.0		0.14	0.04	4		1228.65	0.06	3.8	2.09	0.11	4
	657.02	0.05	23.0	15.9	0.9	2		1253.0	2.0		0.08	0.03	4
	665.1	0.1	1.4	0.70	0.04	4		1271.0	2.0		0.059	0.022	4
	681.4	0.2	0.67	0.422	0.025	4		1280.0	2.0		0.07	0.03	4
	695.9	0.2	1.2	0.49	0.03	4		1288.0	1.0		0.052	0.022	4
	727.40	0.10	1.0	0.67	0.15	4		1298.0	2.0		0.089	0.015	4
	730.5	0.2	1.3	0.58	0.08	4		1300.5	0.8		0.155	0.015	4
	740.3	0.8		0.16	0.05	4		1308.0	1.0		0.185	0.023	4
	771.8	0.2		0.414	0.025	4		1315.0	1.0		0.052	0.015	4
	789.1	0.2	0.83	0.47	0.03	4		1324.0	2.0		0.044	0.022	4
	797.0	2.0		0.074	0.022	4		1372.1	0.2		0.55	0.05	4
	803.5	0.2	0.76	0.53	0.04	4		1380.53	0.08	4.3	2.52	0.14	3
	812.5	0.5		0.14	0.04	4		1429.1	0.2	0.64	0.266	0.007	4
	836.4	0.2	4.5	0.38	0.07	4	1429.1	0.2	0.266		0.007		
	867.6	0.2	0.64	0.30	0.03	4		1439.4	0.2	1.1	0.58	0.03	4
	882.3	0.2		0.407	0.024	4		1454.08	0.10	1.4	0.80	0.05	4
	886.2	0.2		0.333	0.024	4		1461.0	2.0		0.13	0.03	4
	897.0	1.0		0.170	0.023	4		1471.13	0.07	3.7	2.31	0.13	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{76}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 16.2(2) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: Br(γ ,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1504.1	0.5		0.09	0.04	4
1532.0	2.0		0.06	0.04	4
1538.0	2.0		0.17	0.07	4
1560.0	0.5	0.7	0.459	0.025	4
1568.47	0.08	1.6	0.96	0.08	4
1611.9	0.5		0.28	0.06	4
1642.0	3.0		0.13	0.05	4
1654.7	0.5		0.118	0.022	4
1661.0	2.0		0.14	0.05	4
1672.4	0.5		0.24	0.07	4
1741.9	1.0		0.118	0.015	4
1769.9	0.5		0.422	0.011	4
1769.9	0.5		0.422	0.011	4
1787.8	0.5	1.1	0.57	0.06	4
1802.0	2.0		0.030	0.015	4
1815.0	2.0		0.148	0.015	4
1833.8	0.8		0.19	0.10	4
1853.67	0.05	22.0	14.7	0.8	2
1868.4	1.0		0.141	0.022	4
1883.0	2.0		0.13	0.04	4
1901.0	2.0		0.12	0.04	4
1944.2	0.5		0.47	0.08	4
1956.1	0.5		0.30	0.05	4
1976.0	1.0		0.10	0.08	4
1991.0	2.0		0.08	0.03	4
2046.1	1.0		0.178	0.016	4
2071.3	1.5		0.27	0.22	4
2082.0	2.0		0.12	0.04	4
2096.73	0.11	2.0	1.36	0.08	4
2111.23	0.11	4.2	2.49	0.14	3
2127.2	0.8		0.20	0.06	4
2135.60	0.10	2.4	0.94	0.08	4
2170.0	2.0		0.10	0.04	4
2183.5	1.0		0.13	0.04	4
2227.7	2.0		0.10	0.06	4
2235.0	2.0		0.13	0.06	4
2299.0	2.0		0.14	0.04	4
2309.6	1.0		0.10	0.03	4
2338.0	2.0		0.09	0.04	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2391.25	0.10	9.1	4.7	0.3	3
2411.8	2.0		0.06	0.03	4
2429.0	2.0		0.10	0.04	4
2483.0	1.2		0.133	0.022	4
2510.79	0.16	3.2	1.95	0.12	4
2546.7	2.0		0.006	0.004	4
2601.25	0.15	1.2	0.70	0.04	4
2627.0	2.0		0.13	0.04	4
2658.0	2.0		0.13	0.04	4
2690.0	1.5		0.36	0.04	4
2714.0	3.0		0.074	0.022	4
2757.0	3.0		0.074	0.022	4
2792.69	0.08	8.9	5.6	0.3	2
2837.0	3.0		0.11	0.04	4
2844.0	3.0		0.15	0.04	4
2900.50	0.10		0.27	0.10	4
2950.53	0.06	13.9	7.4	0.4	1
2981.5	3.0		0.09	0.03	4
2997.34	0.09	3.0	0.96	0.08	3
3045.0	1.0		0.022	0.007	4
3064.0	2.0		0.074	0.022	4
3072.0	3.0		0.044	0.015	4
3093.2	0.2	1.6	0.163	0.015	3
3159.0	0.2		0.148	0.015	4
3351.8	1.0		0.252	0.023	4
3370.0	1.0		0.089	0.015	4
3411.3	0.5		0.289	0.017	4
3508.0	3.0		0.059	0.022	4
3525.2	0.5		0.178	0.016	4
3603.98	0.08		1.55	0.12	1
3638.7	0.5		0.148	0.015	4
3881.0	3.0		0.015	0.007	4
3892.0	2.0		0.030	0.015	4
3913.5	1.0		0.015	0.007	4
3929.2	0.7		0.089	0.015	4
3963.5	1.0		0.022	0.007	4
3971.0	2.0		0.010	0.004	4
4020.3	1.0		0.059	0.015	4
4044.0	2.0		0.052	0.015	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{76}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

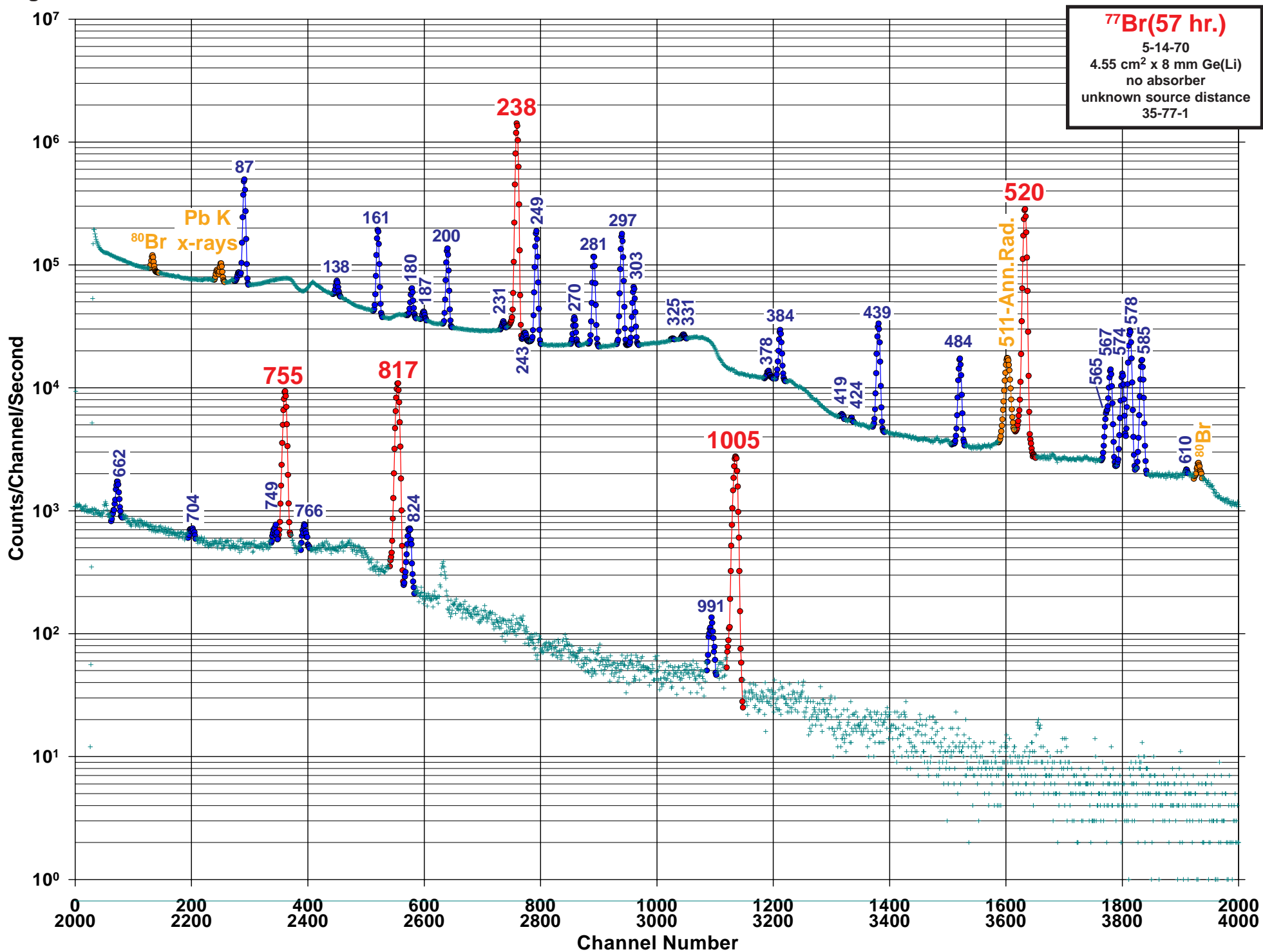
Half Life: 16.2(2) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: Br(γ ,xn)

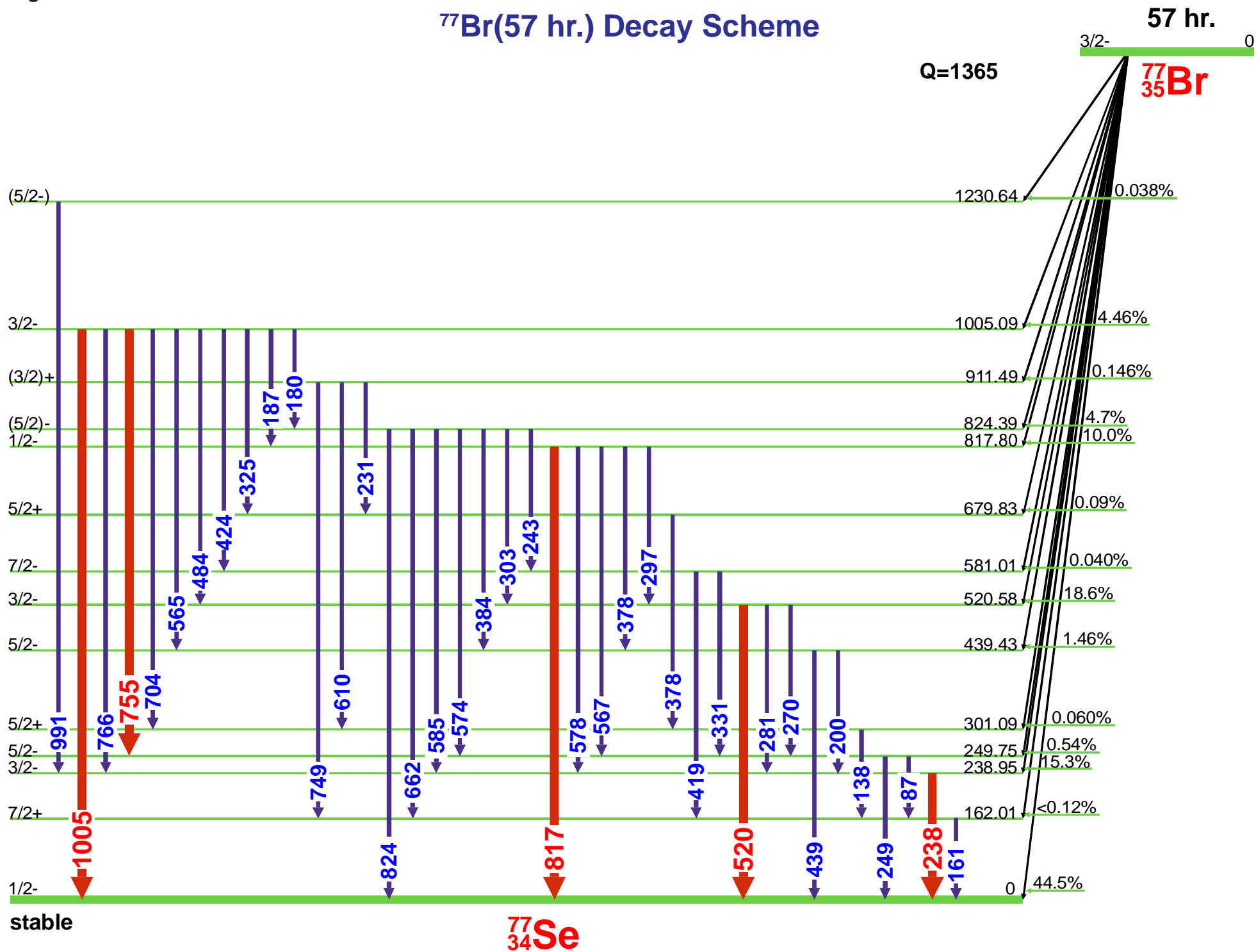
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
4044.0	2.0		0.052	0.015	4
4065.0	3.0		0.022	0.007	4
4084.0	3.0		0.015	0.007	4
4172.0	2.0		0.022	0.007	4
4436.4	1.0		0.052	0.015	1

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
4455.0	3.0		0.0067	0.0022	4
4492.0	3.0		0.0059	0.0022	4
4600.0	4.0		0.022	0.007	4





⁷⁷Br(57 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{77}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 57.036(6) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)

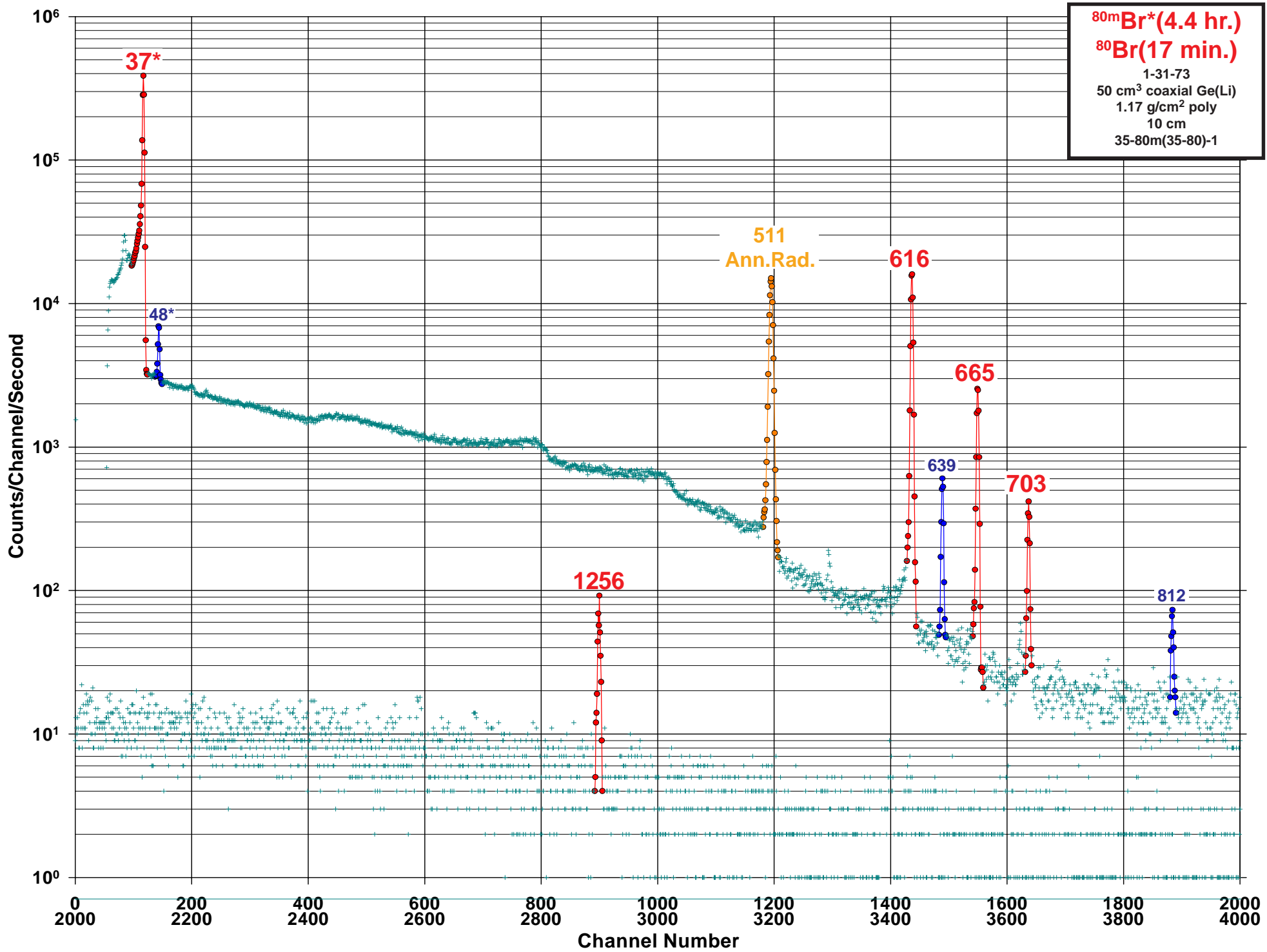
Method of Production: Se(p,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
13.4	0.0				4
80.90	0.10		0.021	0.007	4
87.59	0.07	4.7	1.40	0.04	2
125.57	0.08		0.0092	0.0012	4
138.95	0.09	0.49	0.129	0.005	4
141.1	0.3		0.0025	0.0007	4
144.50	0.10		0.0058	0.0012	4
161.83	0.08	4.2	1.10	0.03	2
180.68	0.07	0.96	0.284	0.009	3
187.26	0.08	0.33	0.058	0.003	4
189.57	0.21		0.0023	0.0012	4
200.40	0.07	4.5	1.21	0.05	2
231.49	0.13	0.15	0.062	0.005	4
238.98	0.07	87.0	23.1	0.5	1
243.35	0.08	0.30	0.037	0.005	4
249.77	0.07	11.0	2.98	0.09	2
270.83	0.07	1.2	0.321	0.014	4
277.47	0.15		0.0323	0.0024	4
281.65	0.07	8.6	2.29	0.07	3
297.23	0.08	16.0	4.16	0.21	2
303.76	0.09	4.7	1.18	0.03	3
325.08	0.11		0.023	0.005	4
331.23	0.09	0.21	0.067	0.007	4
342.08	0.24		0.0062	0.0012	4
378.45	0.09	0.31	0.060	0.005	4
378.45	0.09		0.009	0.007	
384.99	0.08	3.4	0.84	0.03	3
390.97	0.11		0.022	0.003	4
405.87	0.22		0.0074	0.0014	4
419.15	0.19		0.0164	0.0021	4
424.22	0.15		0.0219	0.0024	4
439.47	0.06	7.0	1.56	0.05	2

Ann.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
472.03	0.23		0.0079	0.0021	4
484.57	0.07	4.2	1.00	0.03	2
504.53	0.23		0.0090	0.0019	4
511.006			1.47	0.08	2
517.9	0.4		0.16	0.05	4
520.69	0.06	100	22.4	0.6	1
523.4	0.2		0.039	0.007	4
565.91	0.19	2.3	0.427	0.017	4
567.90	0.08	5.0	0.857	0.026	2
574.64	0.08	3.3	1.19	0.03	2
578.91	0.07	12.0	2.96	0.09	2
585.48	0.07	6.9	1.57	0.05	2
610.39	0.08		0.0215	0.0021	4
662.43	0.09	0.49	0.081	0.003	3
704.09	0.12		0.0159	0.0019	4
749.55	0.10		0.030	0.003	4
755.35	0.07	6.9	1.67	0.05	1
766.11	0.08	0.19	0.0416	0.0025	4
791.26	0.11		0.0092	0.0021	4
817.79	0.06	9.8	2.08	0.06	1
824.28	0.12	0.57	0.0132	0.0014	3
885.71	0.10		0.0083	0.0009	4
911.36	0.26		0.0025	0.0005	4
929.38	0.32		0.0028	0.0009	4
947.5	0.4		0.0007	0.0002	4
980.81	0.37		0.0037	0.0007	4
991.72	0.20	0.06	0.0222	0.0013	3
1005.05	0.06	4.1	0.92	0.03	1
1186.8	0.3		0.0016	0.0005	4
1230.5	0.2		0.0009	0.0002	4





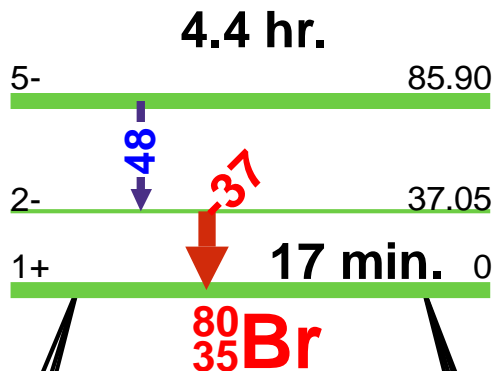
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{80m}\text{Br}^* - ^{80}\text{Br}$ Half Life: 4.4205(8) hr.*- 17.68(2) min.
 Detector: 50 cm³ coaxial Ge (Li) Method of Production: $^{79}\text{Br}(n,\gamma)$

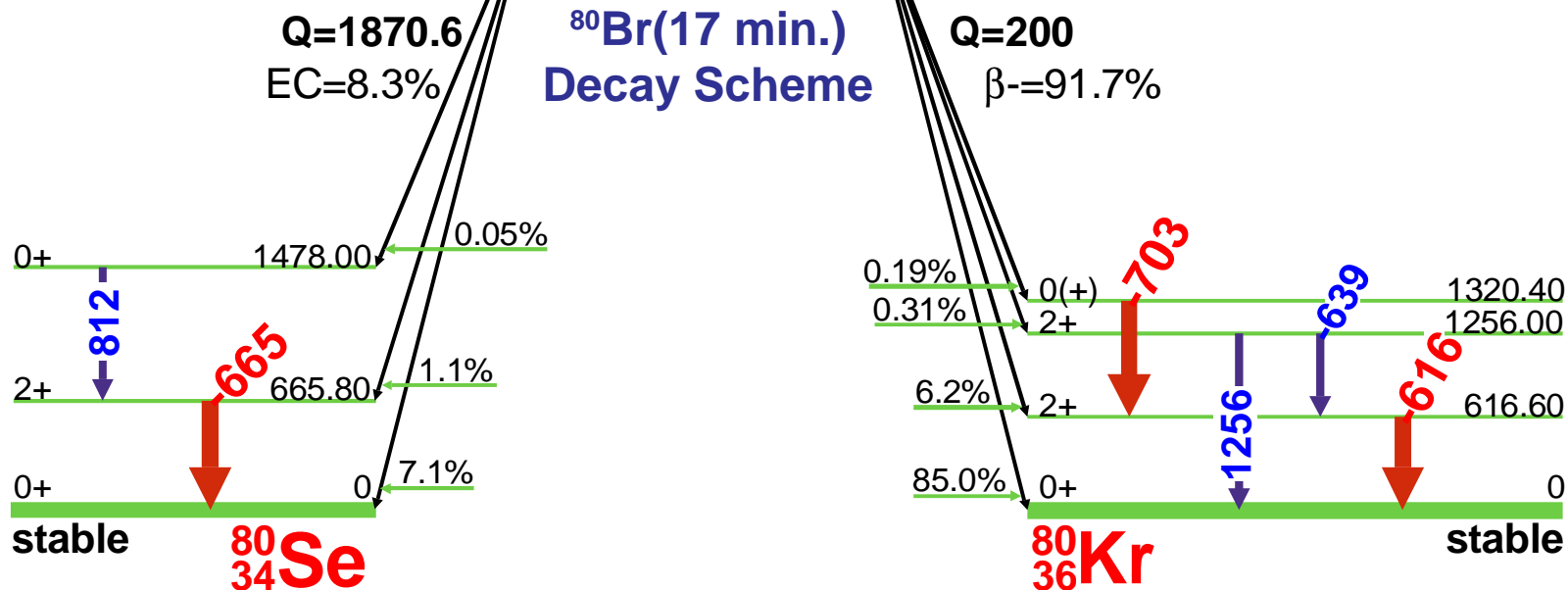
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	37.052	0.002		39.1	0.8	1
*	48.85	0.03		0.317	0.009	3
Ann.	511.006		100	4.4	0.4	1
	616.3	0.5	93.45	6.7	0.6	1
	639.4	0.2	3.23	0.26	0.04	2
	665.8	0.2	15.41	1.08	0.12	1
	677.0	1.0		0.008	0.003	4
	687.4	1.0		0.012	0.004	4
	703.8	0.2	2.64	0.19	0.04	1
	788.	3.		0.0134	0.0012	4
	812.2	1.5	0.58	0.041	0.014	2
	1256.2	0.4	1.25	0.073	0.010	1
	1338.5	0.8				4

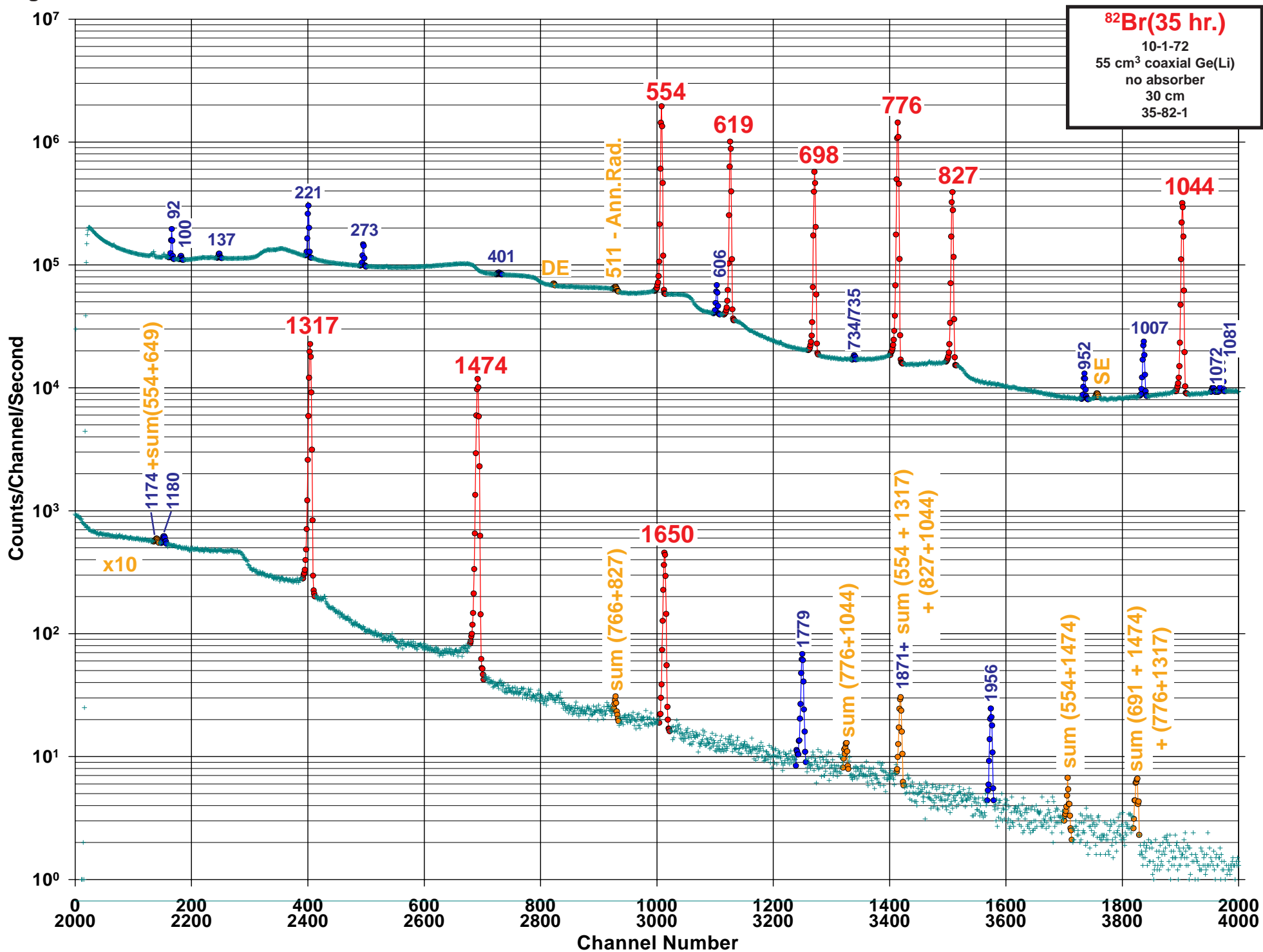
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

^{80m}Br (4.4 hr.) Decay Scheme



^{80}Br (17 min.) Decay Scheme



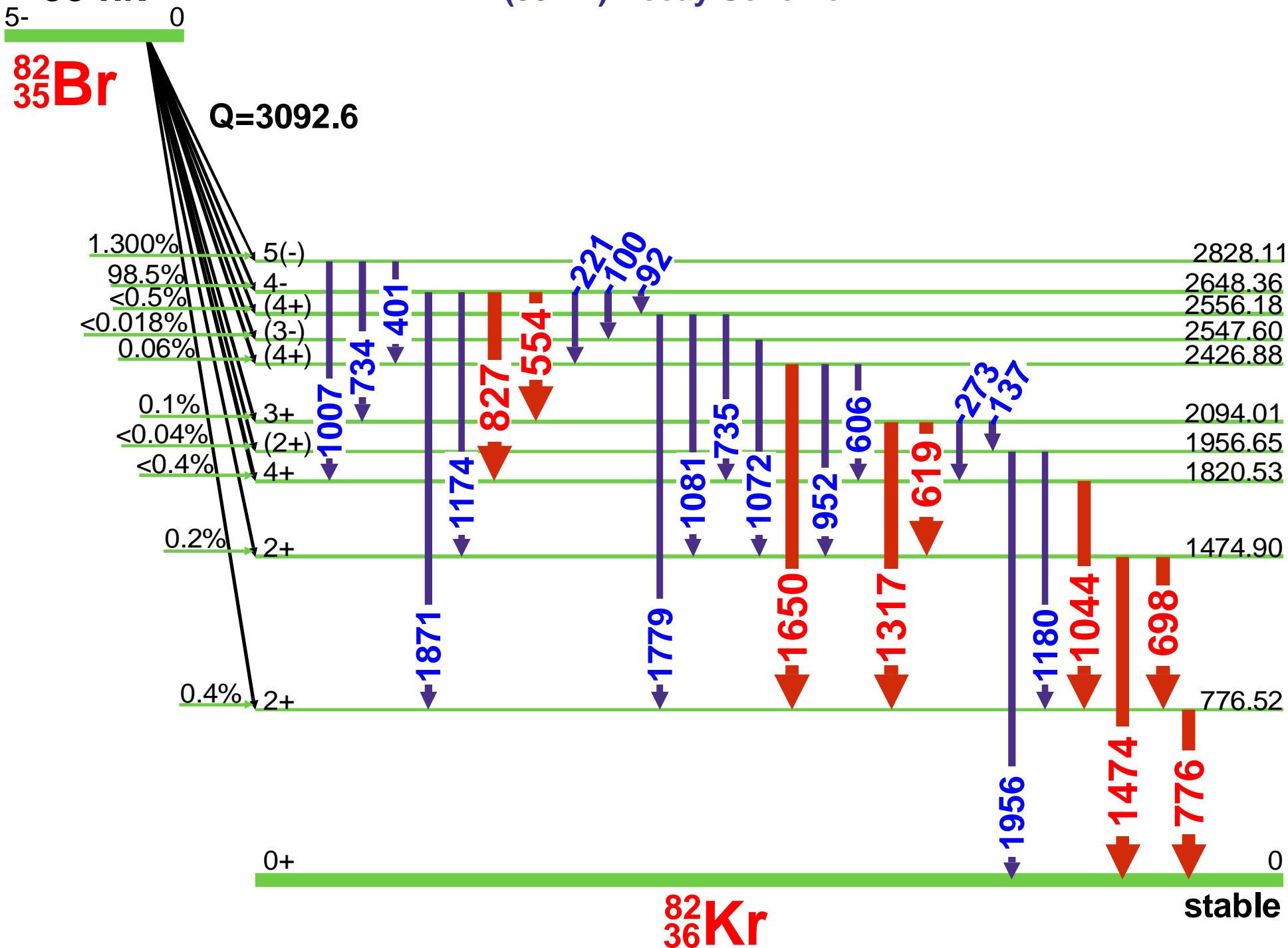


⁸²Br(35 hr.)
 10-1-72
 55 cm³ coaxial Ge(Li)
 no absorber
 30 cm
 35-82-1



35 hr.

⁸²Br(35 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{82}Br E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 35.30(2) hr.

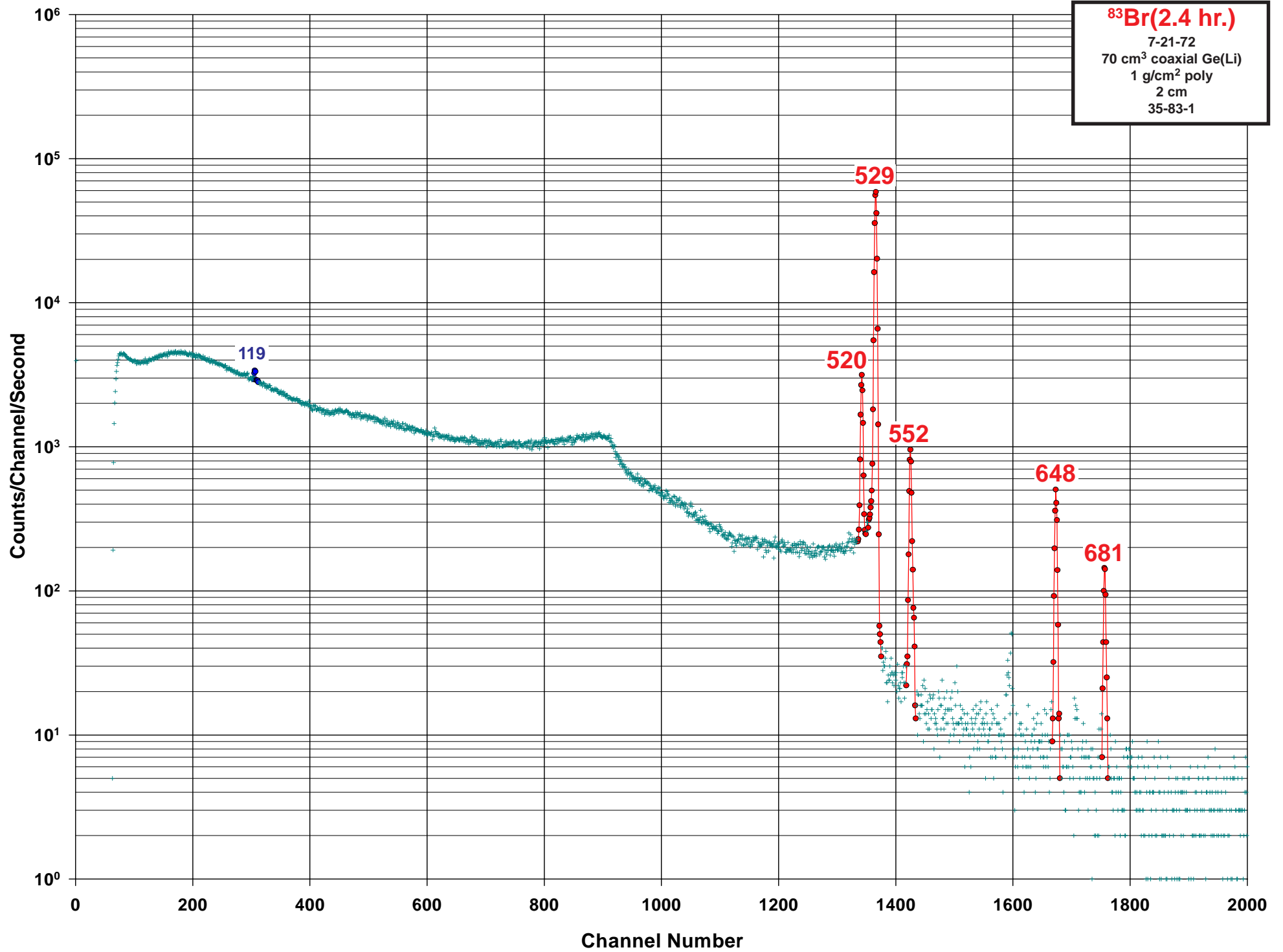
Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{81}\text{Br}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
92.190	0.016	0.825	0.72	0.03	4
100.89	0.08	0.075	0.070	0.007	4
129.29	0.03	0.025	0.030	0.006	4
137.40	0.05	0.115	0.1520	0.0022	4
179.8	0.2		0.010	0.008	4
221.480	0.002	2.72	2.26	0.07	3
273.480	0.008	0.95	0.802	0.026	4
332.90	0.03	0.012	0.090	0.004	4
345.6			0.0008		4
401.16	0.06	0.179	0.0091	0.0008	4
554.348	0.002	84.4	70.8	0.9	1
599.5	0.3		0.013	0.008	4
606.37		1.47	1.211	0.011	4
619.106	0.004	52.1	43.4	0.6	1
698.374	0.005	33.91	28.5	0.4	1
734.1		0.087	0.0084	0.0001	4
735.64	0.07		0.075	0.008	

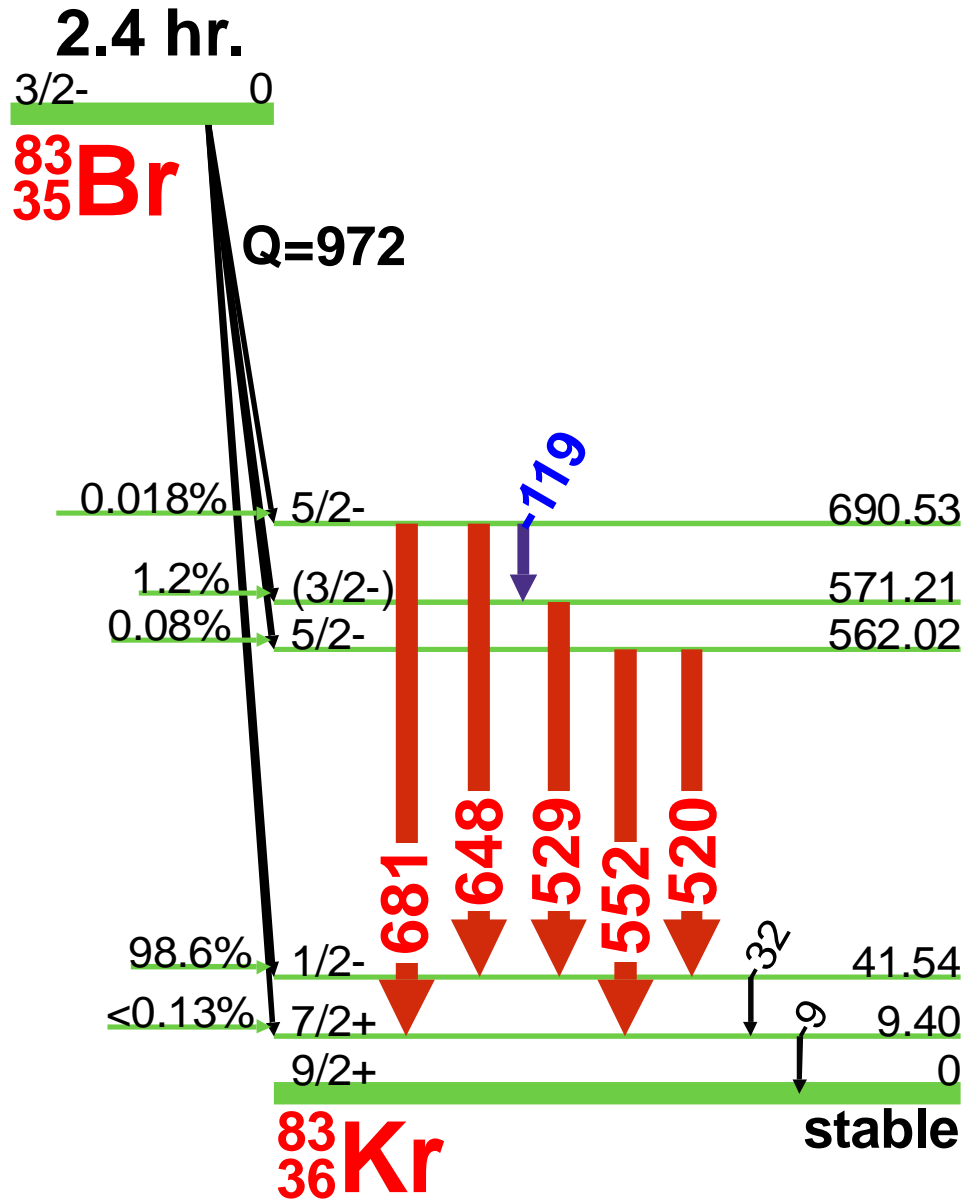
D

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
776.517	0.003	100	83.5	1.1	1
827.828	0.006	29.03	24.0	0.3	1
952.02	0.03	0.46	0.368	0.017	4
1007.59	0.03	1.57	1.272	0.017	3
1044.002	0.005	33.21	27.2	0.4	1
1072.90	0.10	0.079	0.079	0.013	4
1081.29	0.05	0.78	0.618	0.018	4
1099.9	0.2		0.0058	0.0025	4
1174.0	0.4	0.131	0.018	0.008	4
1180.1	0.2	0.183	0.086	0.008	4
1317.473	0.010	32.6	26.5	0.3	1
1474.880	0.010	19.7	16.32	0.22	1
1650.37	0.04	0.90	0.743	0.010	1
1779.66	0.03	0.140	0.1136	0.0020	2
1871.6	0.2		0.025	0.008	4
1956.80	0.10	0.054	0.0391	0.0011	2





⁸³Br(2.4 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸³Br

Half Life: 2.40(2) hr.

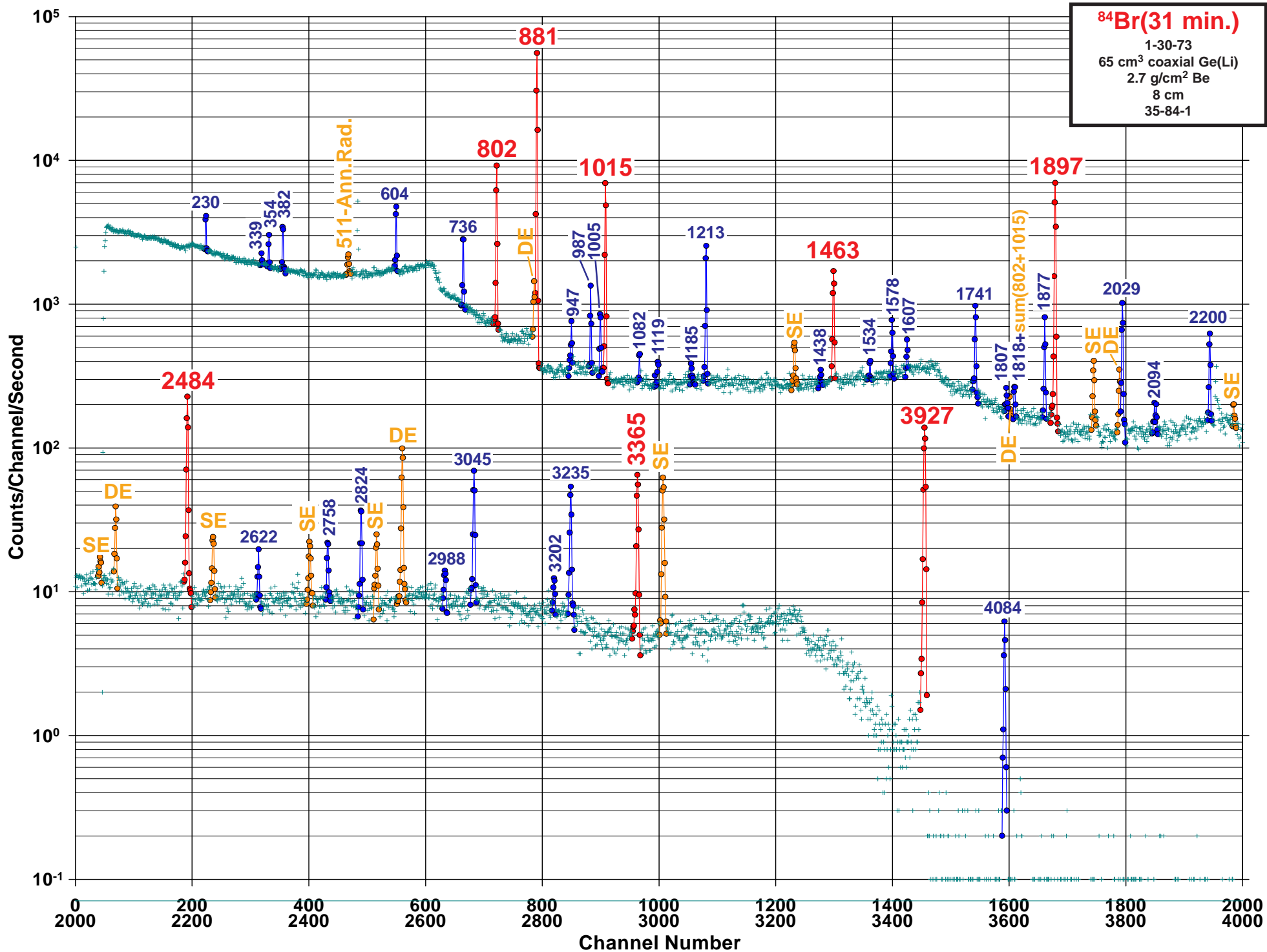
Detector: 70 cm³ coaxial Ge (Li)

Method of Production: ⁸²Se(n, γ) β

E _{γ} (keV)	σ E _{γ}	I _{γ} (rel)	I _{γ} (%)	σ I _{γ}	S
9.396	0.007				4
32.147	0.002				4
119.320	0.020	0.461	0.0013	0.0006	4
128.55	0.08		0.0001		4
520.41	0.05	4.7	0.058	0.024	1
529.640	0.010	100	1.2	0.5	1
552.65	0.03	1.73	0.0200	0.008	1
562.16					4
648.96	0.05	1.05	0.012	0.005	1
681.17	0.07	0.31	0.0039	0.0016	1
790.1					4

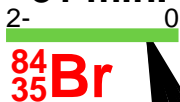
E _{γ} , σ E _{γ} , I _{γ} , σ I _{γ} - 1998 ENSDF Data



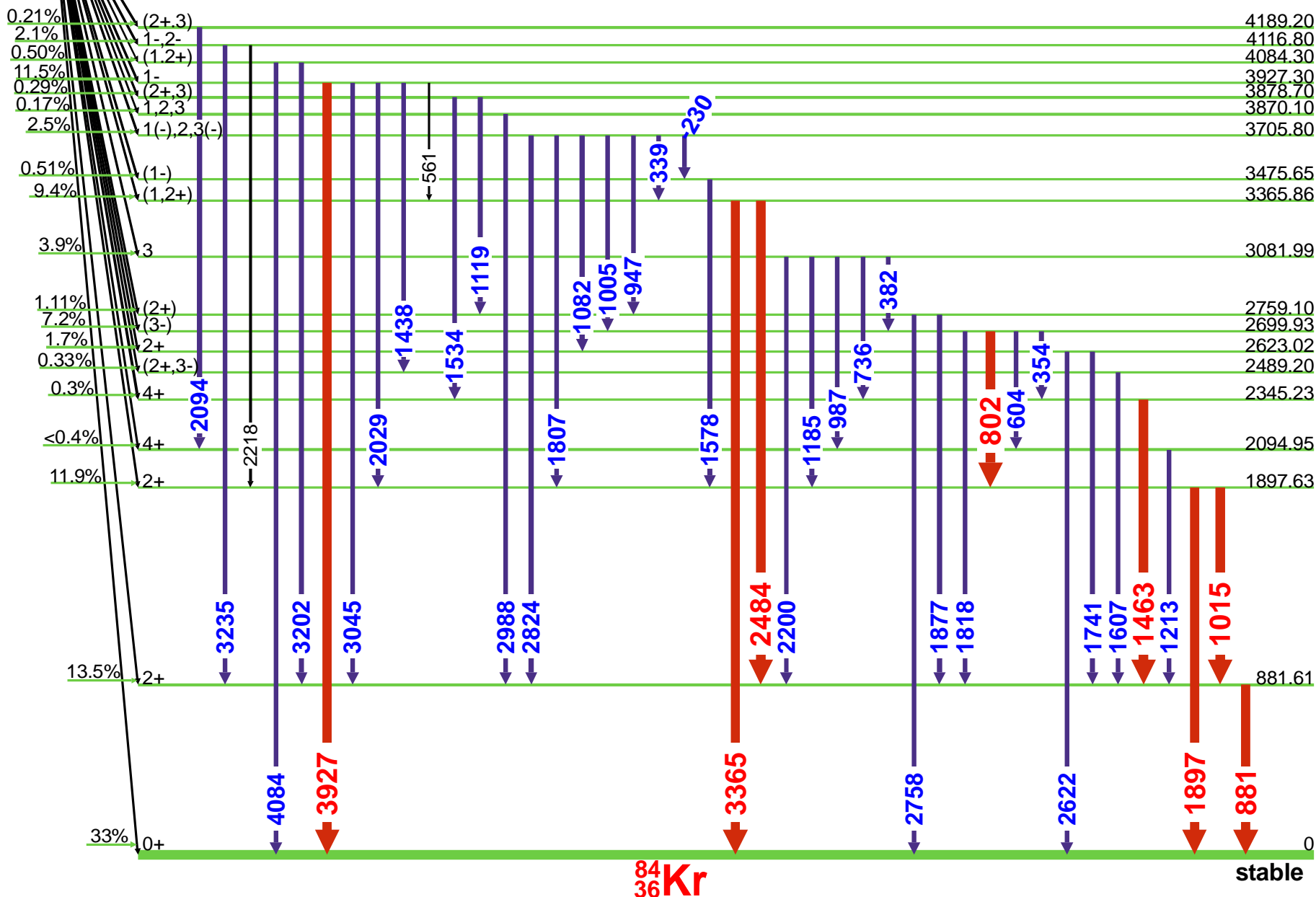


31 min.

⁸⁴Br(31 min.) Decay Scheme



Q=4654



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁴BrE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

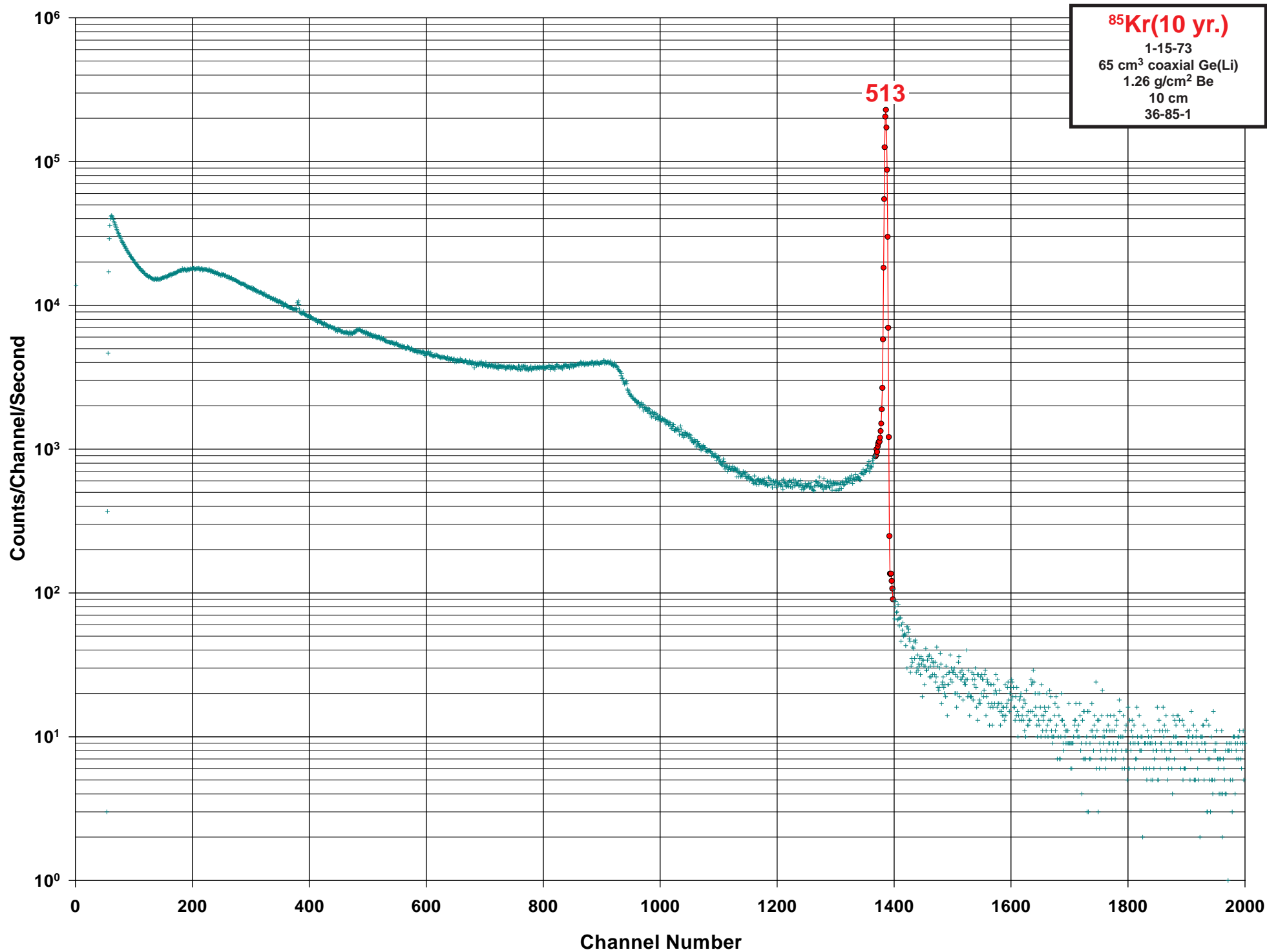
Half Life: 31.80(8) min.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

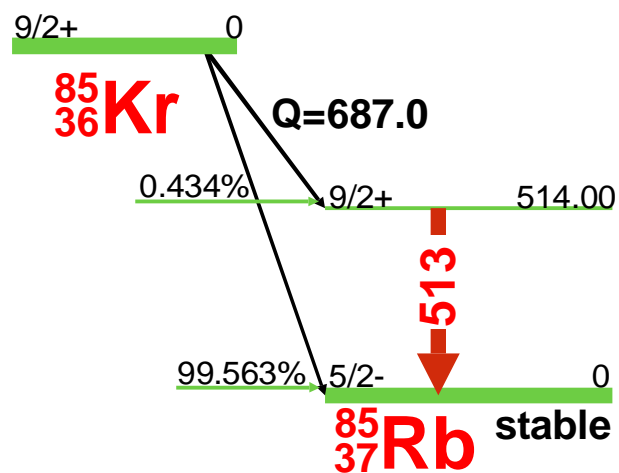
	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	230.2	0.2	1.10	0.30	0.05	4
	339.8	0.4	2.4	0.071	0.018	4
	354.7	0.2	1.05	0.30	0.05	4
	382.0	0.2	1.83	0.56	0.09	3
	394.1	0.7				
D	394.1	0.7				4
	394.1	0.7				
	447.7	0.8		0.042	0.013	4
	561.4	0.5		0.083	0.022	4
	604.8	0.3	4.39	1.75	0.28	3
	688.7	0.7		0.092	0.026	4
	736.5	0.3	3.83	1.29	0.23	3
	802.2	0.2	14.22	6.0	0.8	1
	881.60	0.10	100	41.6	3.1	1
	947.5	0.7	0.9	0.35	0.09	4
	955.7	2.0		0.06	0.03	4
	987.3	0.4	2.1	0.79	0.14	3
	1005.7	0.7	1.79	0.46	0.13	3
	1015.9	0.3	15.28	6.2	0.8	1
	1082.6	0.4	0.51	0.14	0.03	4
	1119.1	0.4	0.16	0.14	0.03	4
	1142.7	1.0		0.033	0.013	4
	1185.0	0.7	0.23	0.108	0.022	4
	1213.3	0.2		2.6	0.3	2
	1255.5	0.6		0.046	0.009	4
	1438.0	0.7	0.38	0.062	0.017	4
	1463.8	0.7	6.38	2.0	0.4	1

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	1534.7	0.6		0.100	0.022	4
	1578.1	0.4	1.86	0.67	0.13	3
	1607.6	0.4	0.82	0.40	0.07	4
	1741.2	0.4	3.95	1.62	0.28	2
	1779.6	0.7		0.062	0.017	4
	1807.8	0.8	0.37	0.042	0.013	4
	1818.7	0.4	0.75	0.241	0.042	4
	1877.5	0.4	3.29	1.12	0.19	3
	1897.6	0.2	29.89	14.6	2.0	1
	2029.6	0.5	4.74	2.1	0.4	2
	2094.2	0.5		0.21	0.04	4
	2200.7	0.4	2.99	1.16	0.19	3
	2218.5	1.2		0.07	0.03	4
	2484.1	0.3	14.32	6.7	0.8	1
	2593.7	0.6		0.14	0.03	4
	2622.9	0.5	0.82	0.30	0.07	3
	2758.7	0.5	1.44	0.49	0.09	3
	2824.1	0.4	2.93	1.12	0.19	3
	2988.7	0.7	0.83	0.17	0.04	4
	3045.4	0.4	6.34	2.5	0.4	2
	3202.1	0.7	0.77	0.21	0.04	4
	3235.3	0.5	4.63	2.0	0.4	2
	3365.8	0.4	7.37	2.9	0.5	1
	3927.5	0.4	16.18	6.8	0.9	1
	4084.6	0.6	0.81	0.27	0.05	3
	4115.8	1.5		0.0039	0.0009	4



⁸⁵Kr(10 yr.) Decay Scheme

10 yr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁵Kr

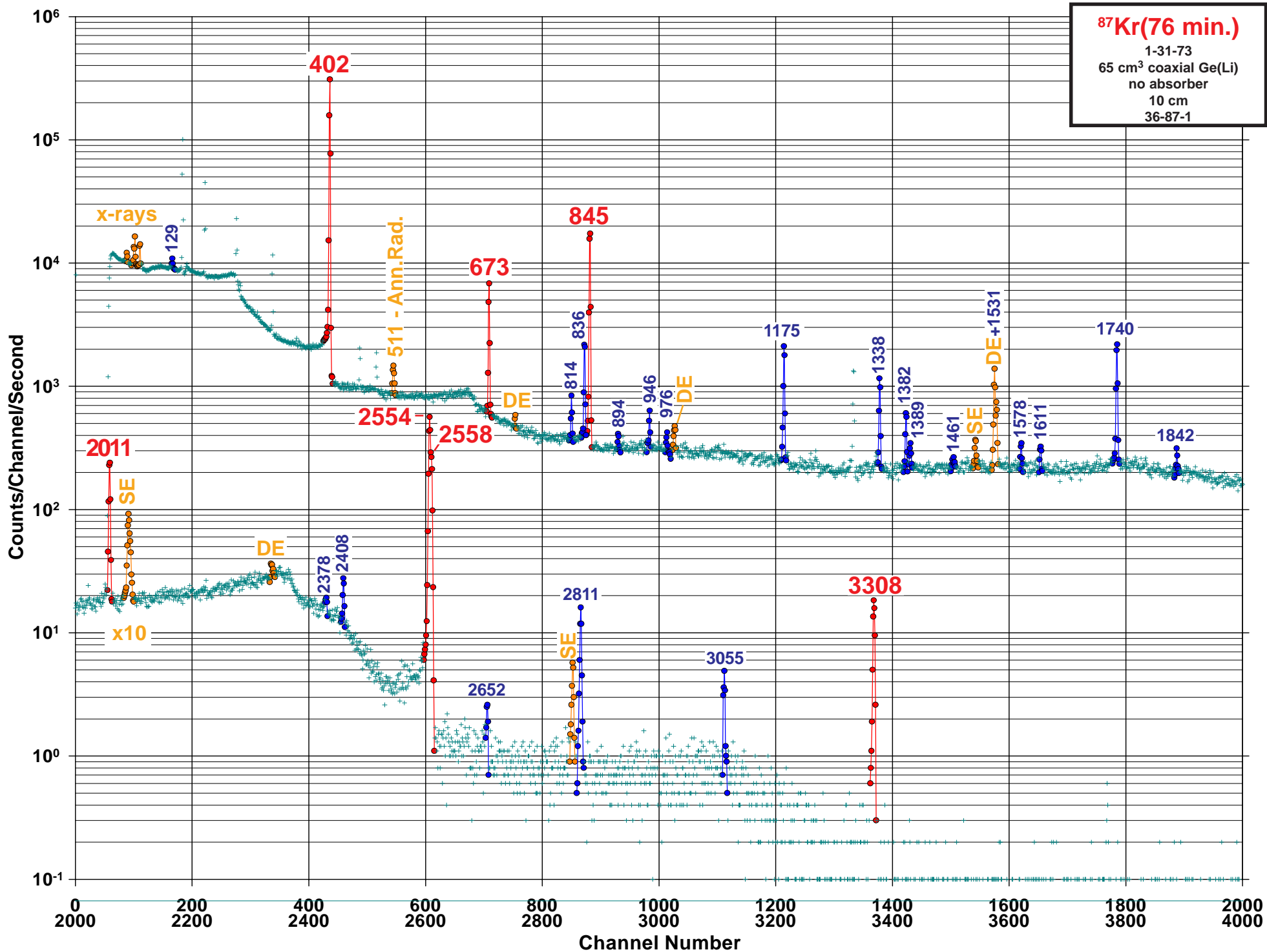
Half Life: 10.756 (18) yr.

Detector: 65 cm³ coaxial Ge (Li)

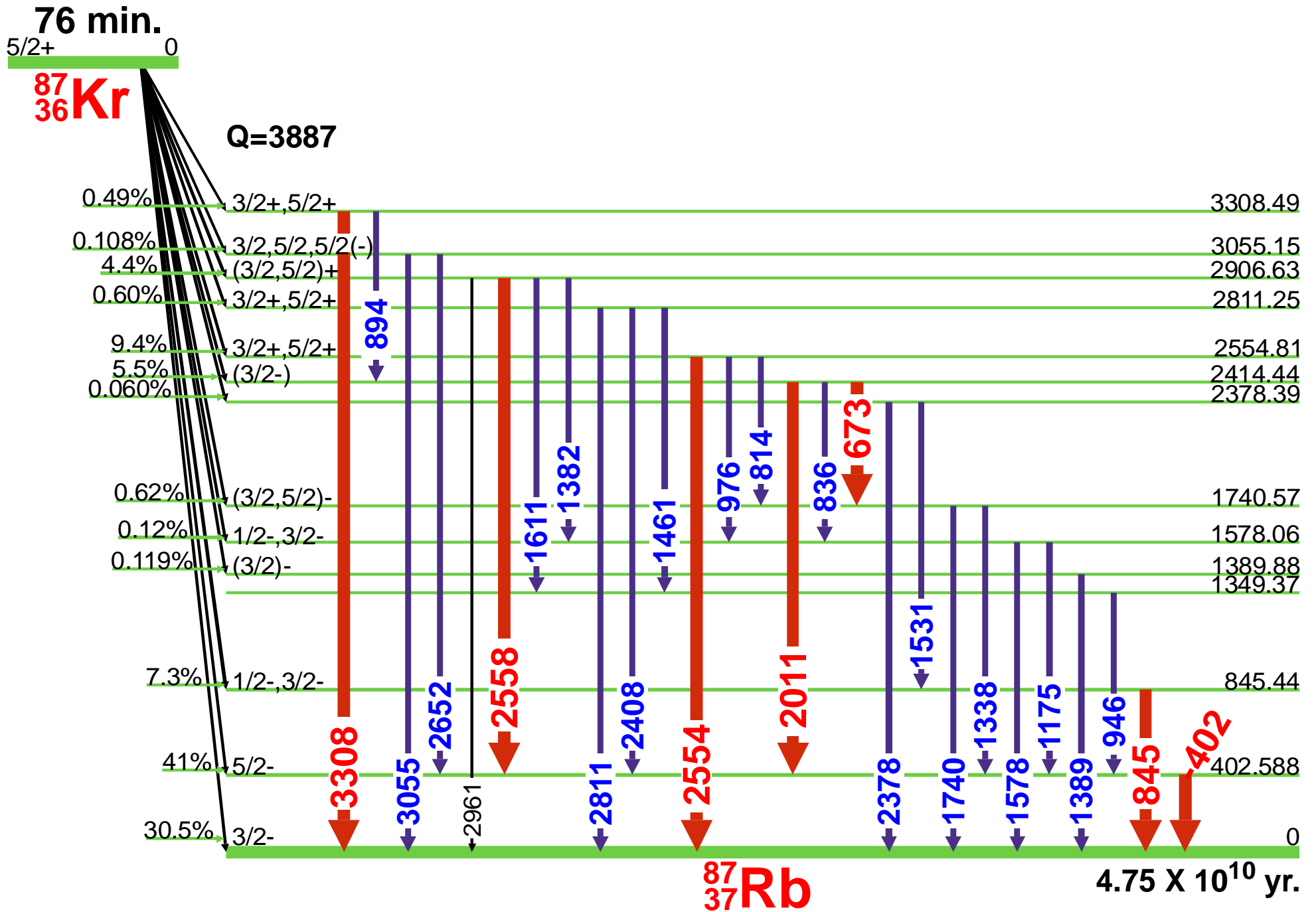
Method of Production: U(fission)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
129.81	0.02				4
151.18	0.03				4
362.81	0.04				4
513.997	0.005	100	0.4340	0.0100	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



⁸⁷Kr(76 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{87}Kr E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

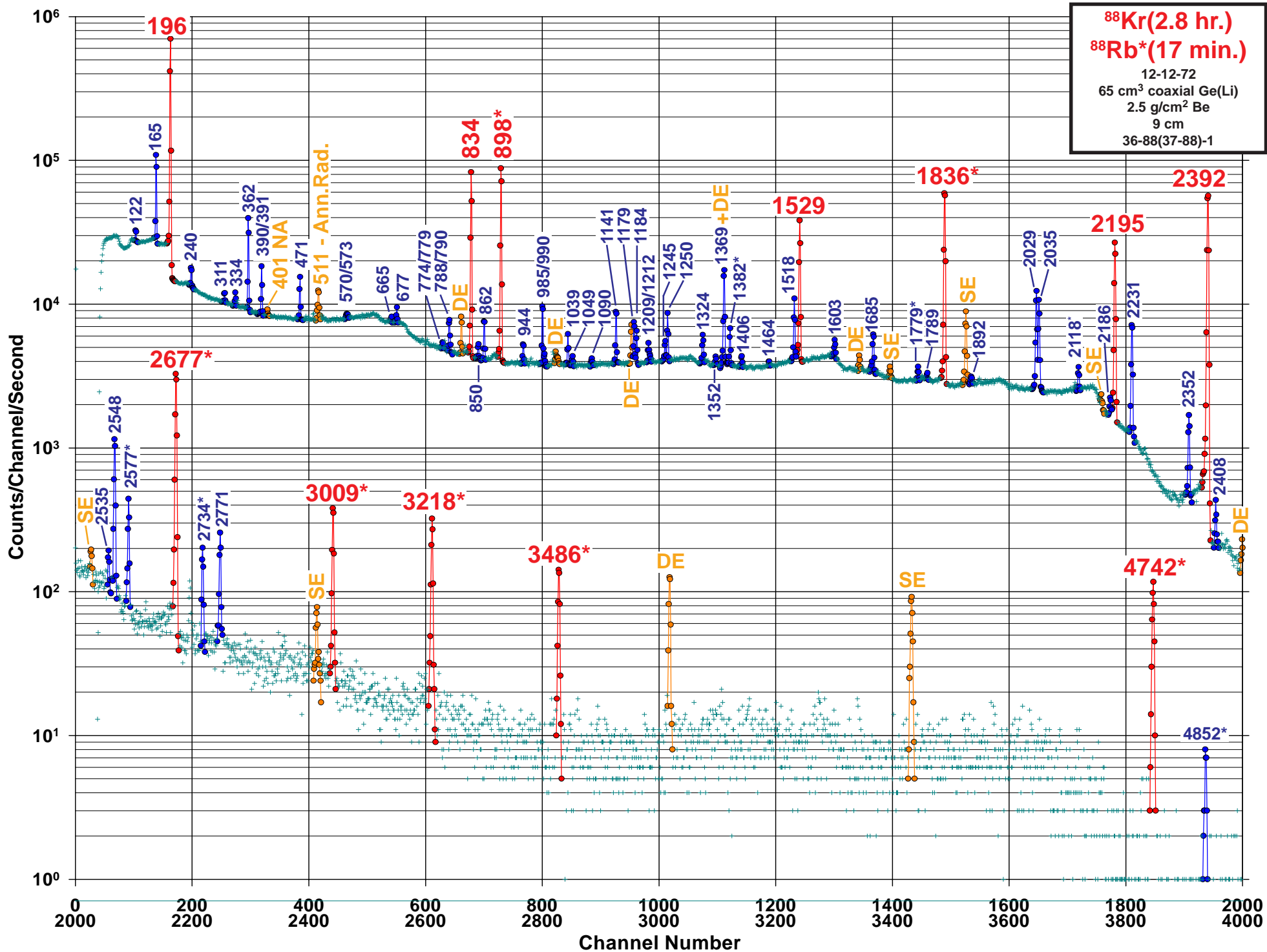
Half Life: 76.3(6) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{86}\text{Kr}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
129.4	0.3	0.070	0.045	0.010	4
402.587	0.010	100	49.6	3.1	1
510.78	0.14		0.069	0.010	
582.3	0.2		0.035	0.010	
673.83	0.08	4.0	1.89	0.10	1
814.25	0.06	0.36	0.164	0.009	3
836.37	0.06	1.48	0.77	0.04	3
845.44	0.04	15.1	7.3	0.4	1
894.02	0.13	0.106	0.045	0.004	4
901.5	0.3		0.026	0.005	4
946.69	0.13	0.29	0.129	0.008	4
976.49	0.21	0.126	0.056	0.005	4
1063.10	0.10		0.027	0.006	4
1175.40	0.08	2.46	1.11	0.06	2
1338.00	0.07	1.43	0.63	0.05	2
1382.55	0.06	0.62	0.288	0.017	3
1389.87	0.12	0.24	0.119	0.008	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1461.3	0.6	0.098	0.050	0.006	4
1531.2	0.4		0.36	0.06	4
1578.03	0.14	0.29	0.129	0.012	4
1611.18	0.14	0.19	0.104	0.016	4
1740.52	0.08	4.3	2.04	0.11	2
1842.61	0.24	0.27	0.139	0.012	4
2011.88	0.10	6.1	2.88	0.18	1
2378.5	0.3	0.20	0.094	0.007	4
2408.5	0.2	0.50	0.228	0.023	4
2554.8	0.2	20.6	9.2	0.6	1
2558.1	0.2	7.8	3.9	0.3	1
2652.5	0.4	0.061	0.023	0.004	4
2811.4	0.2	0.70	0.322	0.022	2
2961.2	0.8		0.069	0.020	4
3055.1	0.3	0.19	0.084	0.006	3
3308.5	0.2	0.96	0.45	0.03	1

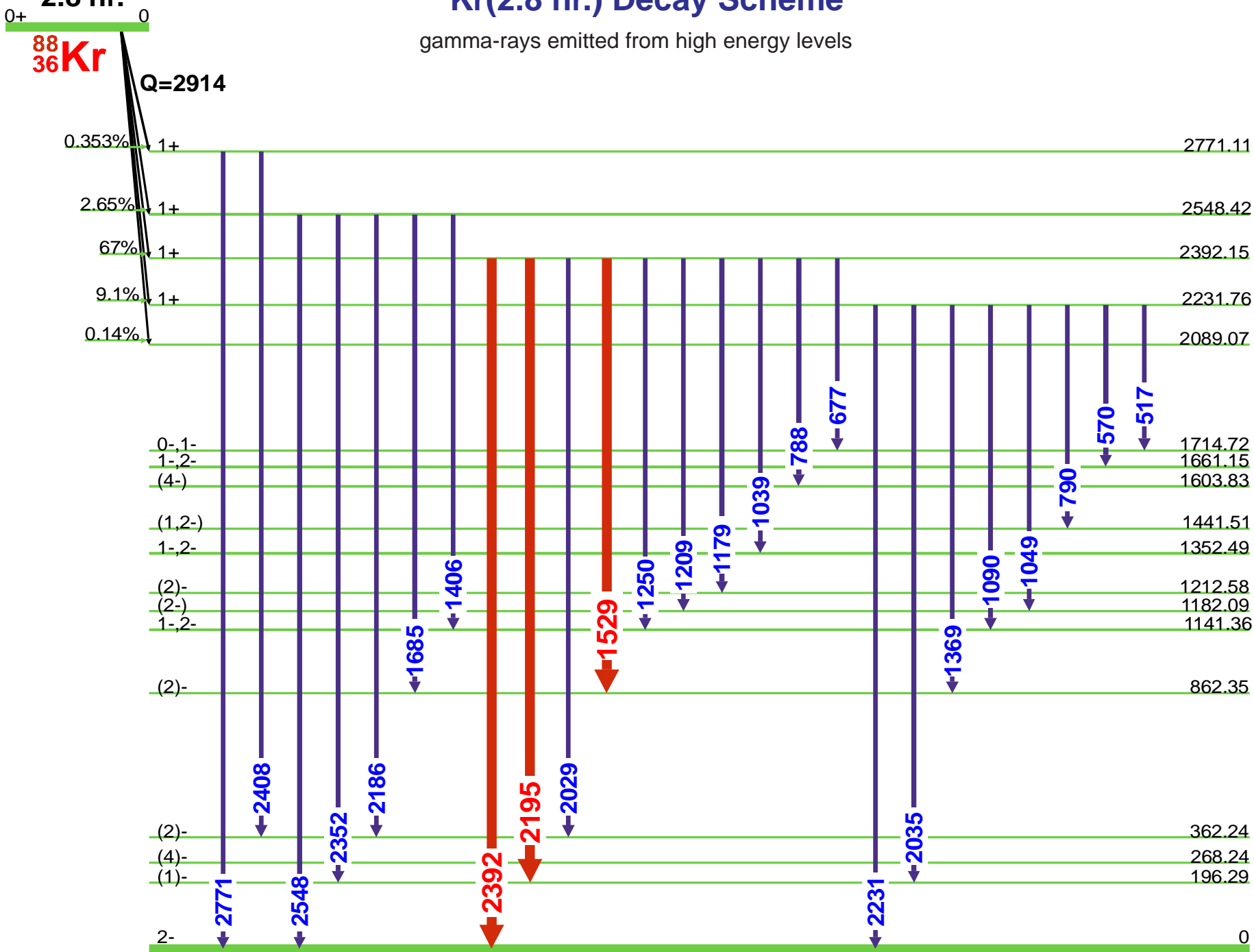




2.8 hr.

⁸⁸Kr(2.8 hr.) Decay Scheme

gamma-rays emitted from high energy levels



see ⁸⁸Rb section for ⁸⁸Rb decay scheme

⁸⁸₃₇Rb

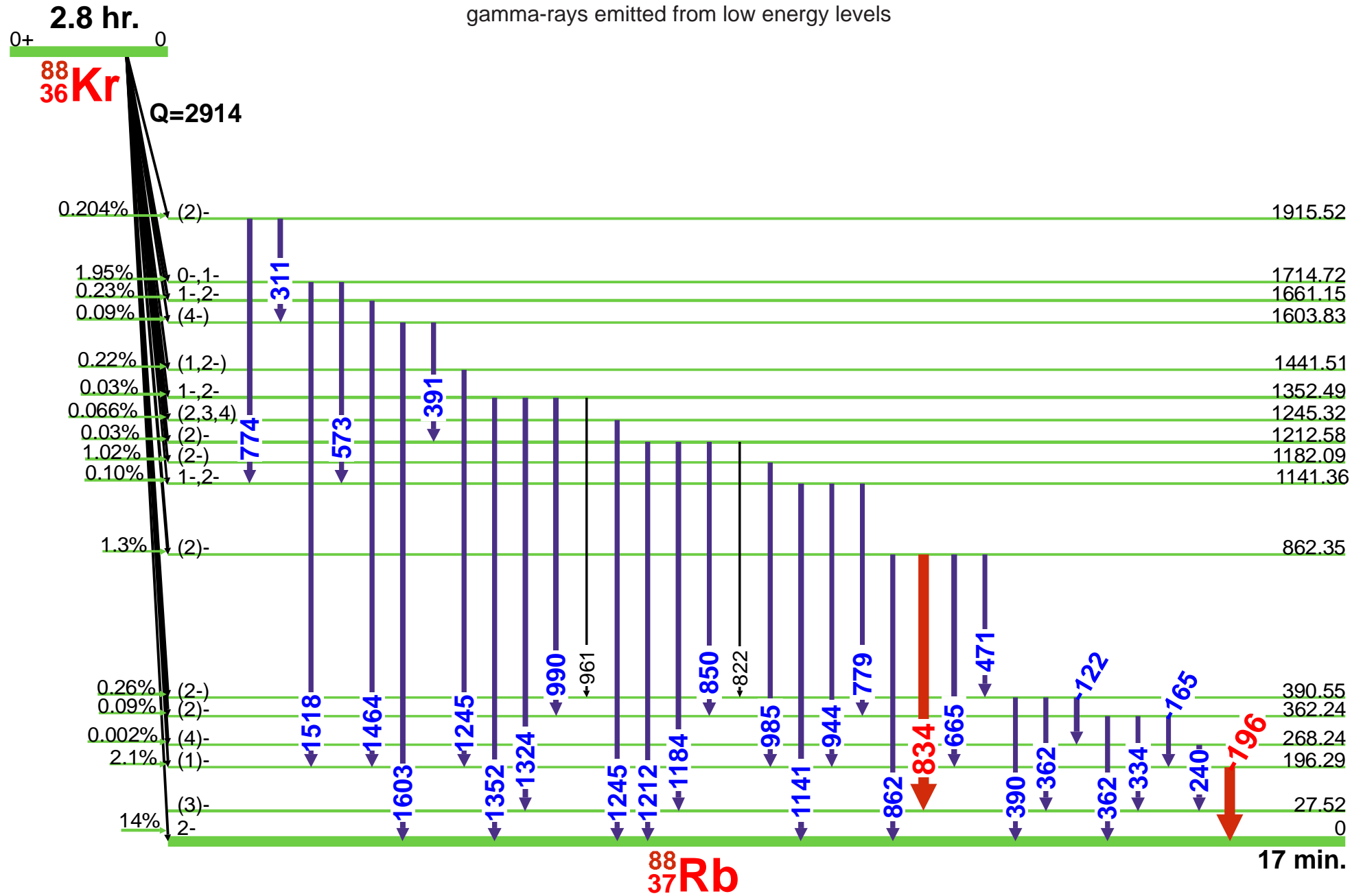
17 min.

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⁸⁸Kr(2.8 hr.) Decay Scheme

gamma-rays emitted from low energy levels



see ⁸⁸Rb section for ⁸⁸Rb decay scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: $^{88}\text{Kr} - ^{88}\text{Rb}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.84(3) hr. - 17.78(11) min.*

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
27.513	0.014		1.94	0.16	4
28.26	0.11		0.0277	0.010	4
122.27	0.06	0.49	0.197	0.011	4
165.98	0.04	8.9	3.10	0.14	3
168.5	0.2		0.0069	0.0003	4
176.71	0.17		0.024	0.007	4
196.301	0.010	74.0	26.0	1.2	1
240.71	0.04	0.66	0.253	0.014	4
268.24					4
311.69	0.03	0.32	0.107	0.008	4
334.71	0.03	0.44	0.145	0.010	4
* 338.95	0.07		0.060	0.007	4
350.04	0.19		0.017	0.007	4
362.226	0.013	6.5	2.25	0.12	3
363.5	0.5		0.05	0.03	4
390.543	0.011	2.01	0.64	0.05	3
391.20	0.10		0.08	0.04	4
* 416.2	0.3		0.0036	0.0013	4
421.70	0.18		0.010	0.004	4
* 439.2	0.3		0.014	0.004	4
471.80	0.03	1.98	0.73	0.04	3
* 484.53	0.16		0.028	0.007	4
500.02	0.06	0.25	0.097	0.008	4
517.00	0.08	0.25	0.035	0.010	4
D 570.57	0.07	0.32	0.062	0.008	4
D 573.27	0.06		0.073	0.008	
579.04	0.14		0.024	0.010	4
603.21	0.13		0.042	0.011	4
665.94	0.06	0.22	0.086	0.014	4
677.34	0.05	0.67	0.235	0.018	4
731.01	0.09		0.035	0.010	4
741.34	0.18	0.25	0.035	0.010	4
774.14	0.06	0.26	0.097	0.014	4
779.12	0.08	0.36	0.097	0.021	4
D 788.28	0.04	1.86	0.533	0.028	3
D 790.32	0.07		0.125	0.012	
798.65	0.21		0.028	0.010	4
822.01	0.12	0.24	0.090	0.011	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
834.830	0.003	35.5	13.0	0.6	1
850.34	0.05	0.61	0.173	0.013	4
862.327	0.019	1.94	0.67	0.04	3
879.51	0.19		0.024	0.007	4
883.06	0.14		0.042	0.007	4
* 891.3			0.021	0.004	4
* 898.03	0.04	44.1	14.0	0.8	1
944.92	0.04	0.70	0.294	0.019	4
950.49	0.12	0.23	0.038	0.010	4
961.83	0.06	0.16	0.083	0.011	4
D 985.780	0.016	4.0	1.31	0.07	4
D 990.09	0.09		0.142	0.018	
* 1027.3	0.3		0.011	0.004	4
1039.59	0.03	1.31	0.484	0.028	4
1049.48	0.12	0.33	0.142	0.012	4
1054.54	0.20	0.05	0.031	0.010	4
1090.53	0.12	0.40	0.062	0.014	4
1141.33	0.06	3.6	1.28	0.07	3
1179.51	0.03	2.79	1.00	0.05	3
1184.95	0.04	2.00	0.69	0.04	3
D 1209.84	0.08	1.21	0.142	0.025	3
D 1212.73	0.17		0.138	0.049	
* 1217.97	0.18		0.051	0.007	4
D 1245.22	0.04	1.17	0.363	0.024	4
D 1245.22	0.04				
1250.67	0.04				
1298.78	0.15		0.093	0.021	4
1303.09	0.24		0.066	0.024	4
1324.98	0.04	2.36	0.14	0.04	4
1335.81	0.14		0.066	0.011	4
1352.32	0.11	0.56	0.159	0.022	4
* 1366.26	0.12		0.103	0.014	4
1369.5	0.2	12.1	1.48	0.09	2
* 1382.45	0.05		0.74	0.05	4
1406.94	0.10	0.56	0.218	0.020	4
1464.84	0.09	0.22	0.114	0.015	4
1518.39	0.03	5.4	2.152	0.11	3
1529.77	0.03	30.4	10.9	0.5	1



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: $^{88}\text{Kr} - ^{88}\text{Rb}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.84(3) hr. - 17.78(11) min.*

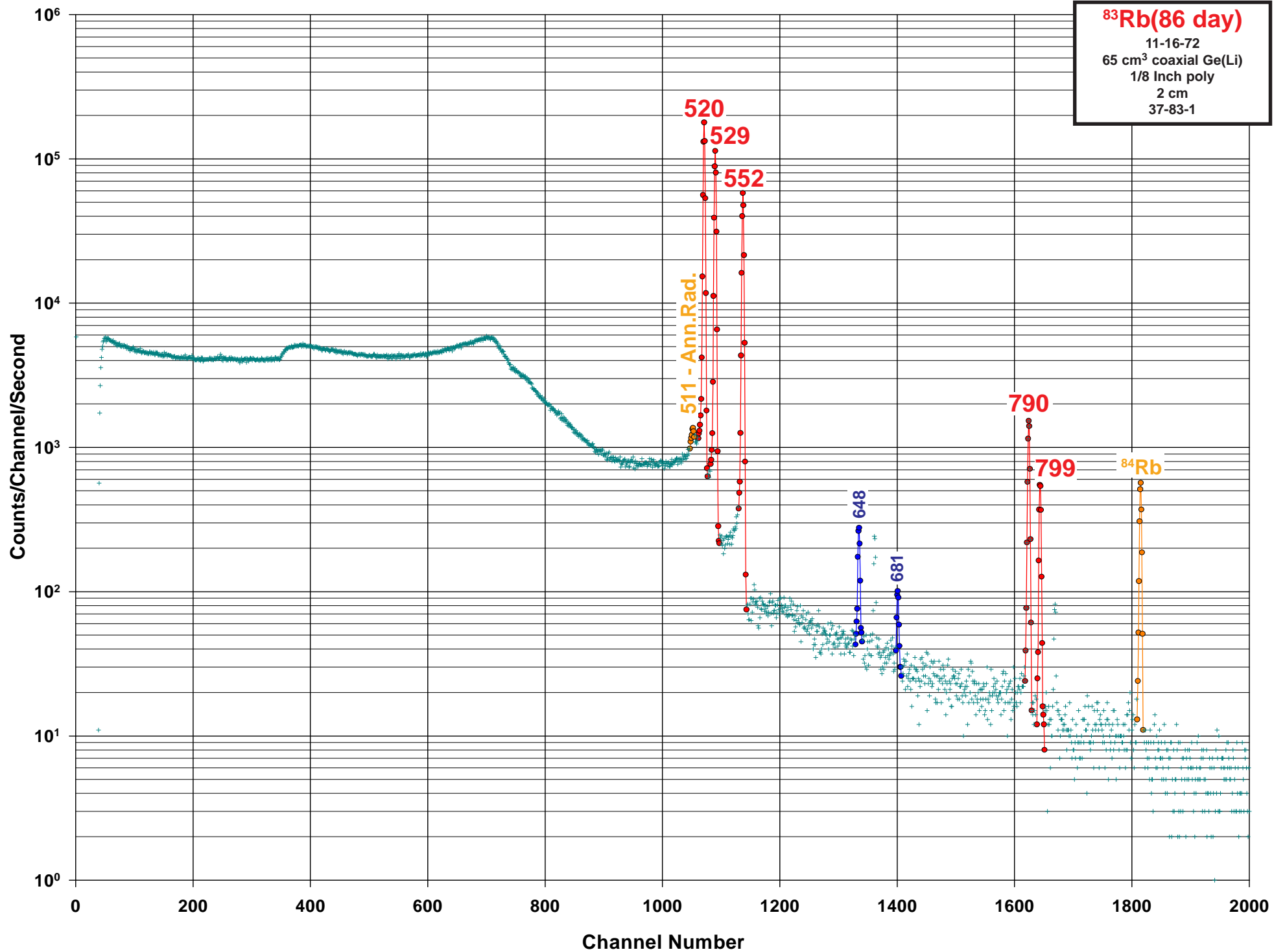
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f)

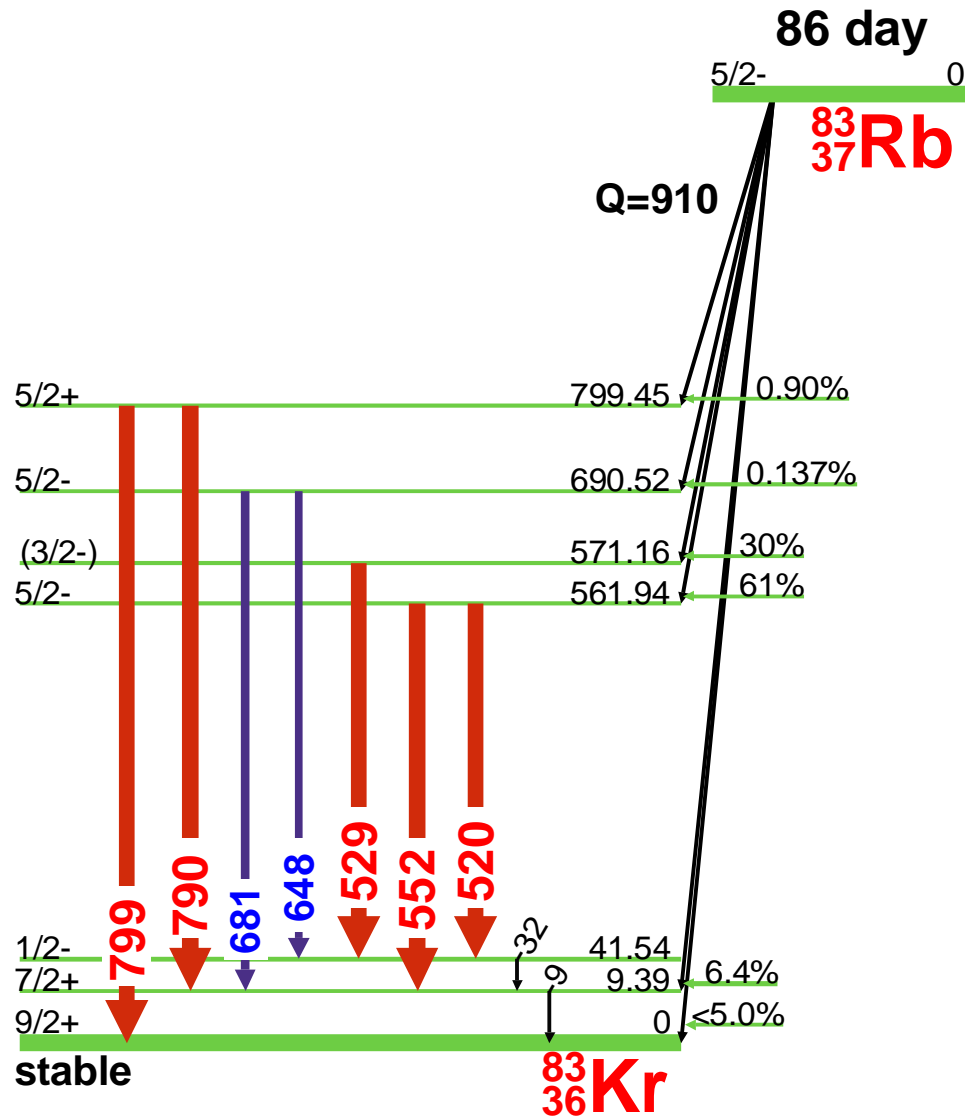
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1603.79	0.05	1.29	0.46	0.03	4
	1608.01	0.20		0.069	0.018	4
*	1627.0			0.0088	0.0018	4
	1661.3	0.3		0.090	0.021	4
*	1679.6	0.3		0.045	0.009	4
	1685.6	0.4	3.96	0.66	0.08	3
*	1687.3			0.011	0.006	4
*	1779.870	0.021		0.216	0.018	4
	1789.14	0.22	0.22	0.045	0.017	4
	1793.3	0.3		0.035	0.014	4
*	1798.35	0.19		0.062	0.013	4
	1801.3	0.3		0.038	0.014	4
*	1836.00	0.05	71.5	21.4	1.2	1
	1892.76	0.13	0.43	0.138	0.025	4
	1908.7	0.4	0.39	0.100	0.015	4
	2029.84	0.03	13.6	4.53	0.23	3
	2035.411	0.018	10.6	3.73	0.20	3
*	2111.50	0.04		0.118	0.013	4
*	2118.867	0.020		0.42	0.03	4
	2186.5	0.3	1.2	0.29	0.06	4
	2195.842	0.007	37.1	13.2	0.6	1
	2231.772	0.021	9.7	3.39	0.17	2

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	2259.5	0.3	0.27	0.031	0.014	4
	2352.08	0.04	2.10	0.73	0.04	3
	2364.7	0.3		0.031	0.014	4
*	2388.0	0.6		0.028	0.009	4
	2392.11	0.04	100	34.6	1.6	1
	2408.91	0.07	0.33	0.104	0.011	3
	2535.52	0.11	0.15	0.042	0.004	4
	2548.40	0.03	1.95	0.62	0.03	2
*	2577.791	0.028		0.118	0.013	4
*	2677.892	0.021	6.5	1.96	0.11	1
*	2734.086	0.013		0.109	0.009	4
	2771.02	0.05	0.44	0.149	0.010	2
*	3009.52	0.04	0.85	0.244	0.016	1
*	3017.19	0.20		0.0043	0.0022	4
*	3218.48	0.05		0.214	0.014	1
*	3486.47	0.06		0.130	0.008	1
*	3524.0	0.6		0.006	0.004	4
*	4035.5	0.4		0.0107	0.0022	4
*	4742.42	0.08		0.143	0.010	1
*	4852.882	0.024		0.0090	0.0014	3





⁸³Rb(86 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸³Rb

Half Life: 86.2(1) day

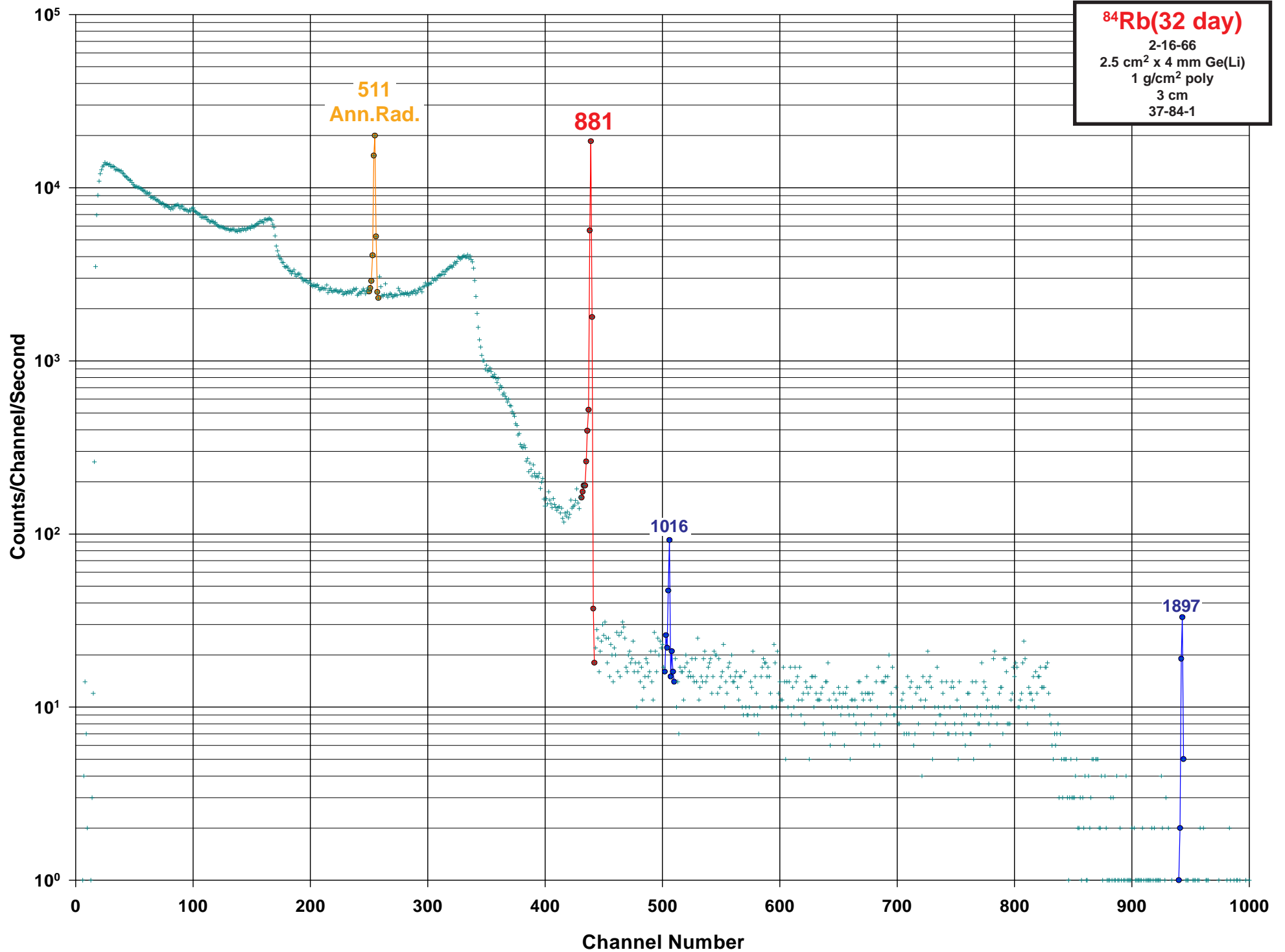
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ⁸⁵Rb(γ ,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
9.396	0.007				4
32.147	0.002				4
119.32	0.09		0.0143	0.0024	4
128.55	0.12		0.0013	0.0002	4
237.19			0.0005		4
520.389	0.012	100	44.7	3.3	1
529.591	0.013	65.6	29.3	2.1	1
552.588	0.020	36.0	16.0	1.1	1
562.17	0.05		0.0085	0.0010	4
648.97	0.04	0.21	0.085	0.006	3
681.18	0.05	0.071	0.031	0.005	3
790.15	0.03	1.50	0.66	0.04	1
799.37	0.04	0.51	0.237	0.016	1

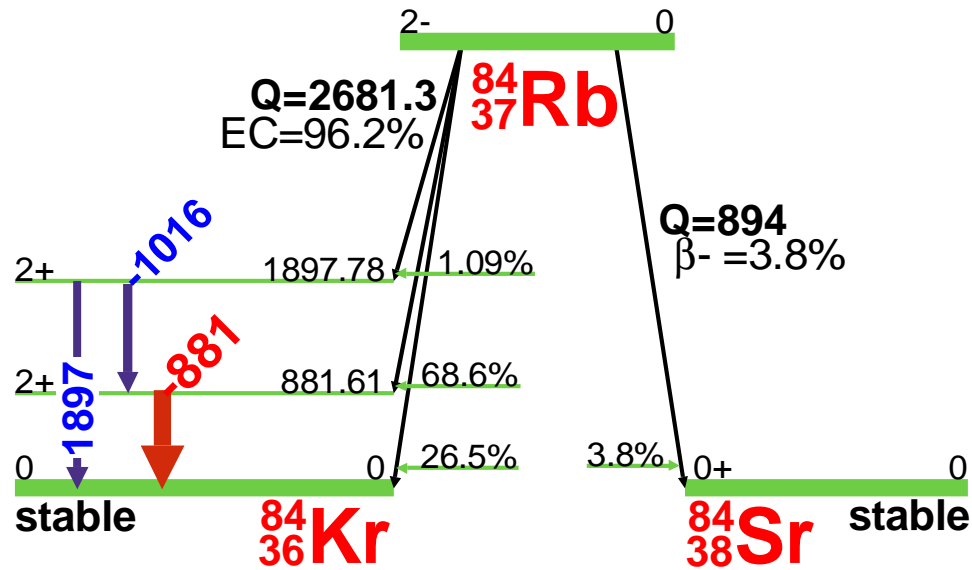
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





⁸⁴Rb(32 day) Decay Scheme

32 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁴Rb

Half Life: 32.77(14) day

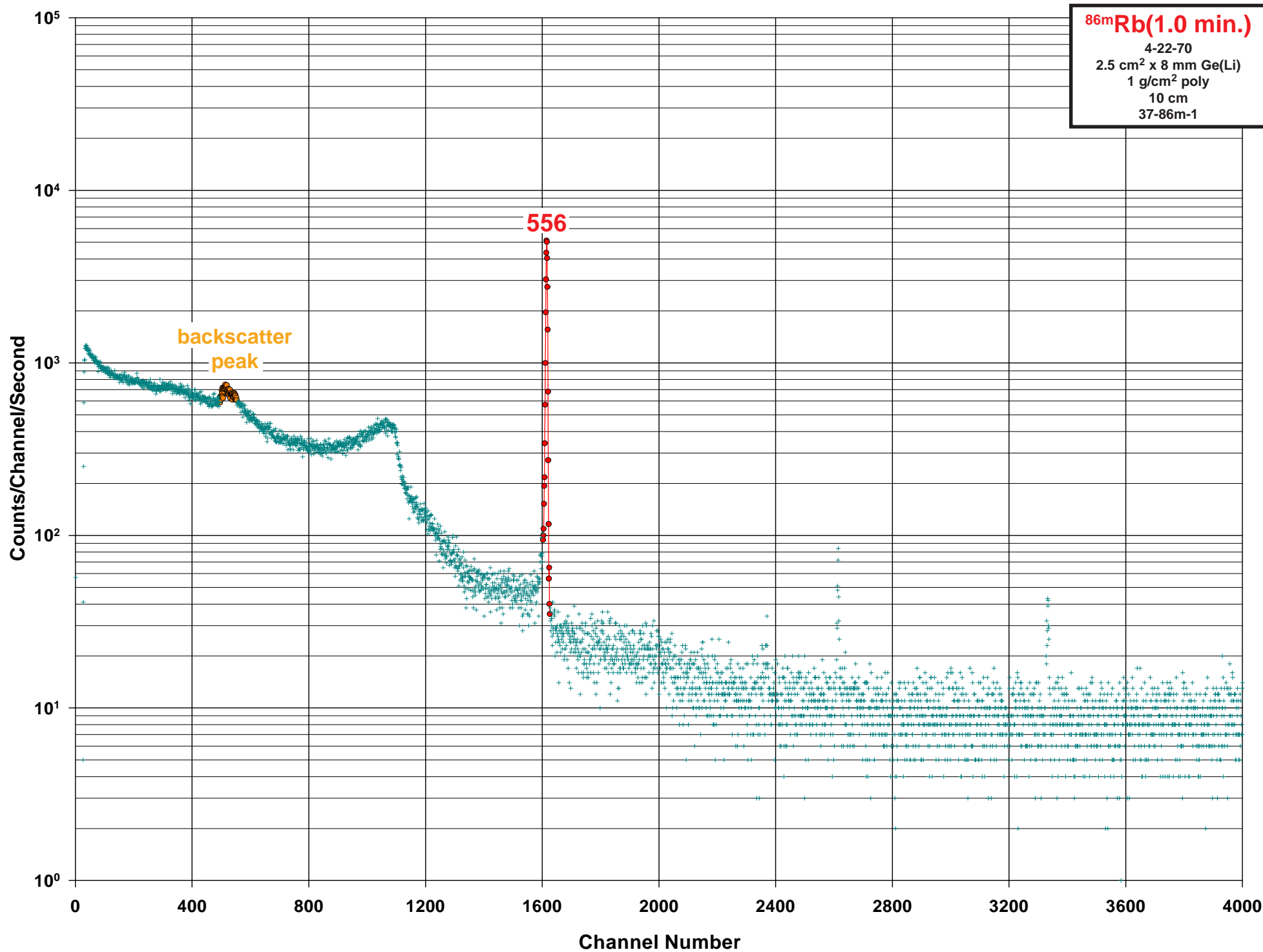
Detector: 2.5 cm² x 4 mm Ge (Li)

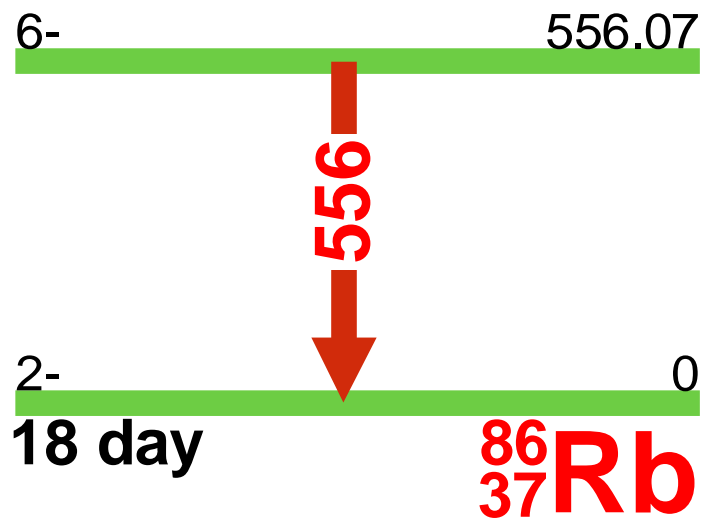
Method of Production: ⁸⁵Rb(γ ,n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
Ann.	511.002			25.9	1.2	2
	881.6041	0.0016	100	69.0	1.6	1
	1016.158	0.011	0.61	0.349	0.013	2
	1897.751	0.011	1.1	0.74	0.03	2

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





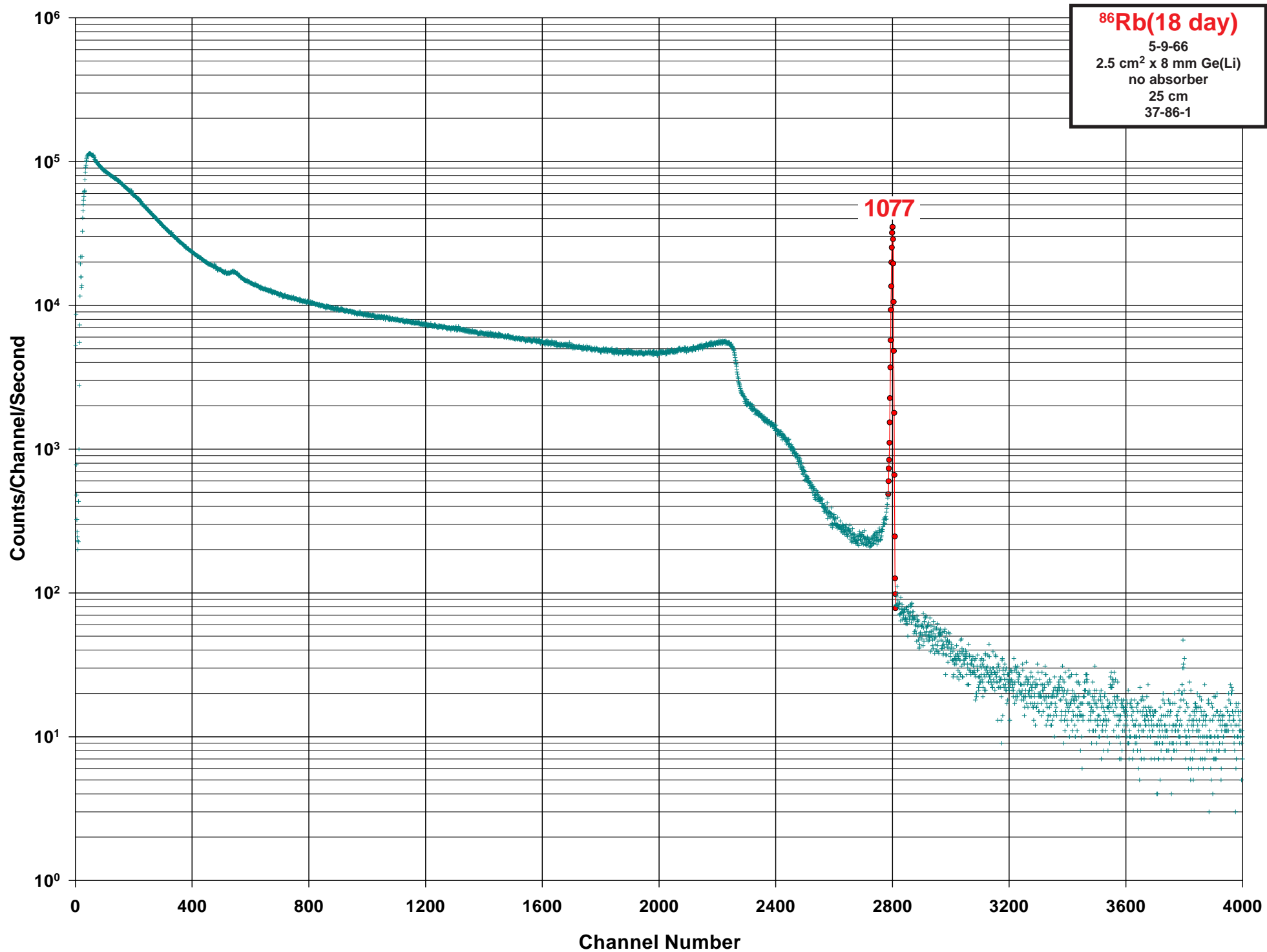
^{86m}Rb (1.0 min.) Decay Scheme**1.0 min****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{86m}Rb

Half Life: 1.017(3)min.

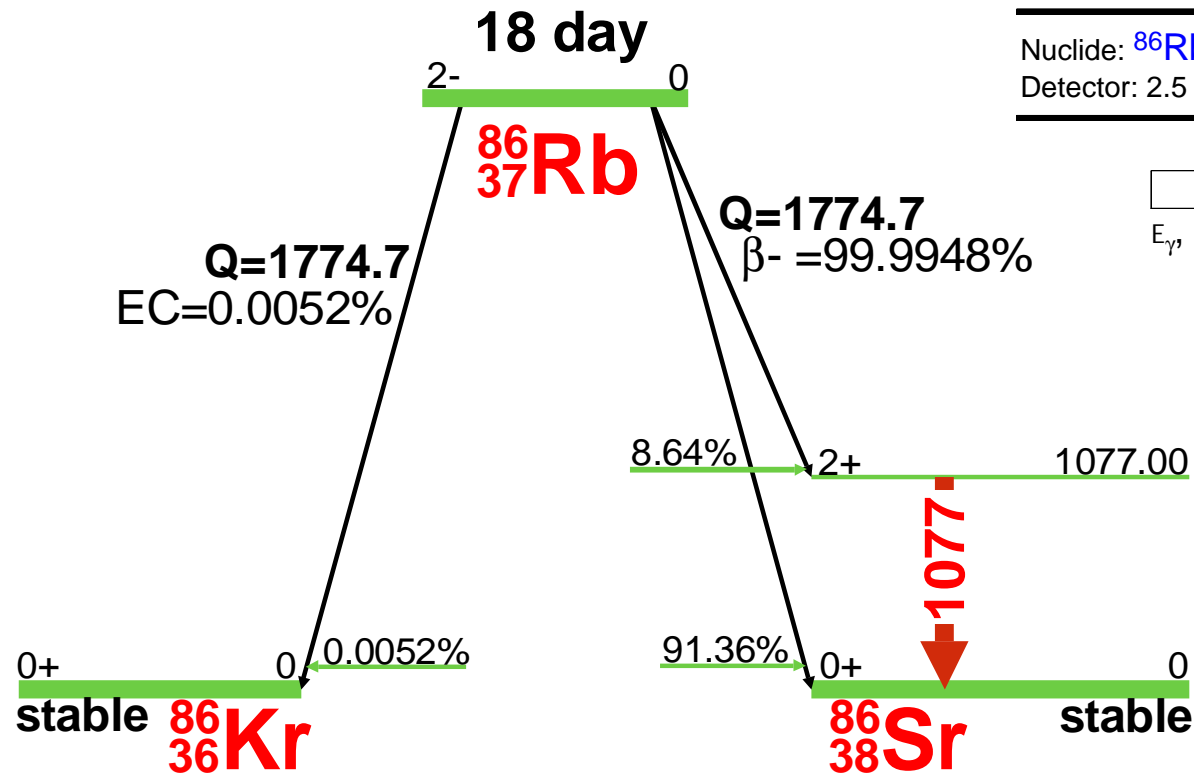
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ^{85}Rb (n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
556.07	0.18	100	98.17	0.09	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



⁸⁶Rb(18 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁶Rb

Half Life: 18.631(18) day

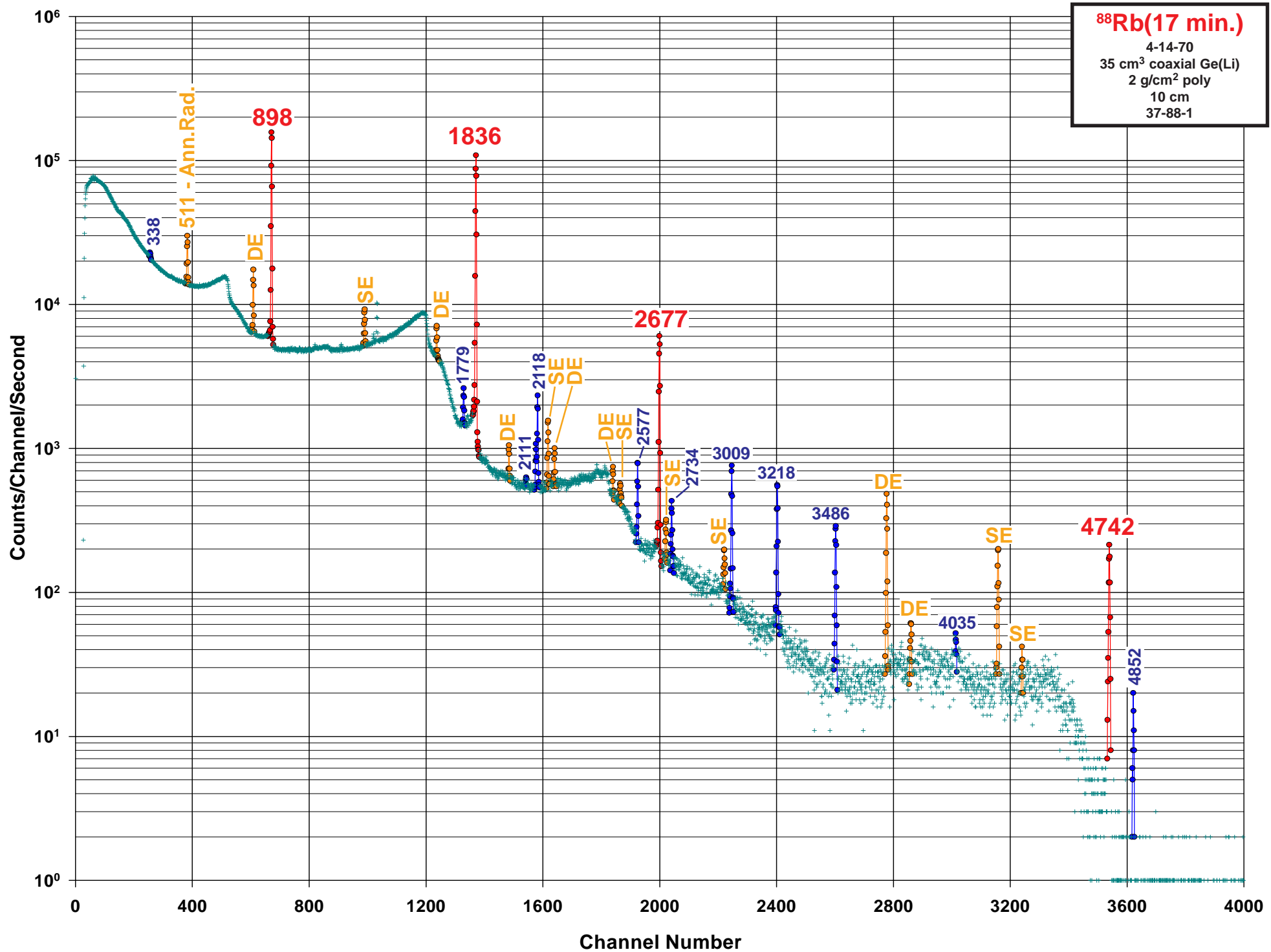
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁸⁵Rb(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
1077.0	0.4	100	8.64	0.04	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





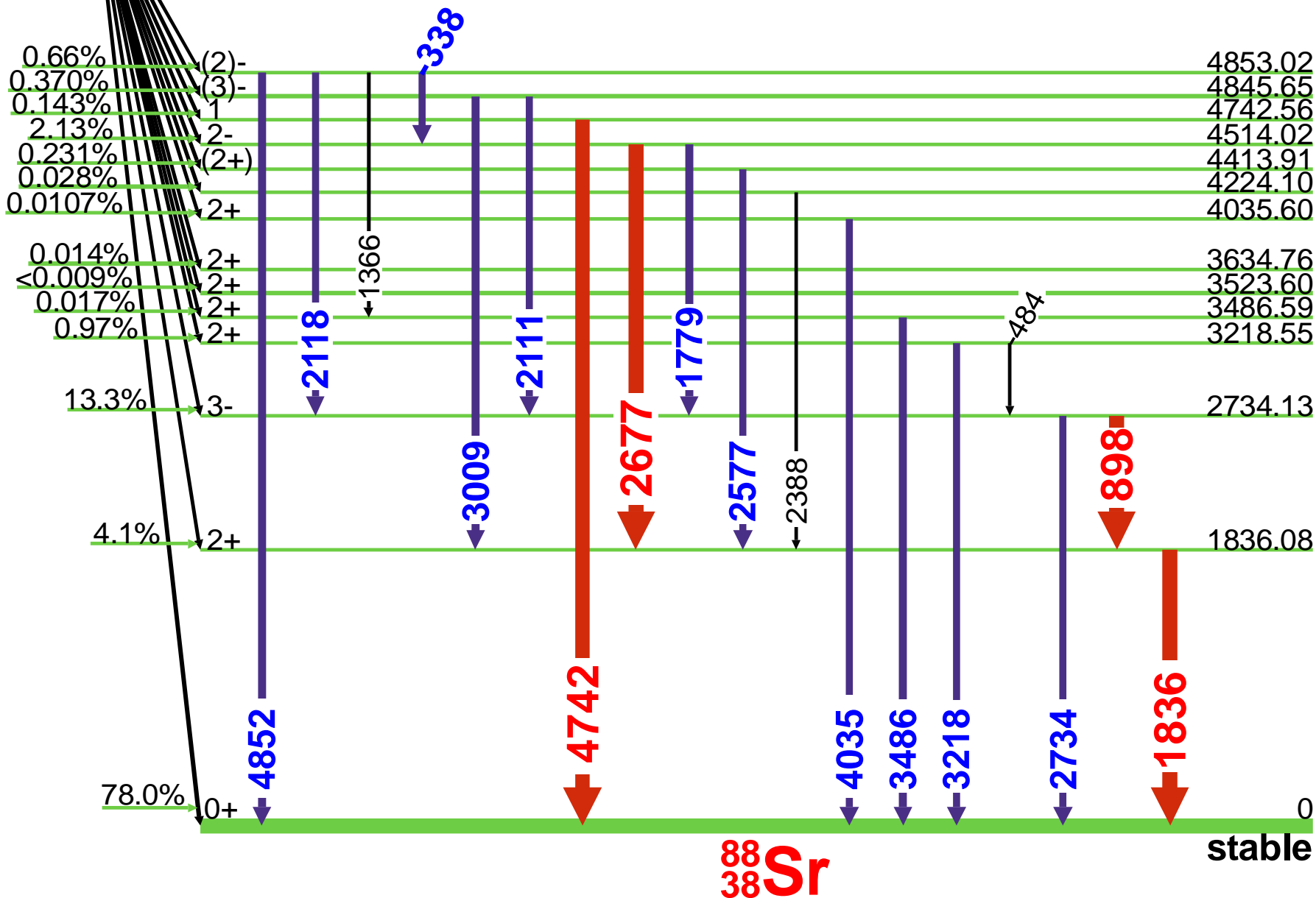
17 min.

⁸⁸Rb(17 min.) Decay Scheme

2- 0

⁸⁸₃₇Rb

Q=5316



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{88}Rb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

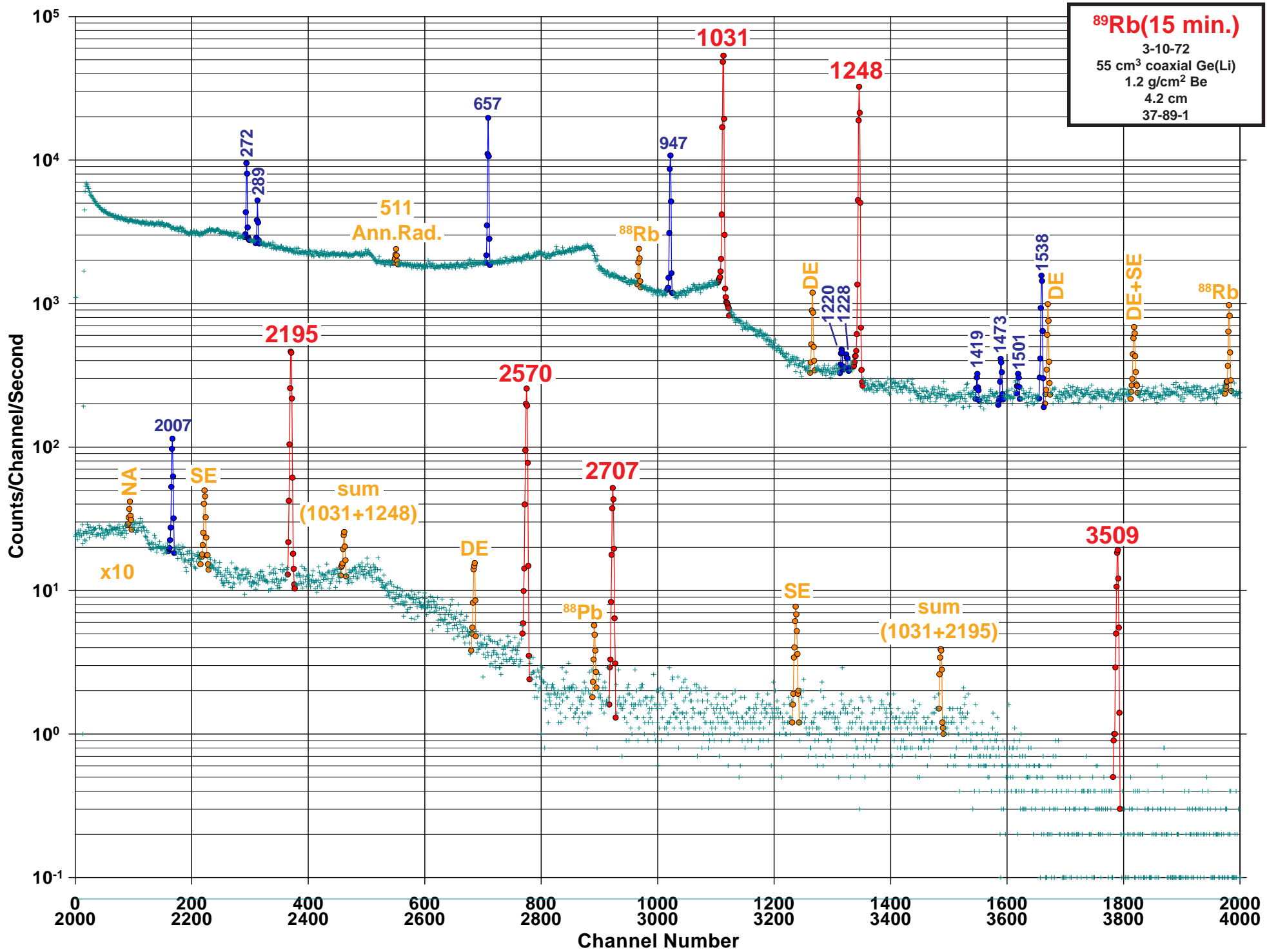
Half Life: 17.78(11) min.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{87}\text{Rb}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
338.950	0.070	0.25	0.0599	0.0072	4
416.200	0.300		0.0036	0.0013	4
439.200	0.300		0.0143	0.0035	4
484.530	0.160	0.16	0.0278	0.0066	4
891.300	0.000		0.0208	0.0042	4
898.030	0.040	61.4	14.0384	0.7918	1
1027.300	0.300		0.0107	0.0043	4
1217.970	0.180		0.0514	0.0070	4
1366.260	0.120	0.39	0.1027	0.0141	4
1382.450	0.050	3.2	0.7426	0.0489	3
1627.000	0.000		0.0088	0.0018	4
1679.600	0.300		0.0449	0.0089	4
1687.300	0.000		0.0107	0.0064	4
1779.870	0.021	1.03	0.2161	0.0177	4
1798.350	0.190		0.0621	0.0133	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1836.000	0.050	100	21.4000	1.2229	1
2111.500	0.040	0.60	0.1177	0.0126	4
2118.867	0.020	2.07	0.4216	0.0305	3
2388.000	0.600	0.15	0.0278	0.0087	4
2577.791	0.028	0.98	0.1798	0.0132	4
2677.892	0.021	9.4	1.9581	0.1133	1
2734.086	0.013	0.47	0.1091	0.0089	3
3009.520	0.040	1.25	0.2440	0.0161	2
3017.190	0.200		0.0043	0.0022	4
3218.480	0.050	1.08	0.2140	0.0136	2
3486.470	0.060	0.65	0.1305	0.0085	2
3524.000	0.600		0.0064	0.0043	4
4035.500	0.400		0.0107	0.0022	4
4742.420	0.080	0.78	0.1434	0.0103	1
4852.882	0.024	0.054	0.0090	0.0014	3





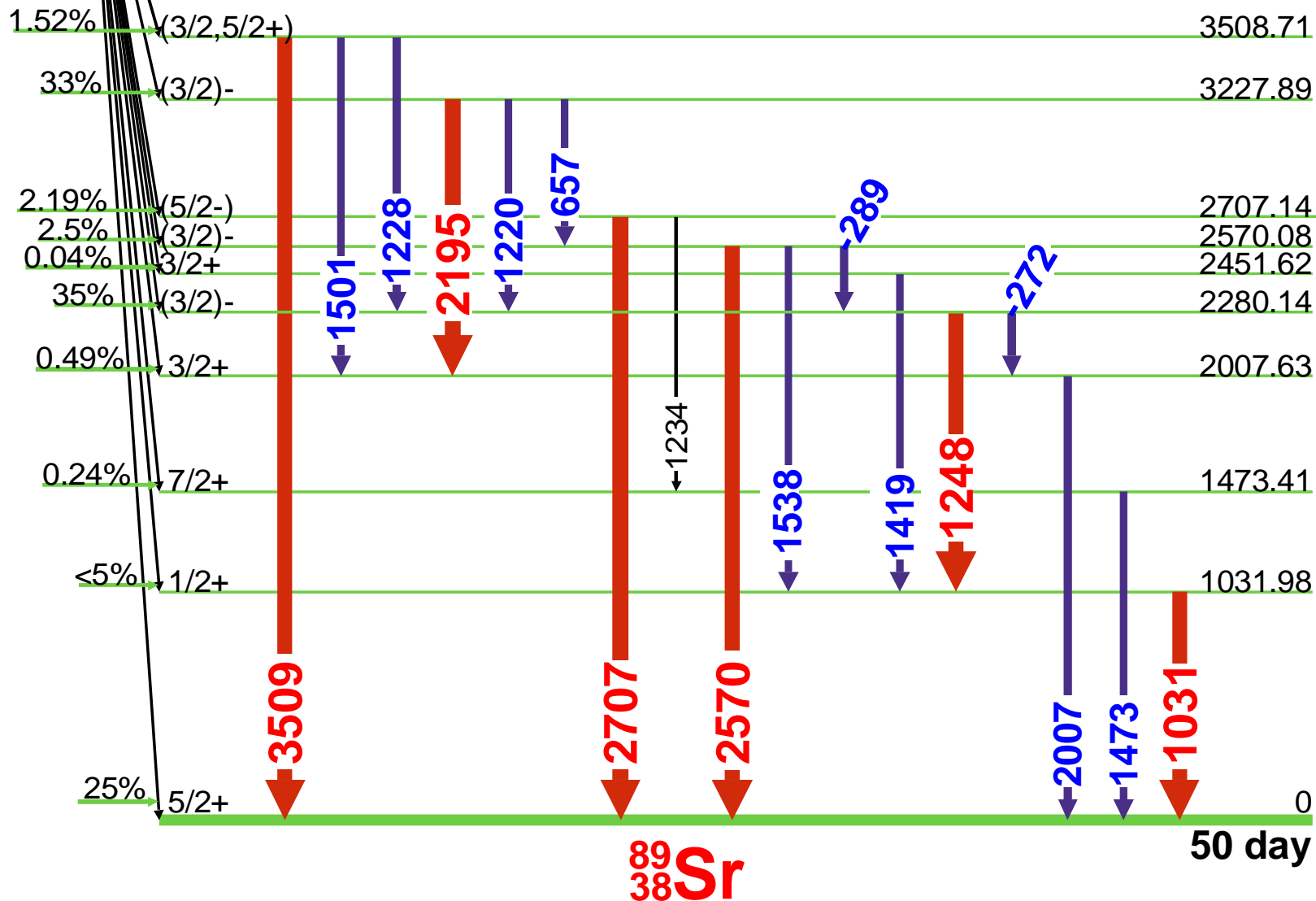
15 min.

⁸⁹Rb(15 min.) Decay Scheme

3/2- 0



Q=4501



50 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁹RbE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

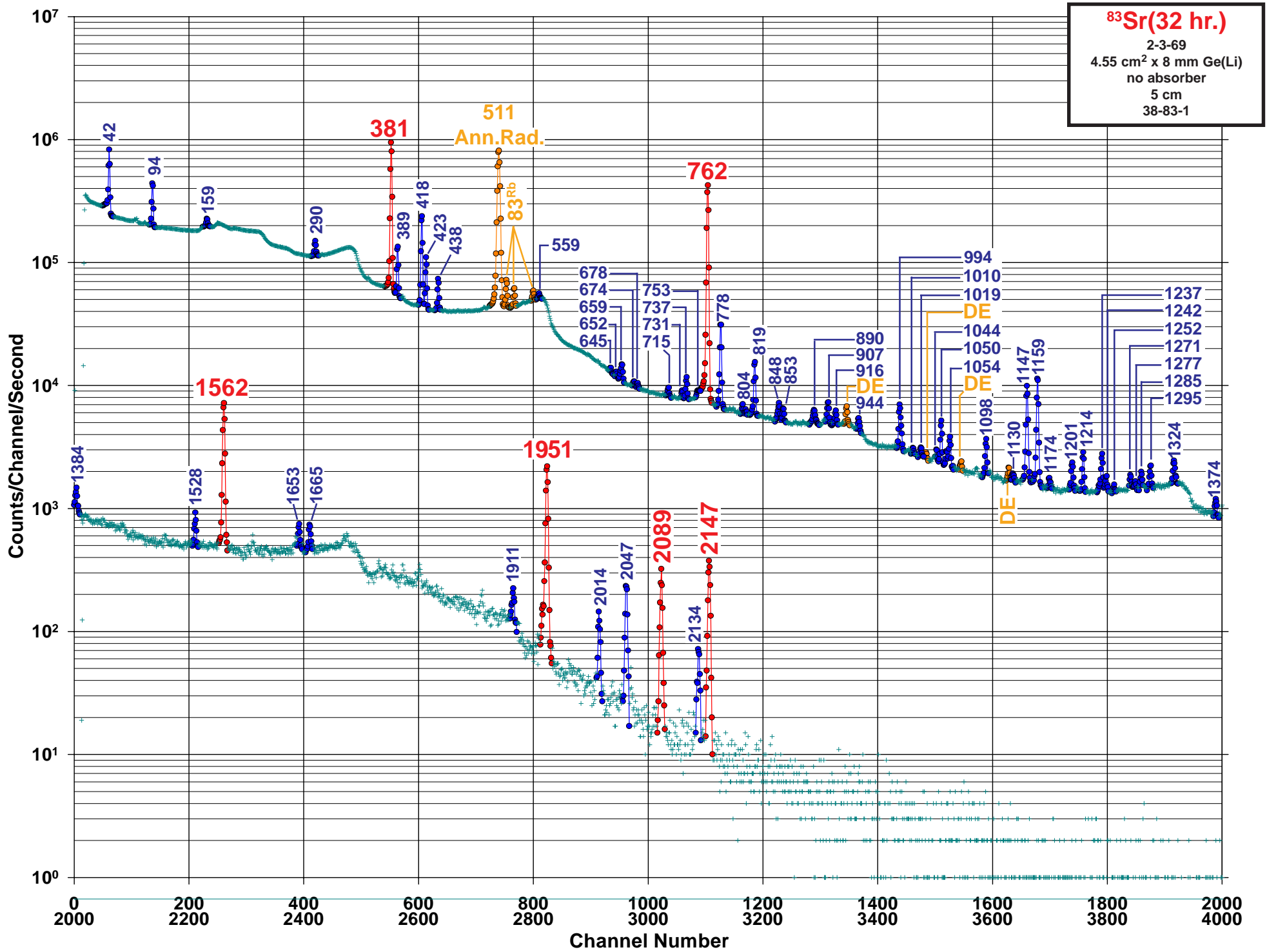
Half Life: 15.15(12) min.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: ⁸⁷Rb(n,γ)

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
118.3	0.5		0.012	0.006	4
205.7	0.4		0.012	0.006	4
272.42	0.07	2.4	1.42	0.14	3
289.76	0.10	0.96	0.54	0.05	3
466.62	0.15		0.070	0.018	4
562.08	0.21		0.046	0.007	4
596.0	0.3		0.023	0.006	4
657.77	0.06	16.8	10.0	1.0	2
699.6	0.4		0.023	0.006	4
766.76	0.12		0.162	0.022	4
776.19	0.25		0.070	0.018	4
801.1	0.5		0.017	0.012	4
822.0	0.4		0.029	0.012	4
947.73	0.07	15.9	9.2	0.9	2
975.40	0.19		0.058	0.013	4
1025.3	0.5		0.23	0.08	4
1031.92	0.06	100	58.	6.	1
1057.2	0.4		0.023	0.012	4
1081.4	0.3		0.023	0.006	4
1138.5	0.5		0.012	0.006	4
1160.47	0.25		0.035	0.006	4
1211.7	0.5		0.012	0.006	4
1220.35	0.09	0.38	0.220	0.026	4
1228.46	0.13	0.21	0.122	0.020	4
1234.0	0.4	0.06	0.029	0.018	4
1248.14	0.06	71.2	43.	4.	1
1419.55	0.09		0.093	0.014	4
1429.6	0.5		0.012	0.006	4
1473.29	0.14	0.60	0.35	0.04	4
1501.00	0.15	0.42	0.197	0.024	4
1538.07	0.09	4.2	2.55	0.28	2

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1596.2	0.5		0.017	0.006	4
1644.2	0.3		0.023	0.006	4
1770.2	0.8		0.012	0.006	4
1939.95	0.23	0.56	0.33	0.04	4
1979.7	0.5		0.023	0.006	4
2007.50	0.09	4.1	2.38	0.27	2
2058.0	1.1		0.23	0.09	4
2109.7	0.5		0.017	0.006	4
2195.92	0.11	23.7	13.3	1.4	1
2231.3	0.4		0.023	0.006	4
2280.00	0.15		0.180	0.023	4
2372.8	0.9		0.012	0.006	4
2451.9	0.2		0.052	0.007	4
2570.20	0.11	16.1	9.9	1.0	1
2668.0	0.5		0.012	0.006	4
2685.6	0.4		0.029	0.006	4
2707.26	0.15	3.43	2.03	0.21	1
2818.1	0.5		0.012	0.006	4
2947.9	0.4		0.017	0.006	4
2955.0	1.2		0.006	0.003	4
3037.5	0.4		0.012	0.006	4
3141.7	0.3		0.052	0.007	4
3227.84	0.13		0.075	0.009	4
3263.6	0.3		0.017	0.006	4
3303.5	0.8		0.006	0.003	4
3509.00	0.19	1.8	1.15	0.12	1
3651.8	0.4	0.06	0.035	0.012	3
3781.8	0.5		0.012	0.006	3
3845.4	0.6	0.05	0.029	0.006	4
3989.1	0.8	0.03	0.017	0.006	4
4093.7	0.6	0.13	0.075	0.013	3





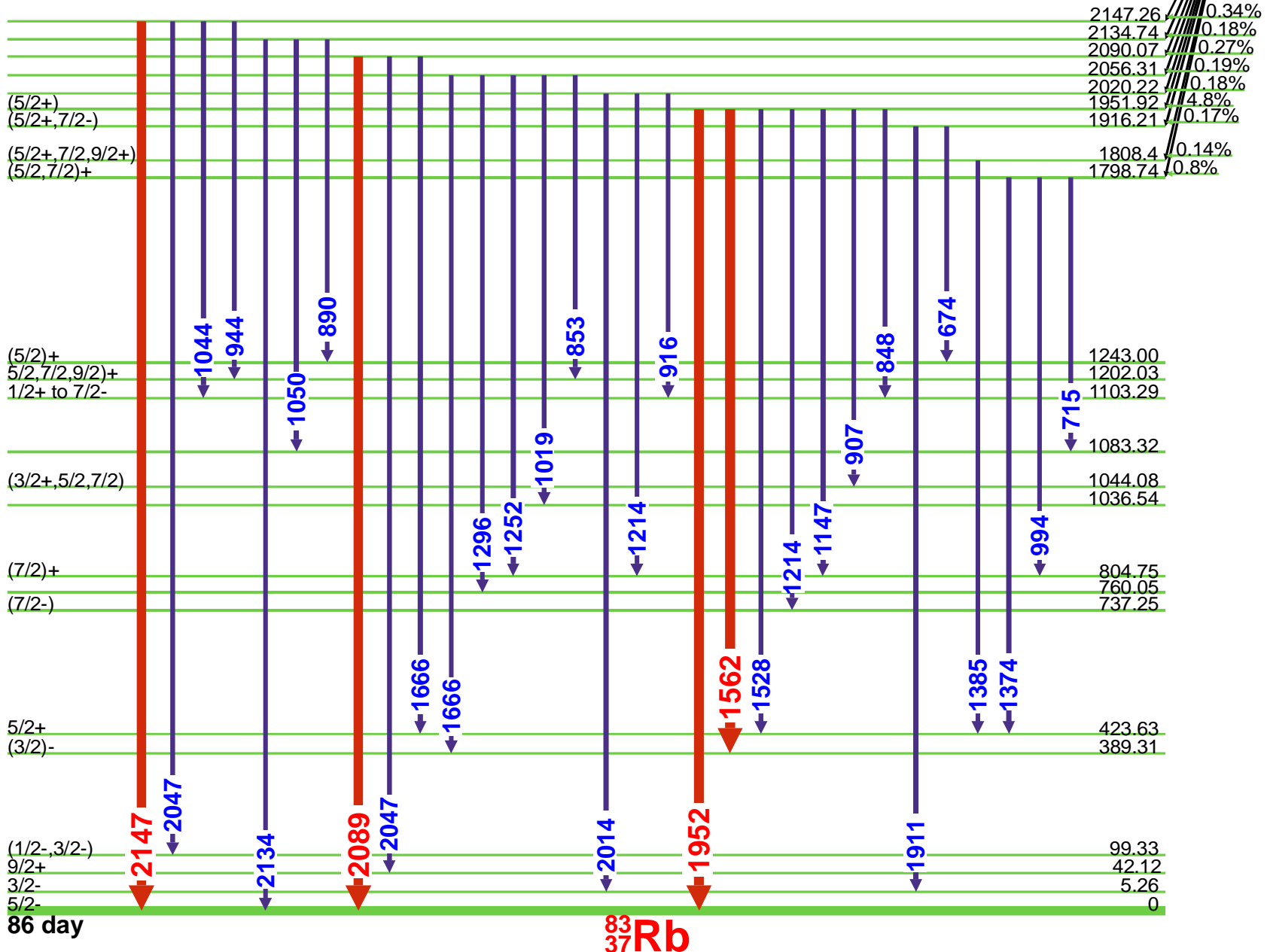
⁸³Sr(32 hr.) Decay Scheme

gamma-rays emitted from high energy levels

32 hr.
7/2+ 0

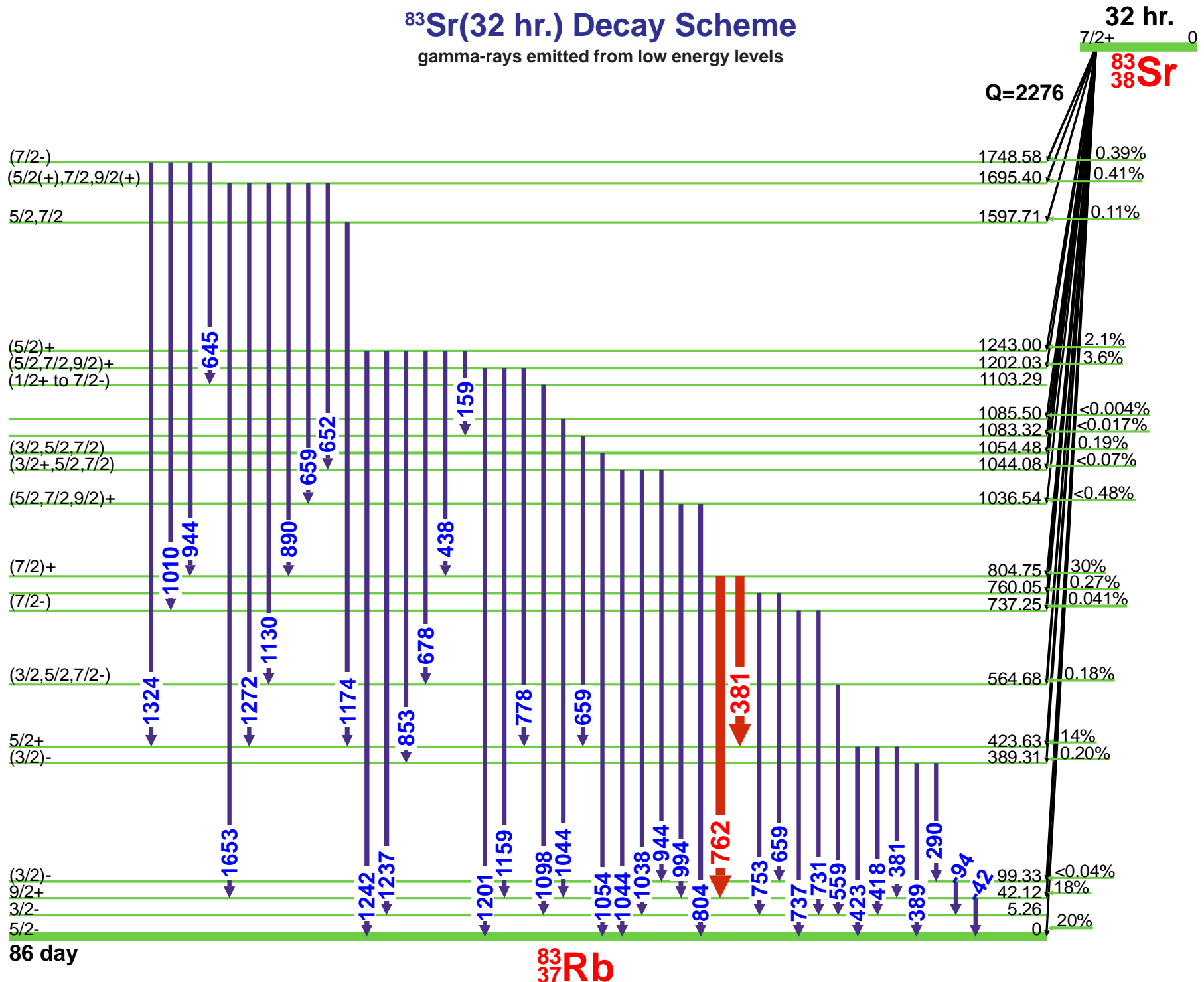
⁸³₃₈Sr

Q=2276



⁸³Sr(32 hr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{83}Sr E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 32.41 (3) hr.

Detector: 4.55 cm² x 8 mm Ge(Li)Method of Production: $^{84}\text{Sr}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	5.23	0.09				4		804.65	0.15	0.33	0.09	0.04	3
	42.33	0.15		1.6	0.8	3		808.7	0.3	0.12	0.041	0.019	4
	94.11	0.10	1.15	0.46	0.21	4		819.29	0.10	2.84	0.8	0.4	3
	156.8	0.3		0.039	0.026			831.0	1.0		0.006	0.009	4
	156.8	0.3		0.039	0.026	4		838.0	1.0		0.009	0.010	4
	159.75	0.10	0.34	0.11	0.05	3		848.44	0.10	0.82	0.23	0.11	4
	290.04	0.10	1.32	0.44	0.21	4		853.83	0.10		0.13	0.06	
D	381.17	0.03		2.5	1.2		D	853.83	0.10	0.56	0.13	0.06	4
	381.53	0.03	56.8	14.	7.	1		868.6	0.4		0.015	0.008	4
	389.37	0.10	6.1	1.7	0.8	3		869.1	0.5		0.027	0.014	4
	418.37	0.03	15.8	4.4	2.1	2		879.1	0.4		0.036	0.018	4
	423.63	0.03	5.3	1.6	0.7	3		888.1	0.9		0.021	0.016	4
	438.16	0.10	2.83	0.9	0.4	3		890.8	0.3		0.14	0.07	
Ann.	511.006			46	44	1	D	890.8	0.3	0.72	0.14	0.07	4
	559.35	0.10	3.0	0.22	0.10	4		902.95	0.30		0.07	0.03	4
	564.45	0.20		0.10	0.05			907.67	0.10	1.02	0.30	0.14	4
	564.45	0.20		0.10	0.05	4		916.91	0.10	0.46	0.13	0.06	4
	630.9	0.3		0.030	0.015	4		930.00	0.20		0.050	0.024	4
	638.05	0.35		0.045	0.023			935.8	0.4		0.028	0.015	4
	638.05	0.35		0.045	0.023	4		944.56	0.10		0.14	0.06	
	645.80	0.20	0.79	0.048	0.023	4	D	944.56	0.10	1.11	0.14	0.06	4
	652.5	0.4	0.81	0.10	0.05	4		944.56	0.10		0.14	0.06	
	657.73	0.15		0.09	0.04	4	D	994.20	0.10	2.03	0.60	0.28	3
	659.1	0.3		0.36	0.17			994.20	0.10		0.60	0.28	
D	659.1	0.3	1.34	0.36	0.17	4		1005.10	0.20		0.022	0.010	4
	659.1	0.3		0.36	0.17			1010.35	0.20	0.19	0.028	0.013	4
	659.61	0.10		0.24	0.11			1019.45	0.15	0.37	0.048	0.024	4
	674.00	0.25	0.57	0.07	0.03	4		1035.4	0.4		0.036	0.018	4
	678.6	0.3	0.36	0.049	0.024	4		1038.55	0.25	0.31	0.09	0.04	4
	682.9	0.4		0.021	0.013	4		1044.03	0.10		0.35	0.16	
	709.1	0.4		0.015	0.007	4	D	1044.03	0.10	1.11	0.35	0.16	3
	710.6	0.6		0.029	0.014	4		1044.03	0.10		0.35	0.16	
	715.34	0.10	0.46	0.10	0.05	4		1050.6	0.3	0.46	0.11	0.05	4
	722.7	0.5		0.016	0.009	4		1054.45	0.10	0.77	0.20	0.10	3
	731.95	0.10	0.31	0.08	0.04	4		1078.8	1.4		0.006	0.007	
	737.13	0.10	0.89	0.26	0.12	4		1078.8	1.4		0.006	0.007	4
	753.3	0.4	0.3	0.09	0.05	4		1086.30	0.25		0.035	0.017	4
	759.1	0.4		0.41	0.21	4		1098.05	0.10	0.88	0.26	0.12	3
	762.65	0.10	100	30.	14.	1		1102.90	0.20		0.029	0.014	
	778.44	0.10	6.6	2.0	0.9	2		1102.90	0.20		0.029	0.014	4
	793.4	0.4		0.042	0.020	4		1125.55	0.30		0.016	0.008	4
								1130.41	0.15	0.18	0.040	0.020	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{83}Sr E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

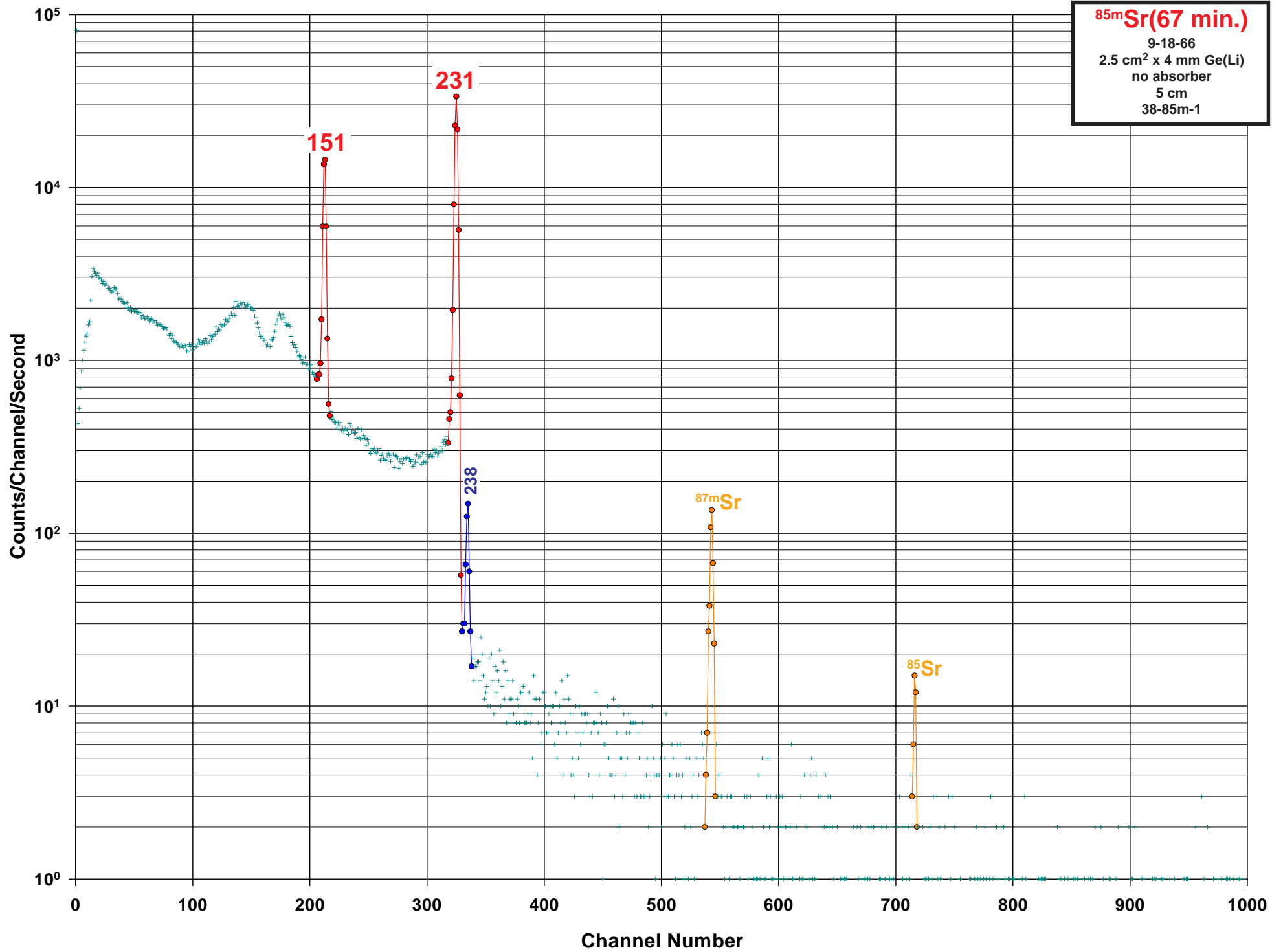
Half Life: 32.41 (3) hr.

Detector: 4.55 cm² x 8 mm Ge(Li)Method of Production: $^{84}\text{Sr}(\gamma, n)$

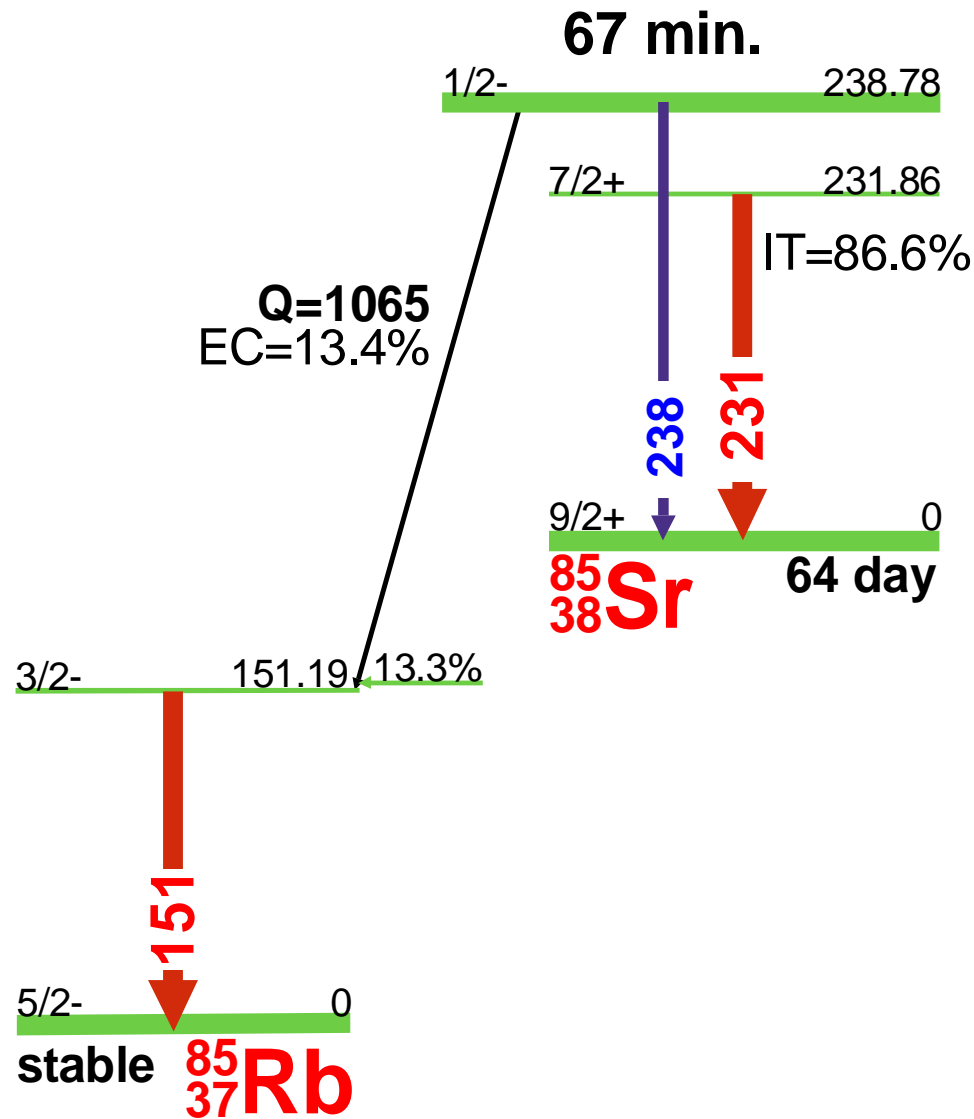
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1147.33	0.10	4.1	1.3	0.6	2
	1159.97	0.10	5.1	1.5	0.7	2
	1174.08	0.15	0.22	0.040	0.019	4
	1178.55	0.40		0.010	0.005	4
	1201.77	0.15	0.61	0.16	0.07	4
	1208.6	0.4		0.020	0.010	4
D	1214.88	0.15	0.82	0.24	0.11	3
	1214.88	0.15		0.24	0.11	
	1234.3	0.6		0.038	0.018	4
	1237.72	0.15	0.77	0.21	0.10	3
	1242.87	0.15	0.29	0.07	0.03	4
	1252.45	0.20	0.07	0.014	0.007	4
	1272.1	0.4	0.22	0.07	0.03	4
	1277.8	0.4	0.09	0.028	0.014	4
	1285.11	0.15	0.31	0.08	0.04	4
	1296.06	0.15	0.49	0.13	0.06	4
	1324.45	0.20	0.71	0.20	0.10	4
	1331.6	0.8		0.015	0.011	4
	1374.97	0.15	0.25	0.046	0.022	4
D	1383.2	0.6	0.47	0.048	0.025	4
	1385.4	0.4		0.10	0.05	
	1396.7	0.6		0.018	0.009	4
	1440.9	0.3		0.028	0.014	4
	1452.5	0.4		0.008	0.004	4
	1492.1	0.3		0.016	0.008	4
	1528.32	0.15	0.30	0.092	0.04	3
	1562.51	0.15	5.7	1.8	0.8	1
	1592.5	0.3		0.014	0.007	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1597.64	0.15		0.032	0.015	4
	1606.0	0.7		0.009	0.007	4
	1612.7	0.5		0.015	0.009	4
	1624.7	0.8		0.009	0.007	4
	1649.5	0.5		0.036	0.017	4
	1653.31	0.15	0.29	0.07	0.03	4
D	1666.20	0.15	0.29	0.08	0.04	4
	1666.20	0.15		0.08	0.04	
	1707.40	0.25		0.023	0.011	4
	1711.15	0.20		0.030	0.014	4
	1749.25	0.25		0.023	0.011	4
	1756.50	0.20		0.020	0.009	4
	1765.7	0.4		0.015	0.007	4
	1777.85	0.25		0.023	0.011	4
	1793.25	0.25		0.013	0.006	4
	1798.55	0.15		0.027	0.013	4
	1873.74	0.15		0.028	0.013	4
	1911.15	0.20	0.21	0.030	0.014	4
	1946.7	0.6		0.07	0.04	4
	1952.06	0.15	2.80	0.8	0.4	1
	2014.98	0.15	0.18	0.046	0.022	3
D	2047.81	0.15	0.34	0.09	0.04	2
	2047.81	0.15		0.09	0.04	
	2053.4	0.3		0.007	0.004	4
	2089.94	0.15	0.43	0.12	0.06	1
	2134.89	0.15	0.09	0.027	0.013	2
	2147.64	0.15	0.60	0.17	0.08	1





^{85m}Sr(67 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{85m}Sr

Half Life: 67.63 (4) min.

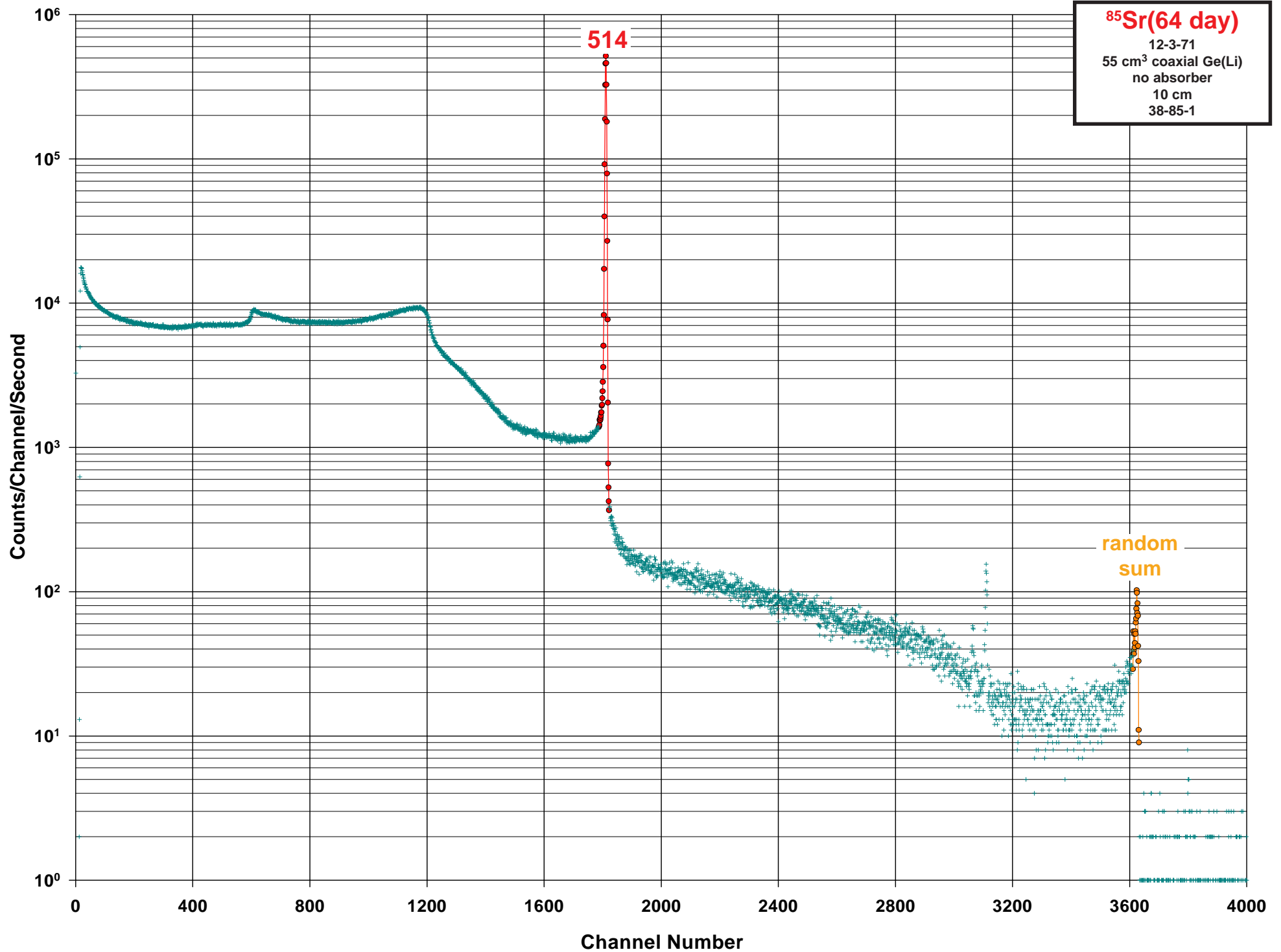
Detector: 2.5 cm² x 4 mm Ge (Li)

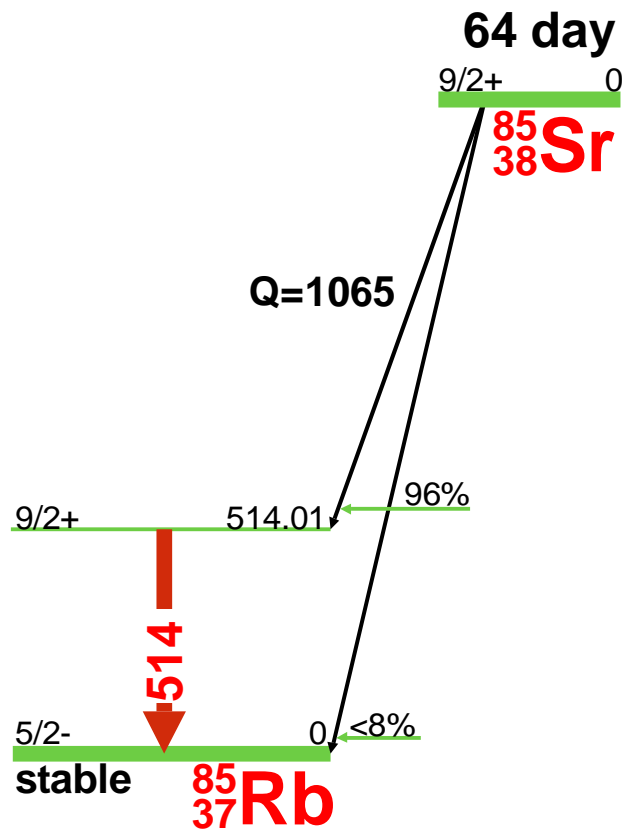
Method of Production: ⁸⁴Sr(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
6.92	0.05		0.000004		4
129.82	0.04		0.15	0.04	4
151.194	0.015	8.6	12.9	0.7	1
231.860	0.020	100	84.4	2.2	1
238.78	0.05	0.5	0.277	0.007	3
281.01	0.03		0.0004	0.0002	4
450.79	0.05		0.0108	0.0005	4
580.64	0.05		0.00088	0.00009	4
731.797	0.015		0.0147	0.0008	4
768.5	1.0		0.00030	0.00002	4
919.8	0.9		0.00010	0.00005	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





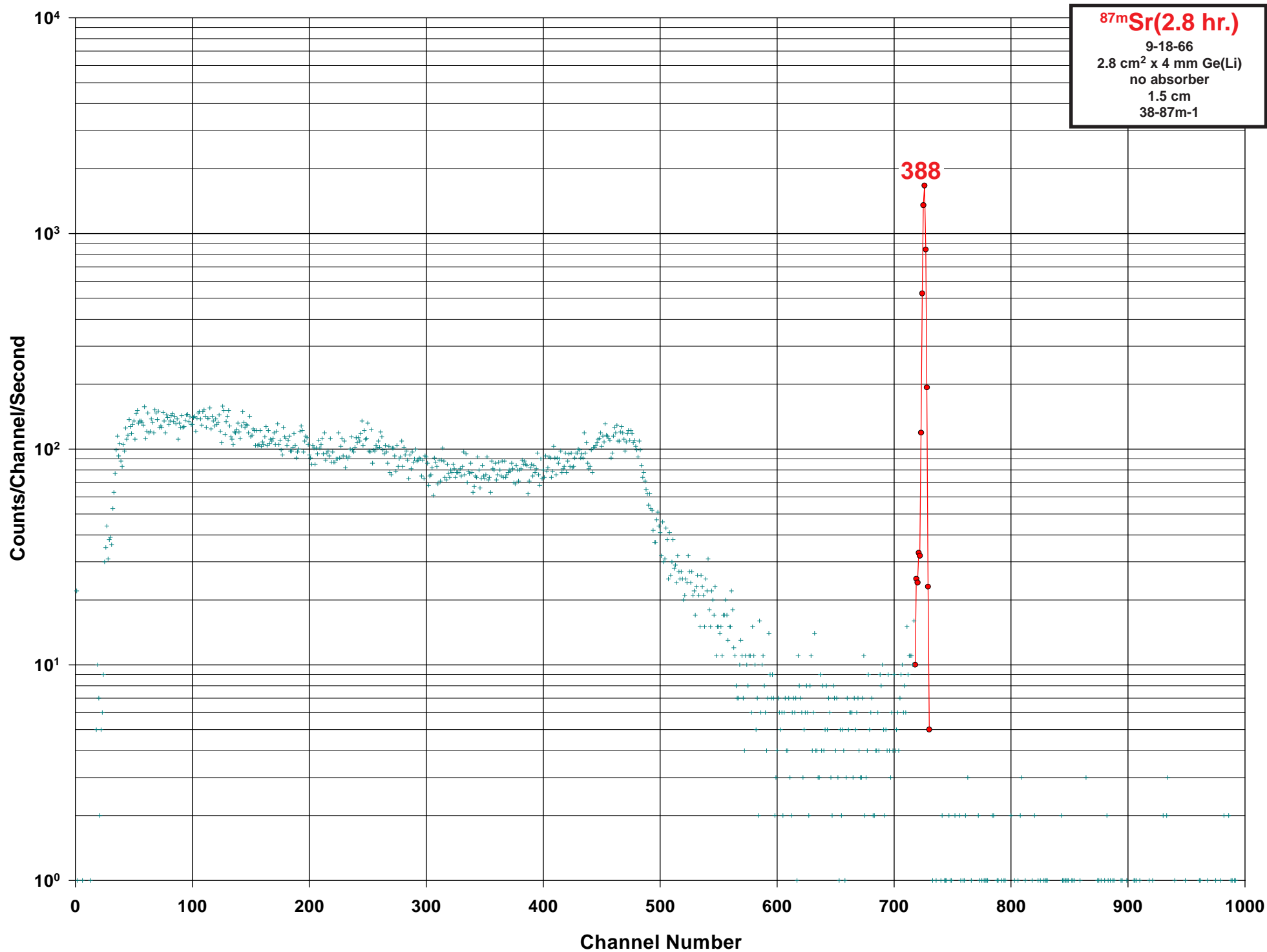
^{85}Sr (64 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{85}Sr

Half Life: 64.84 (2) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{85}\text{Rb}(p,n)$

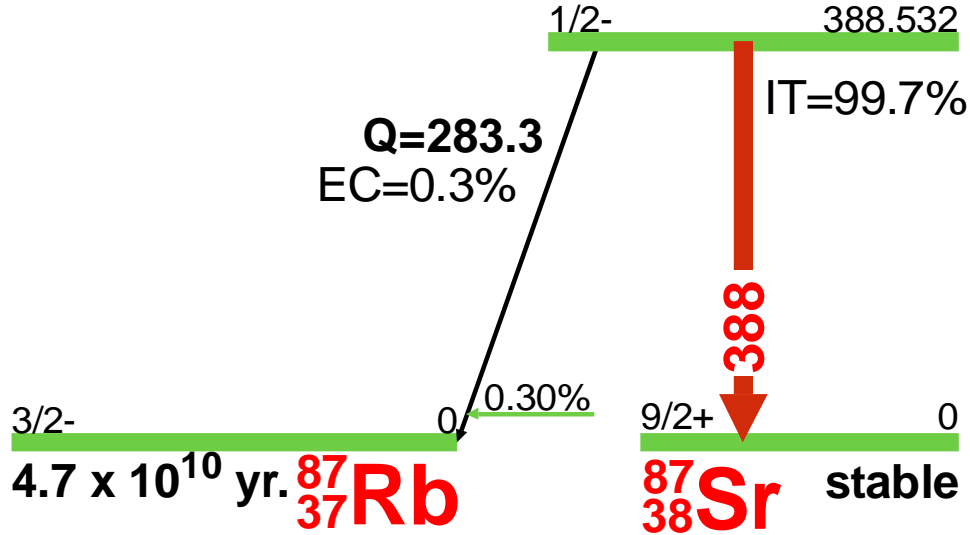
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
129.80	0.05		0.0005		4
151.18	0.03		0.0012	0.0009	4
354.06	0.05				4
362.82	0.00		0.0010		4
514.007	0.002	100	96.	4.	1
716.87	0.05		0.0003		4
868.06	0.05		0.0120	0.0007	4
951.0	0.5				4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



^{87m}Sr(2.8 hr.) Decay Scheme

2.8 hr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{87m}Sr

Half Life: 2.803 (3) hr.

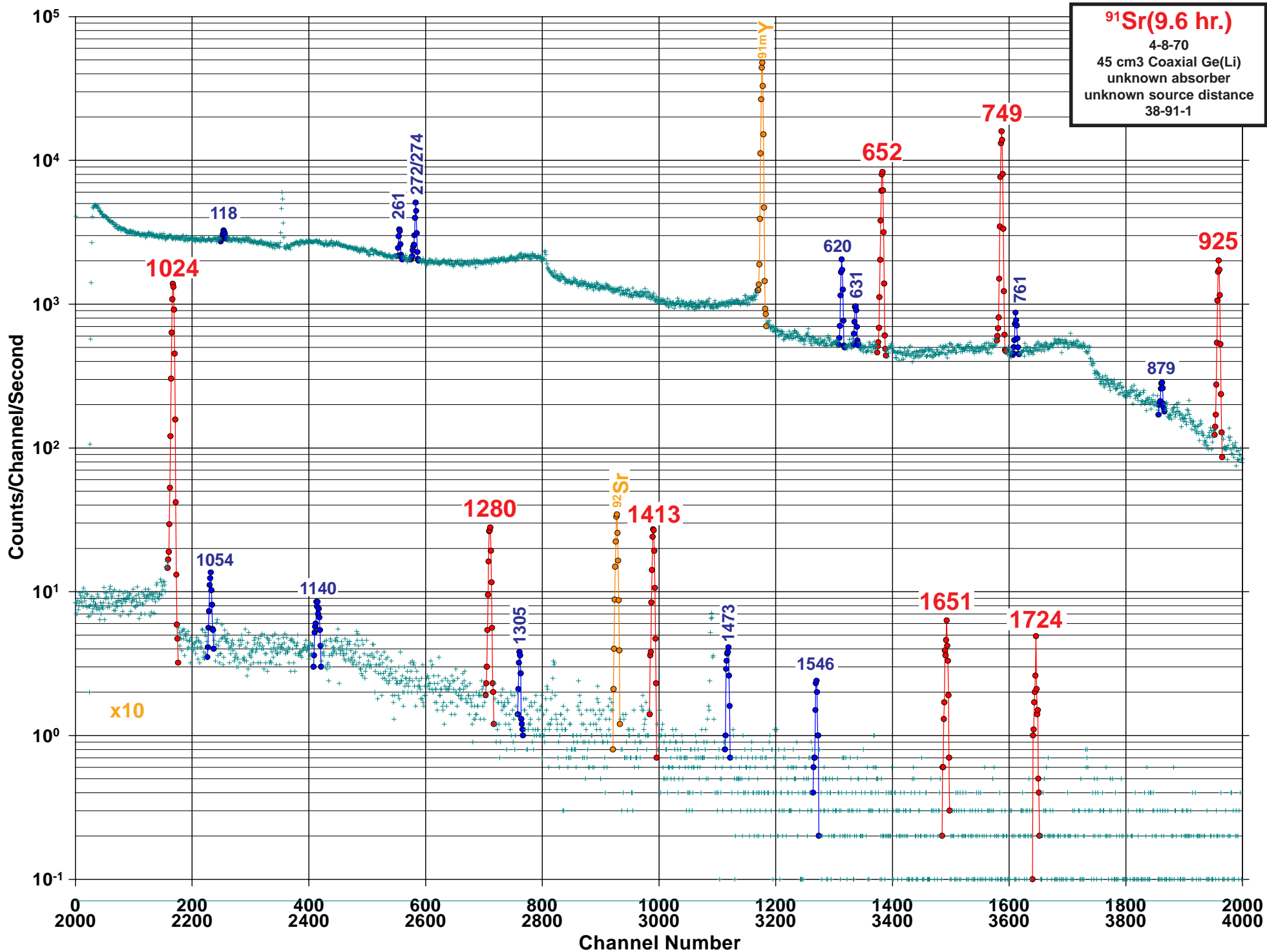
Detector: 2.8 cm² x 4 mm Ge (Li)

Method of Production: ⁸⁶Sr(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
388.531	0.003	100	82.1	0.5	1

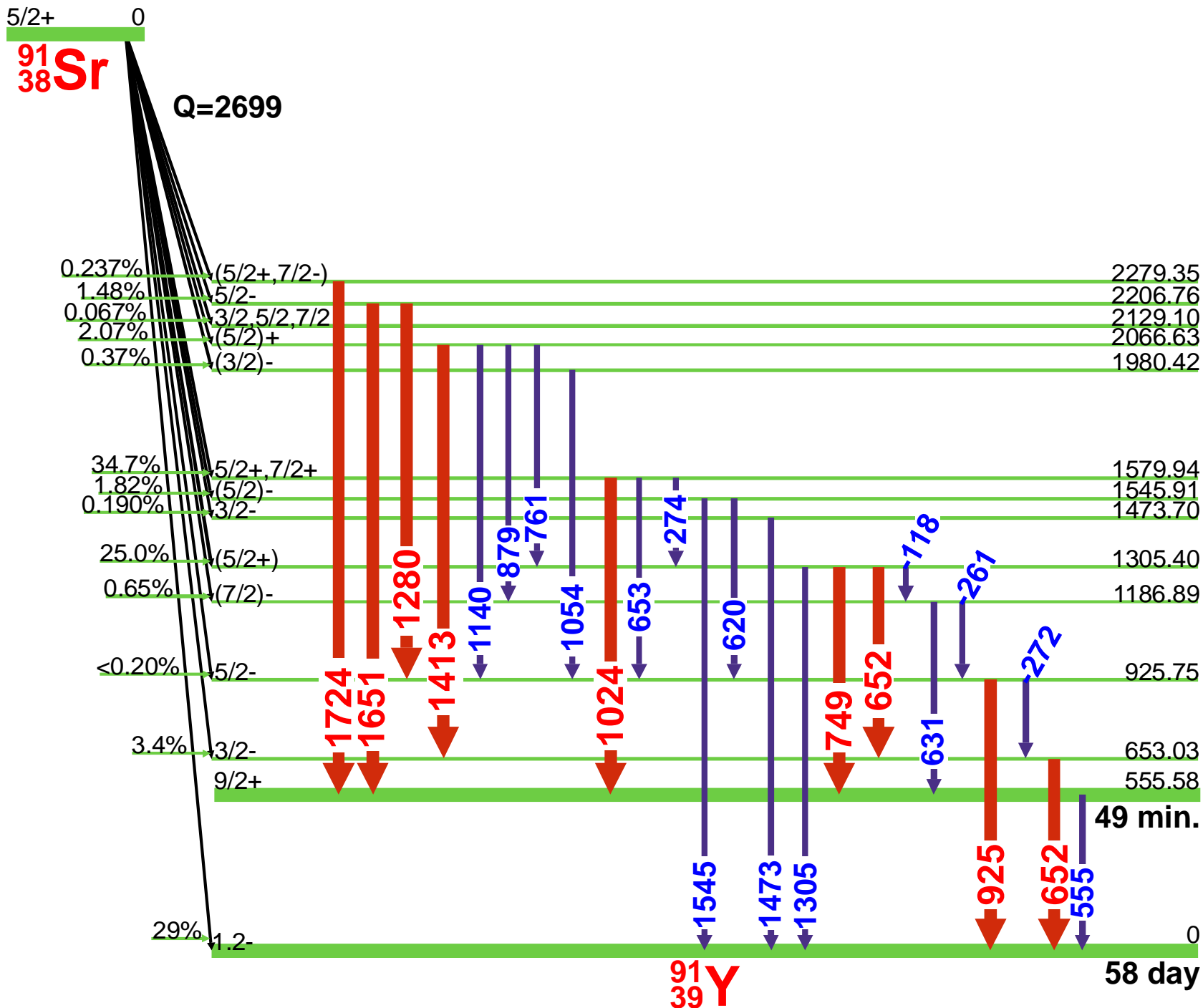
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





9.6 hr.

⁹¹Sr(9.6 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹¹SrE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 9.63(5) hr.

Detector: 45 cm³ coaxial Ge (Li)Method of Production: ²³⁵U(fission)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	118.50	0.20	0.35	0.074	0.006	4
	261.20	0.20	1.60	0.45	0.03	4
	272.6	0.6	0.7	0.26	0.04	4
	274.70	0.20	3.4	1.03	0.08	3
	359.10	0.10		0.050	0.005	4
	379.90	0.10		0.147	0.011	4
	393.00	0.10		0.050	0.005	4
	486.50	0.20		0.080	0.006	4
	506.70	0.10		0.043	0.004	4
	520.8	0.3		0.033	0.004	4
	533.90	0.10		0.077	0.006	4
^{91m} Y	555.57	0.05				
	593.10	0.10		0.094	0.007	4
	620.10	0.10	5.6	1.77	0.13	3
	626.80	0.10		0.043	0.004	4
	631.30	0.10	2.1	0.55	0.04	4
	652.3	0.3		2.97	0.26	
D	652.90	0.20	34.0	8.0	0.6	1
	653.0	2.0		0.37	0.14	
	660.90	0.10		0.100	0.008	4
	749.80	0.10	72.0	23.6	1.6	1
	761.40	0.10	1.9	0.57	0.04	3
	793.60	0.10		0.064	0.006	4
	820.80	0.20		0.160	0.012	4
	823.70	0.10		0.067	0.006	4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	879.70	0.10	0.74	0.187	0.013	4
	892.90	0.10		0.070	0.006	4
	901.30	0.20		0.094	0.007	4
	925.80	0.20	11.8	3.84	0.27	1
	973.90	0.10		0.040	0.004	4
	992.20	0.10		0.043	0.004	4
	1024.30	0.10	100	33.4	2.3	1
	1054.60	0.10	0.75	0.224	0.016	3
	1140.80	0.10	0.6	0.127	0.009	4
	1280.9	0.5	2.8	0.93	0.06	1
	1305.30	0.10	0.24	0.017	0.004	4
	1327.40	0.10		0.040	0.004	4
	1353.50	0.20		0.023	0.004	4
	1413.40	0.10	3.1	0.98	0.07	1
	1473.80	0.10	0.5	0.167	0.012	2
	1486.40	0.10		0.013	0.004	4
	1545.90	0.10	0.23	0.067	0.006	3
	1553.6	0.3		0.017	0.004	4
	1626.8	0.3		0.013	0.004	4
	1646.0	1.0		0.0030	0.0004	4
	1651.4	0.5	0.74	0.291	0.020	1
	1724.0	0.5	0.24	0.160	0.012	1
	2016.0	1.0		0.0040	0.0010	4
	2412.30	0.20		0.0043	0.0010	4



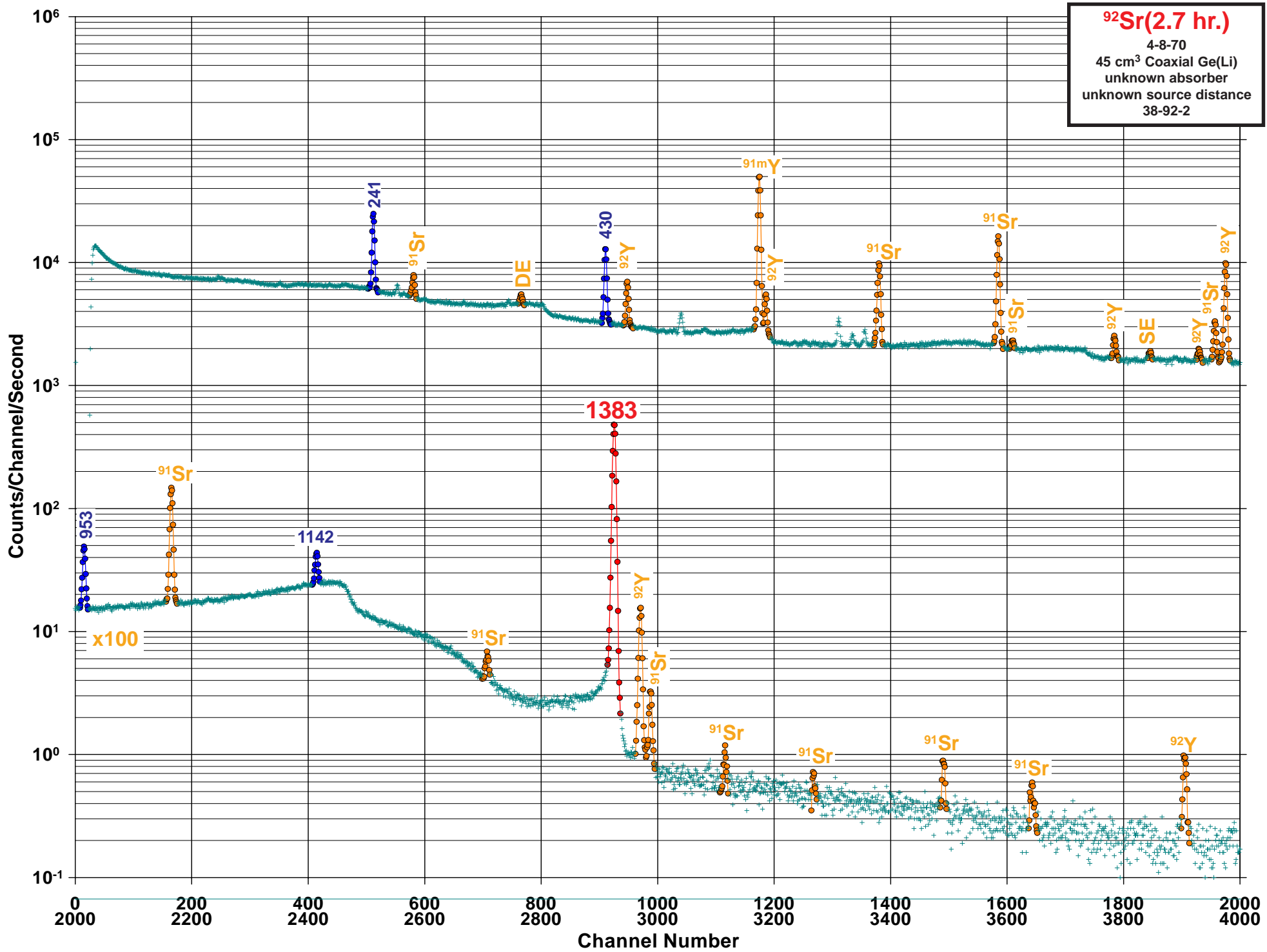
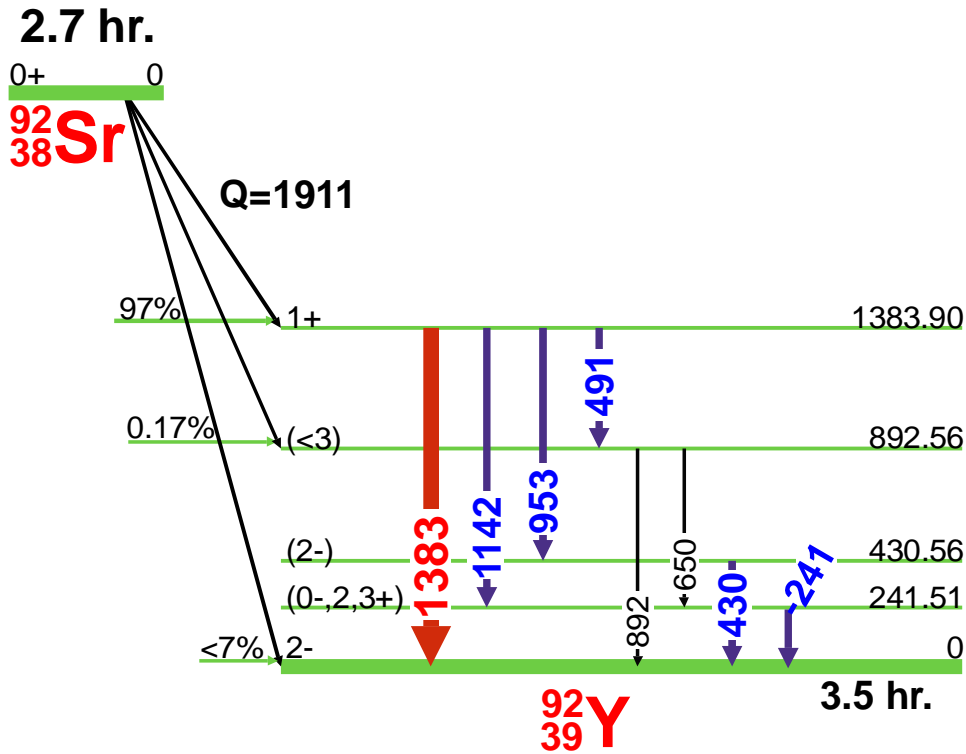


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⁹²Sr(2.7 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹²Sr

Half Life: 2.71(1) day

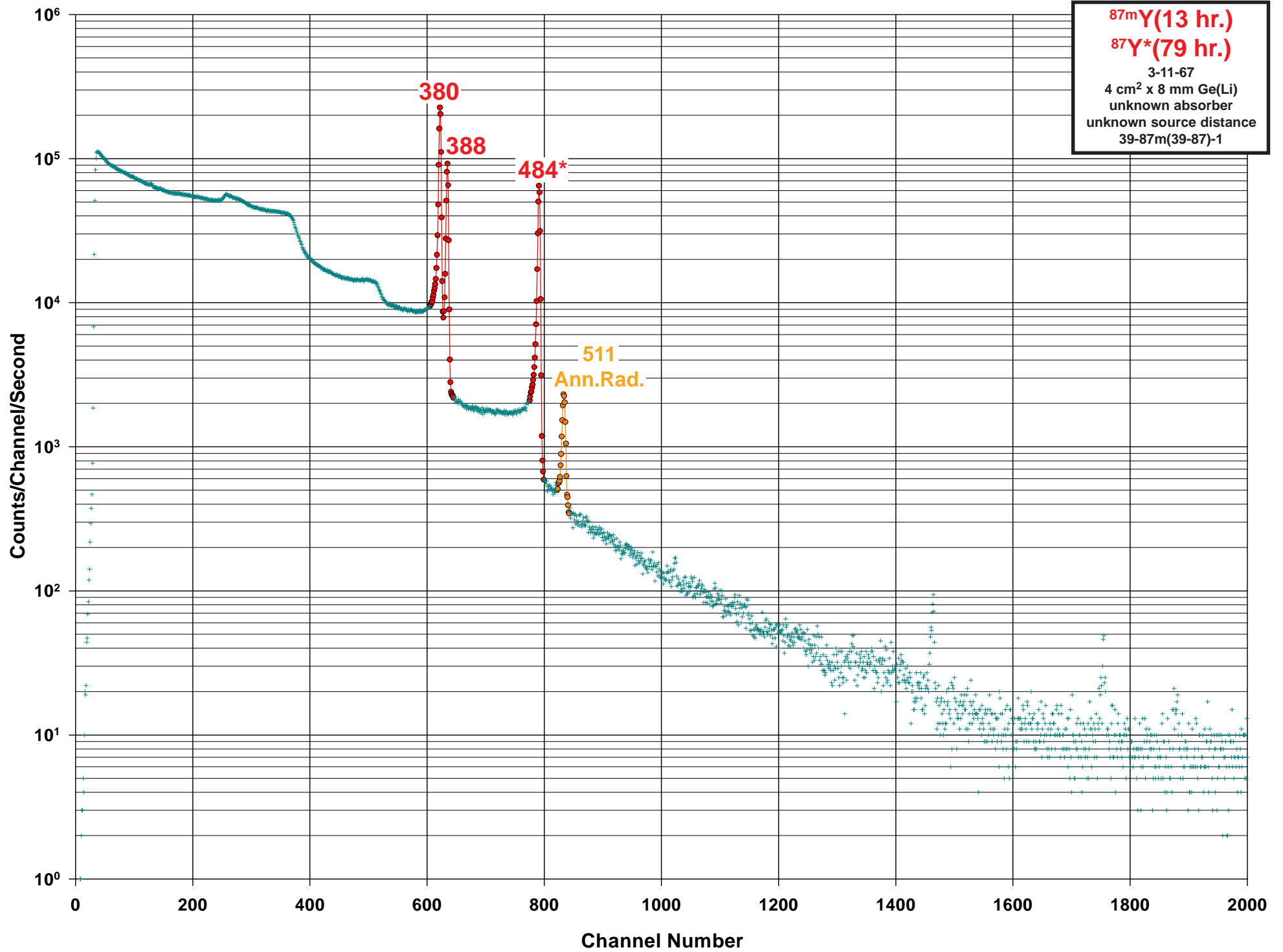
Detector: 45 cm³ coaxial Ge (Li)

Method of Production: ²³⁵U(fission)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
241.56	0.05	3.9	2.90	0.20	3
352.50	0.20	0.09	0.054	0.010	4
430.49	0.03	4.6	3.28	0.24	3
491.27	0.17	0.48	0.27	0.03	4
650.80	0.20		0.37	0.03	4
892.68	0.24		0.080	0.016	4
953.31	0.07	4.2	3.52	0.24	3
1142.35	0.07	3.2	2.79	0.21	3
1383.93	0.05	100	90.	6.	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{87m}\text{Y} - ^{87}\text{Y}^*$

Half Life: 13.37(3)hr. - 79.8(3)hr.*

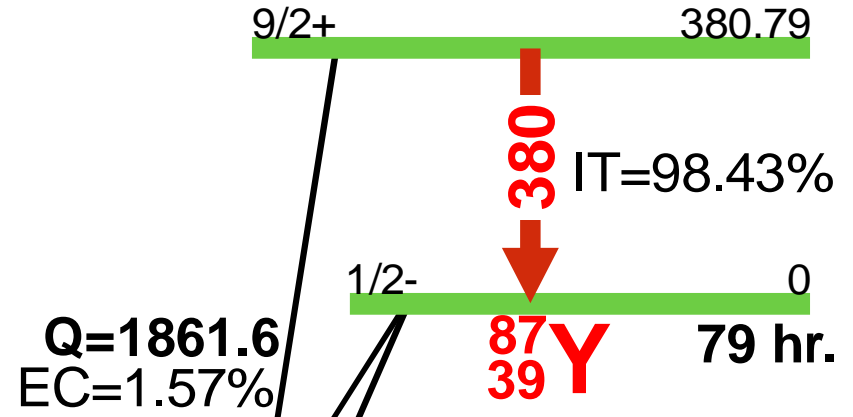
Detector: 4 cm² x 8 mm Ge (Li)

Method of Production: Sr(p,xn)

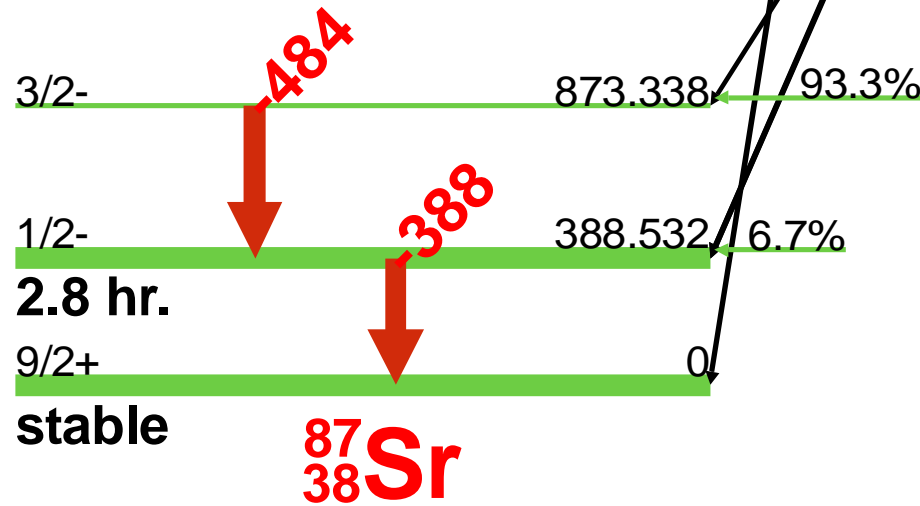
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	380.79	0.07	100	79.3		1
*	388.531	0.003	100	82.1	0.5	1
*	484.805	0.005		89.7	0.6	1
Ann.	511.006			1.48	0.10	2
*Ann.	511.006			0.36	0.04	

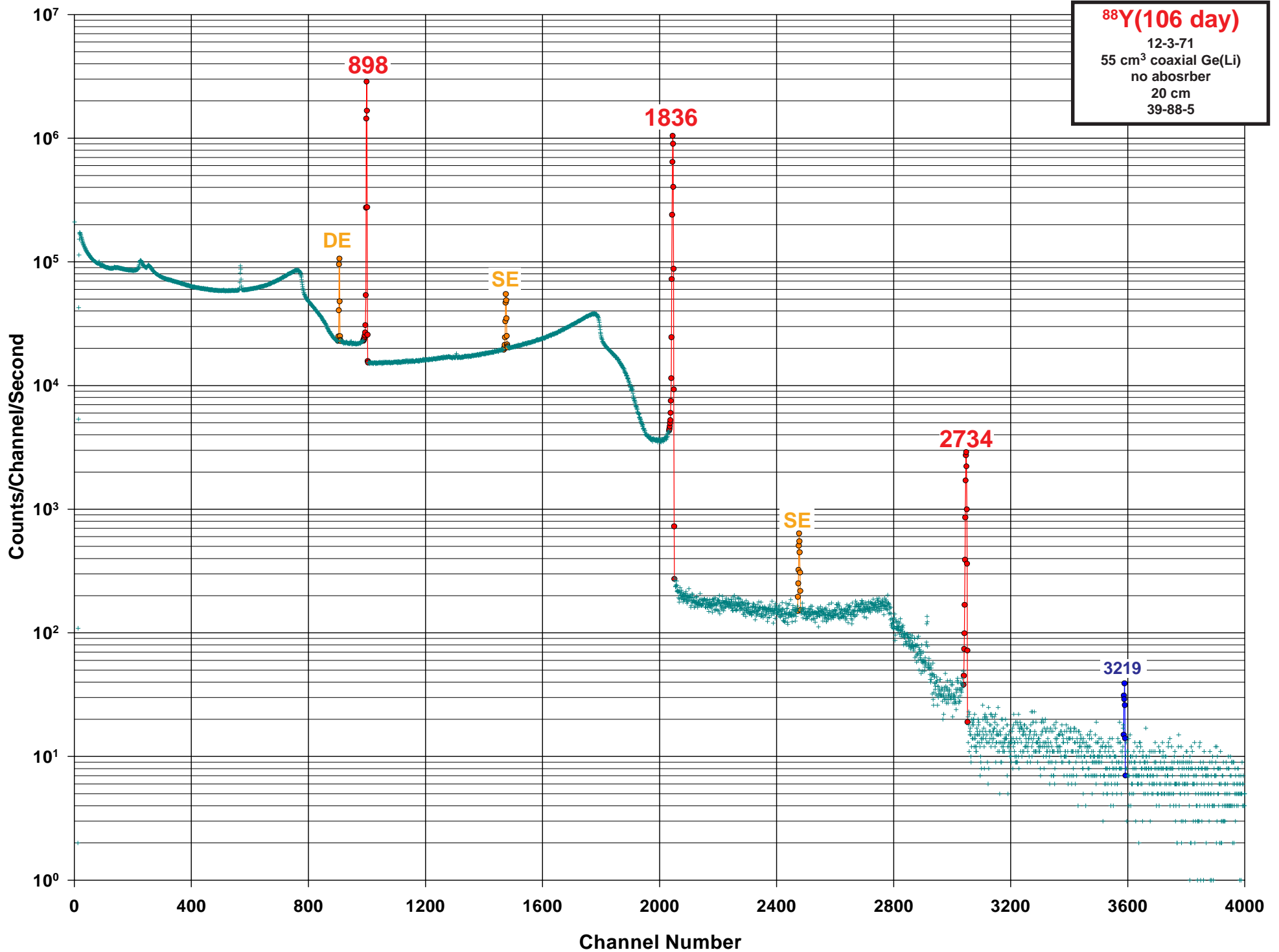
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

**^{87m}Y (13 hr.) Decay Scheme
13 hr.**

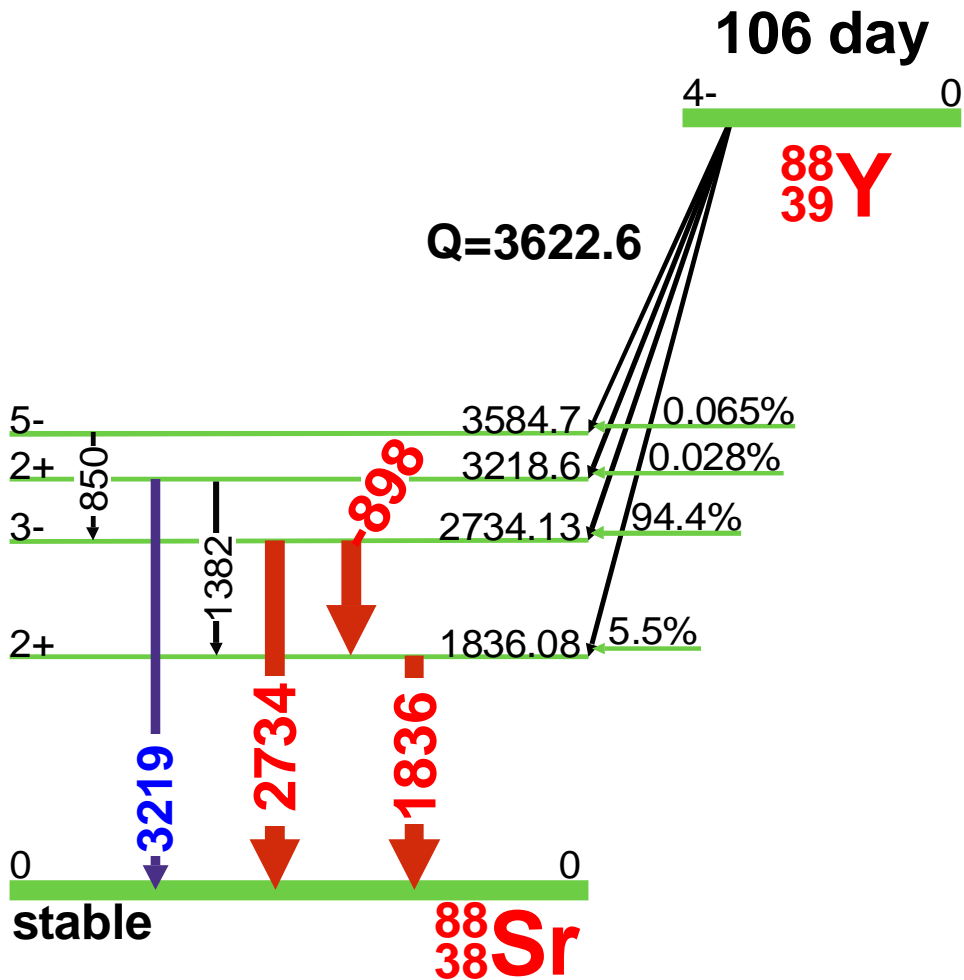


^{87}Y (79 hr.) Decay Scheme





⁸⁸Y(106 day) Decay Scheme



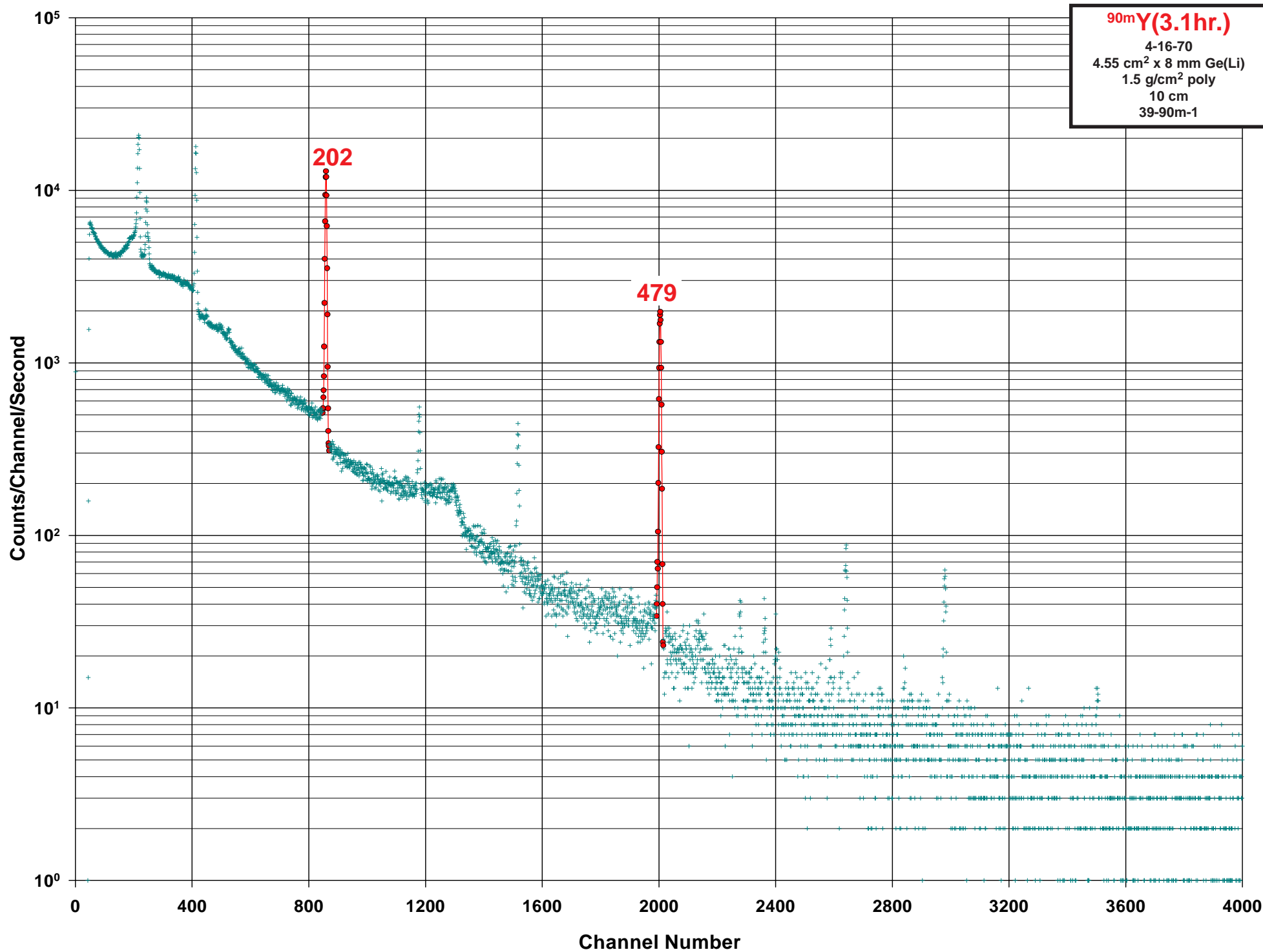
GAMMA-RAY ENERGIES AND INTENSITIES

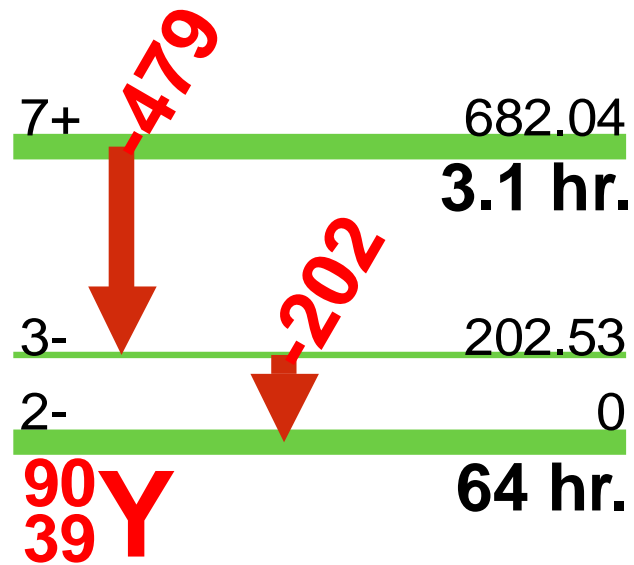
Nuclide: ⁸⁸Y Half Life: 106.65(4) day
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: ⁸⁸Sr(p,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			0.41	0.04	4
	850.6	0.8		0.066	0.013	4
	898.042	0.003	92.12	93.7	0.3	1
	1382.2	1.0		0.021	0.006	4
	1836.063	0.012	100	99.2	0.3	1
	2734.0	0.5	0.54	0.71	0.07	1
	3219.7	2.0	0.007	0.0070	0.0020	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





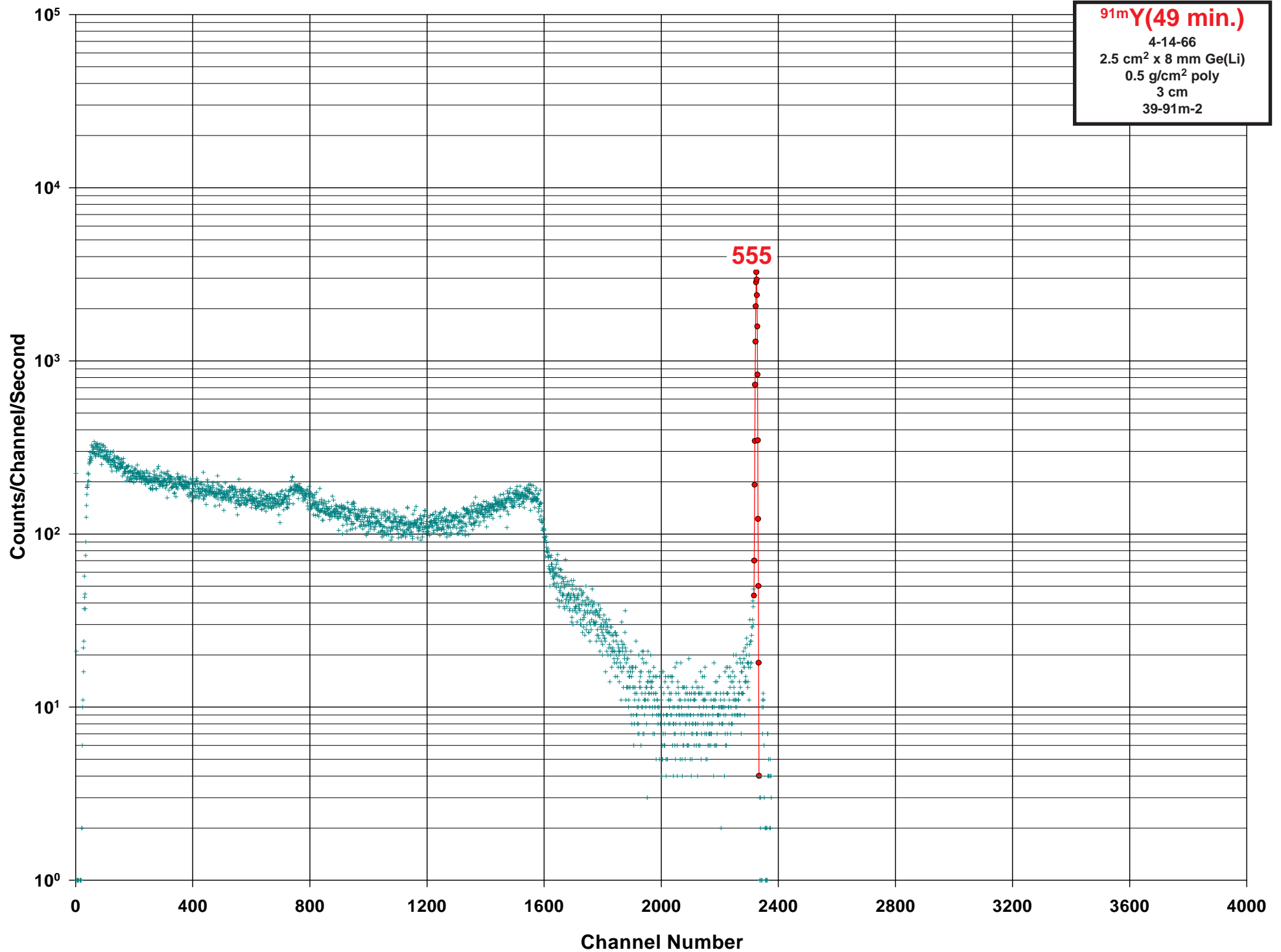
^{90m}Y (3.1 hr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{90m}Y

Half Life: 3.19(6) hr.

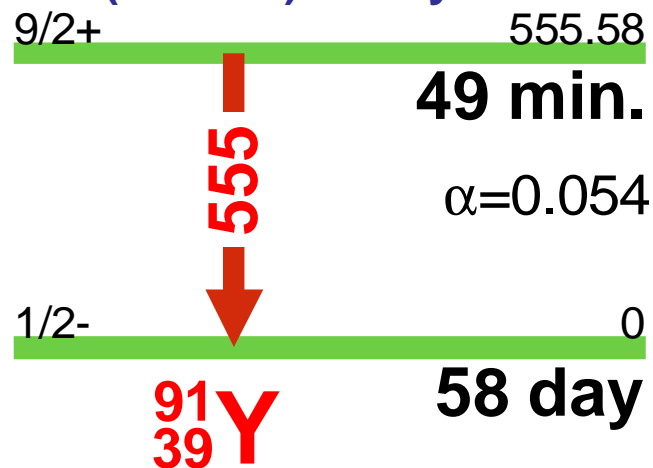
Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{89}\text{Y}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
202.53	0.03	71.9	97.3	0.4	1
479.51	0.05	100	90.7	0.05	1
681.8	0.6		0.319	0.027	4
2318.968	0.010		0.0018		4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



^{91m}Y(49 min.) Decay Scheme



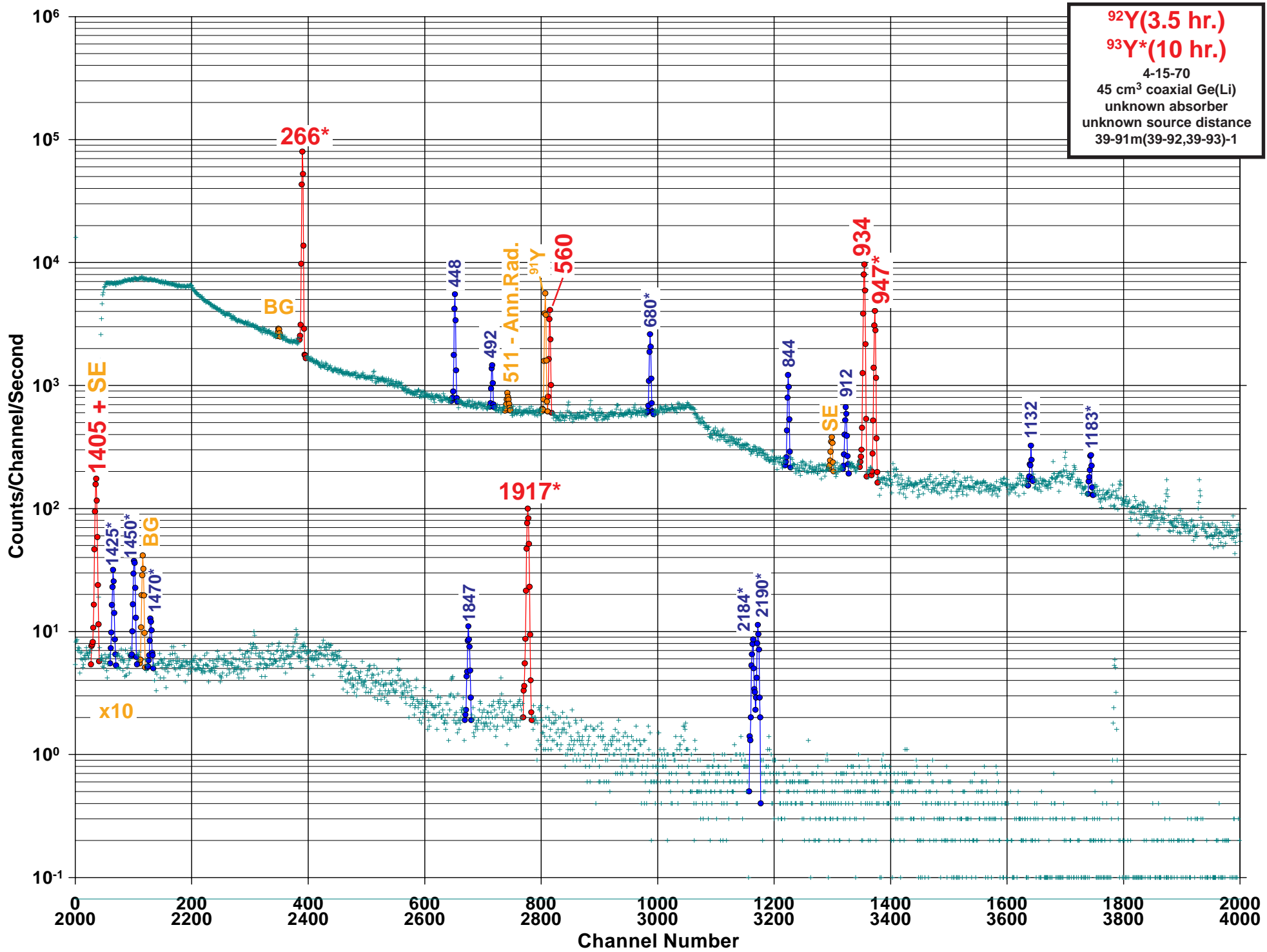
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{91m}Y Half Life: 49.71(4) min.
 Detector: 2.5 cm² x 8 mm Ge (Li) Method of Production: U(n,f)chem.

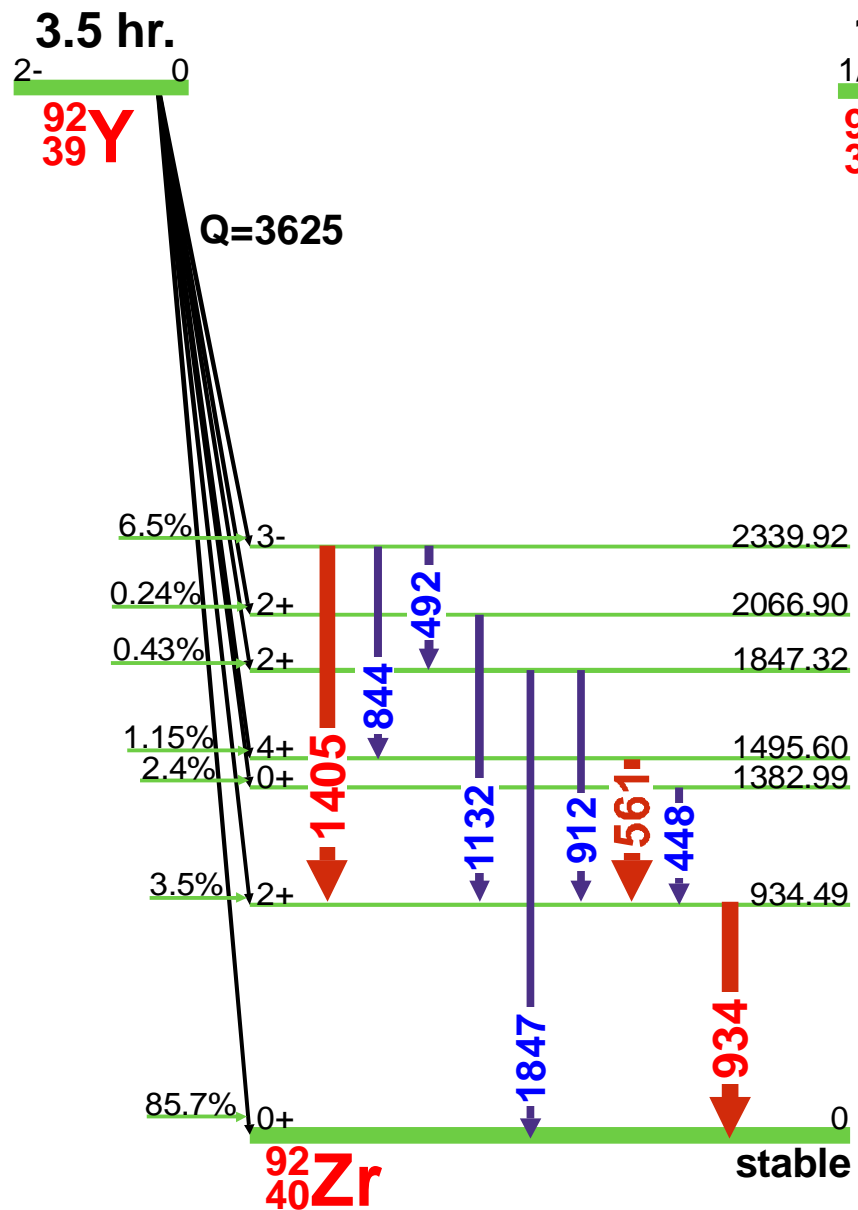
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
555.57	0.05	100	94.9	0.3	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

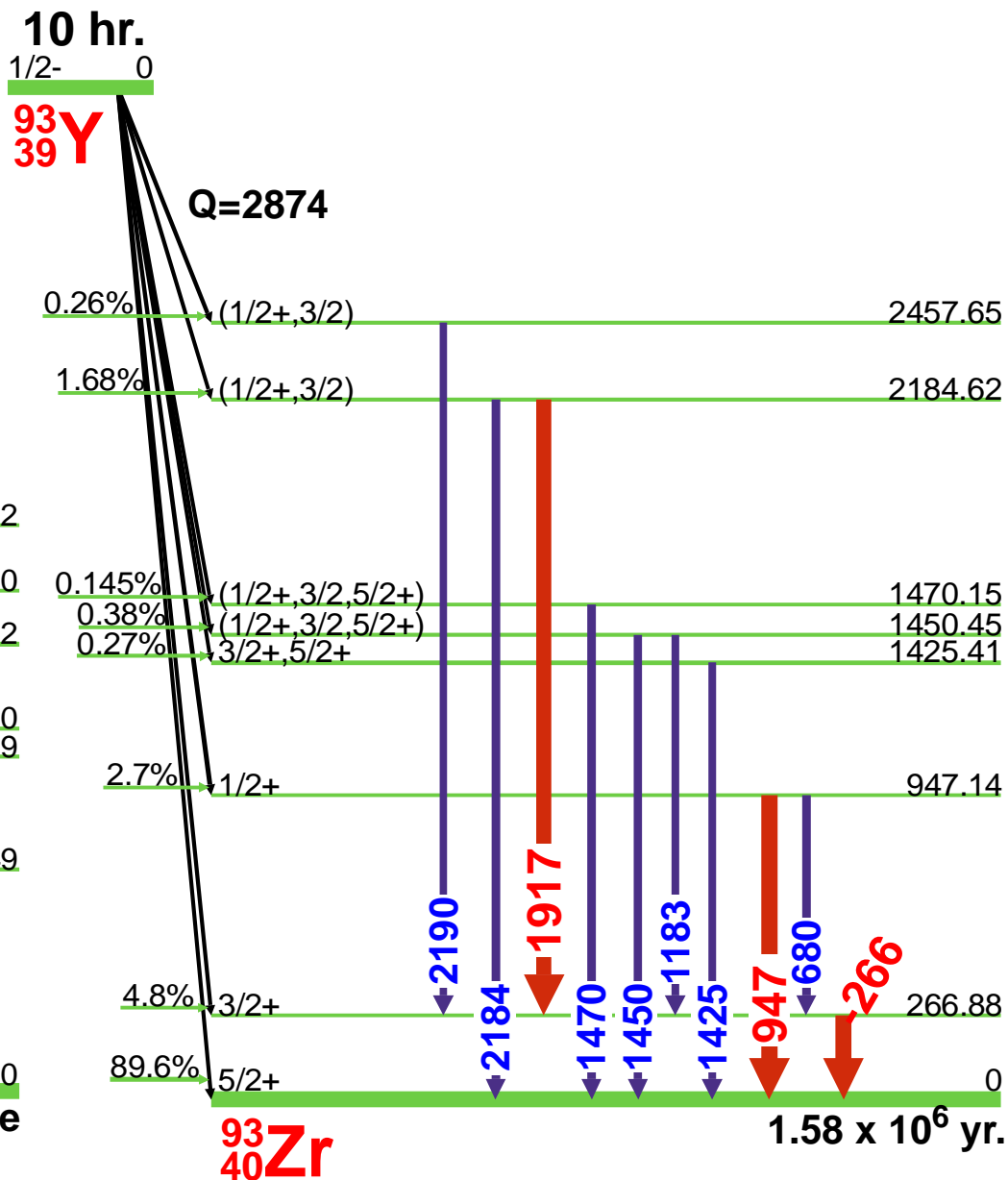




$^{92}\text{Y}(3.5 \text{ hr.})$ Decay Scheme



$^{93}\text{Y}(10 \text{ hr.})$ Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{92}\text{Y} - ^{93}\text{Y}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 3.54(1) hr. - 10.18(8) hr.*

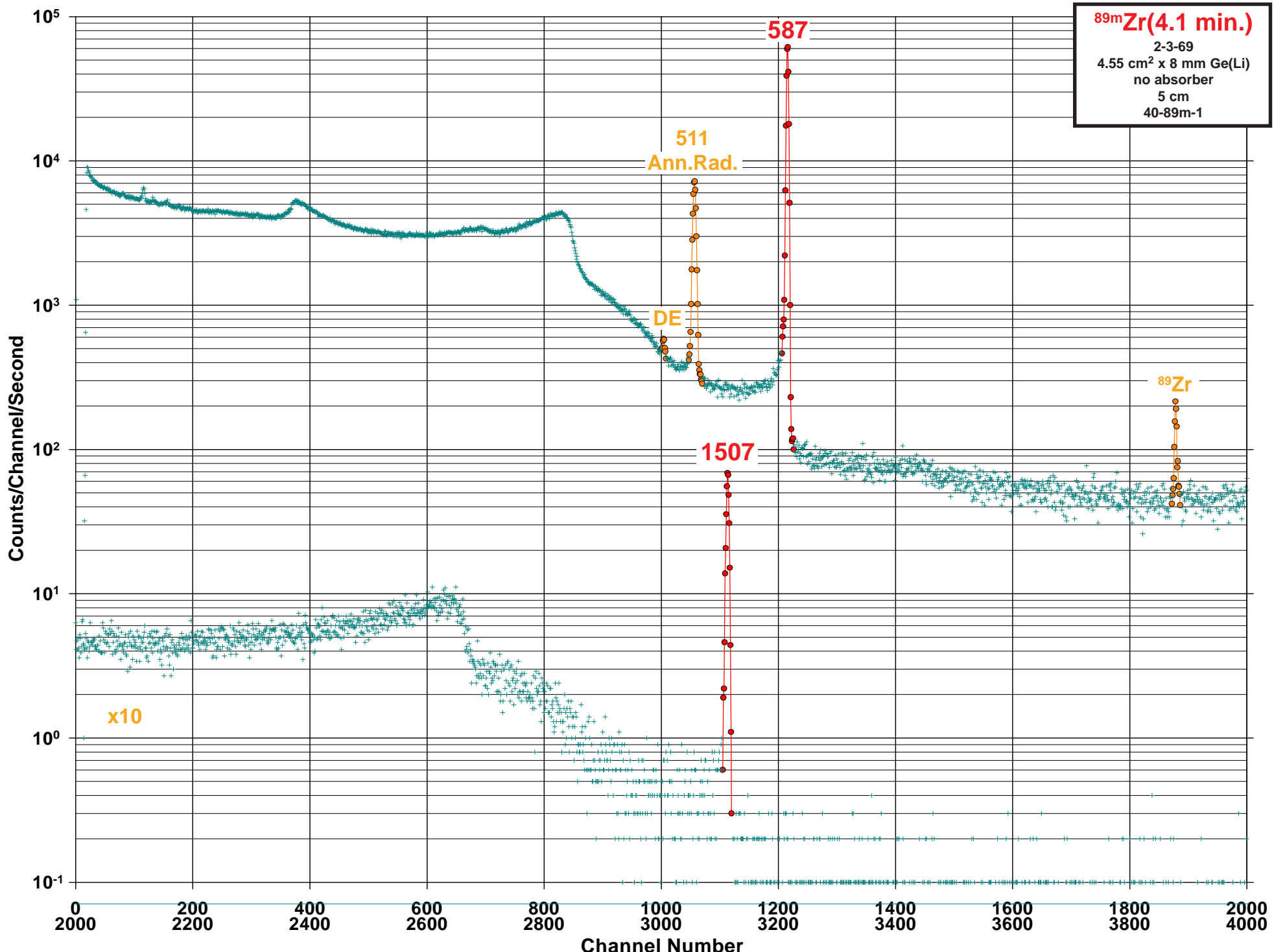
Detector: 45 cm³ coaxial Ge (Li)

Method of Production: U(n,f)chem.

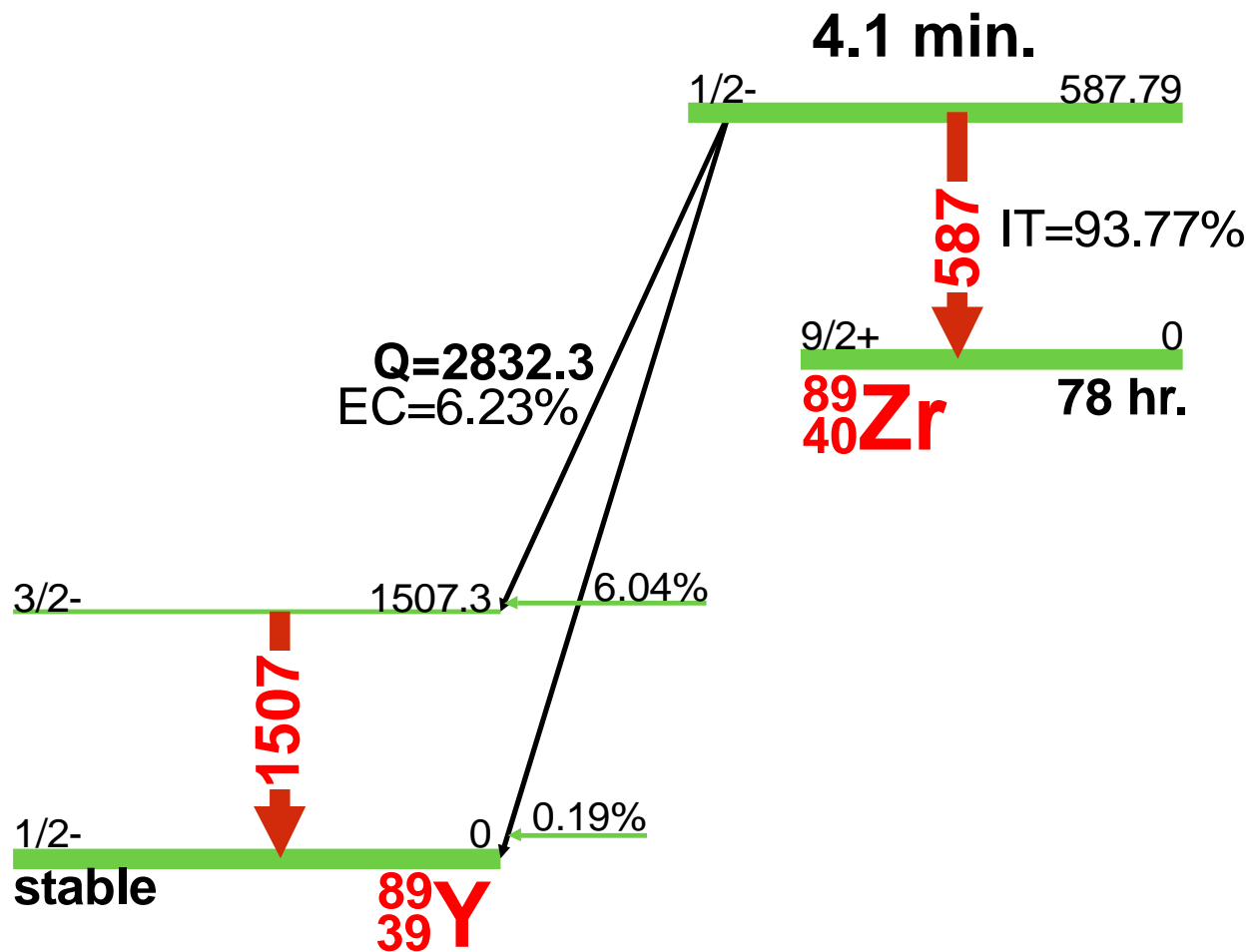
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	266.90	0.10	100	7.3	1.1	1
*	273.0	1.0		0.071	0.018	
*	287.0	1.0		0.075	0.015	
*	341.5	0.5		0.044	0.006	
*	387.5	1.0		0.008	0.005	
	448.50	0.10	20.0	2.34	0.26	2
	492.60	0.10	4.3	0.49	0.05	3
	561.10	0.10	26.9	2.40	0.26	1
*	680.20	0.10	9.5	0.66	0.09	3
*	714.40	0.20		0.017	0.003	
	844.30	0.10	9.3	1.25	0.14	2
	912.8	0.3	5.5	0.63	0.08	3
	934.47	0.07	100	13.9	1.5	1
*	947.10	0.10	27.1	2.1	0.3	1
*	962.30	0.20		0.0120	0.0022	4
*	971.0	0.8		0.0068	0.0024	4
*	972.30	0.20		0.068	0.009	4
*	987.7	0.3		0.0105	0.0027	4
*	1132.40	0.10	1.9	0.243	0.027	4
*	1158.50	0.20		0.030	0.005	4
*	1168.60	0.20		0.011	0.004	4
*	1183.50	0.10	0.98	0.048	0.008	4
*	1184.7	0.6		0.020	0.005	4
*	1203.30	0.10		0.107	0.015	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	1237.40	0.10		0.029	0.008	4
	1383.00	0.00				4
	1405.40	0.10	34.2	4.8	0.5	1
*	1425.40	0.10	3.3	0.24	0.03	3
*	1450.50	0.10	4.6	0.33	0.05	2
*	1470.10	0.10	1.3	0.065	0.015	3
*	1642.70	0.10		0.052	0.008	4
*	1651.70	0.20		0.023	0.004	4
*	1827.80	0.20		0.023	0.004	4
	1847.30	0.10	2.9	0.36	0.04	3
	1885.1	0.3		0.028	0.005	4
*	1917.80	0.10	21.0	1.54	0.21	1
	1988.6	1.2		0.0061	0.0022	4
	2067.0	0.0		0.0014	0.0001	4
	2105.6	0.3		0.019	0.003	4
*	2184.60	0.10	2.3	0.157	0.022	2
*	2190.80	0.20	2.5	0.169	0.025	2
	2339.90	0.10		0.014	0.004	4
	2437.0	0.8		0.0031	0.0014	4
*	2457.3	0.3		0.0068	0.0017	4
	2473.4	0.5		0.0051	0.0015	
*	2473.80	0.20		0.0112	0.0018	4
*	2605.0	3.0		0.011	0.005	4
	2819.8	0.3		0.0042	0.0013	4
	3263.9	0.9		0.0011	0.0004	4
	3371.2	0.6		0.0031	0.0005	4





^{89m}Zr(4.1 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{89m}Zr

Half Life: 4.18(1) min.

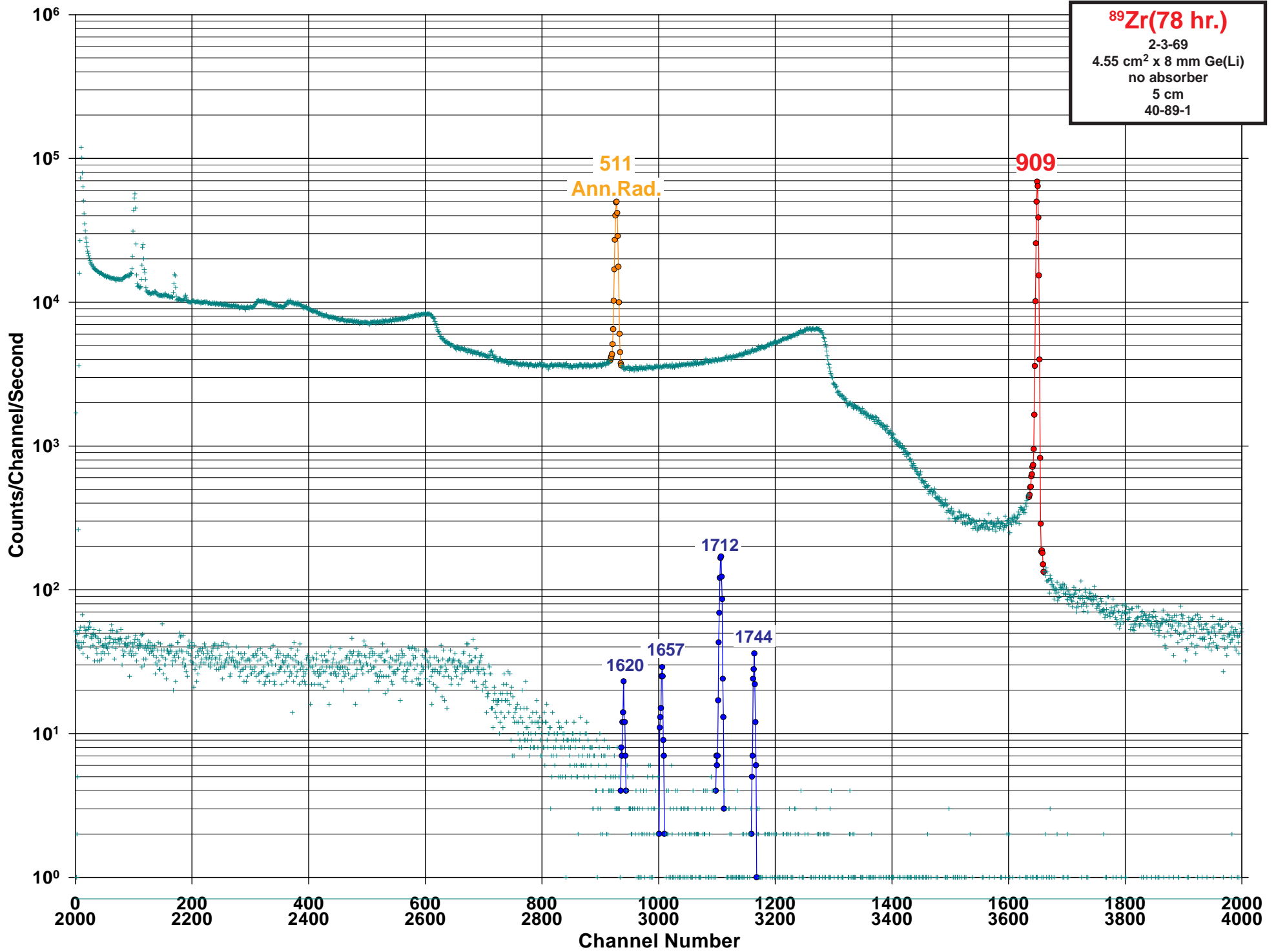
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁹⁰Zr(γ,n)

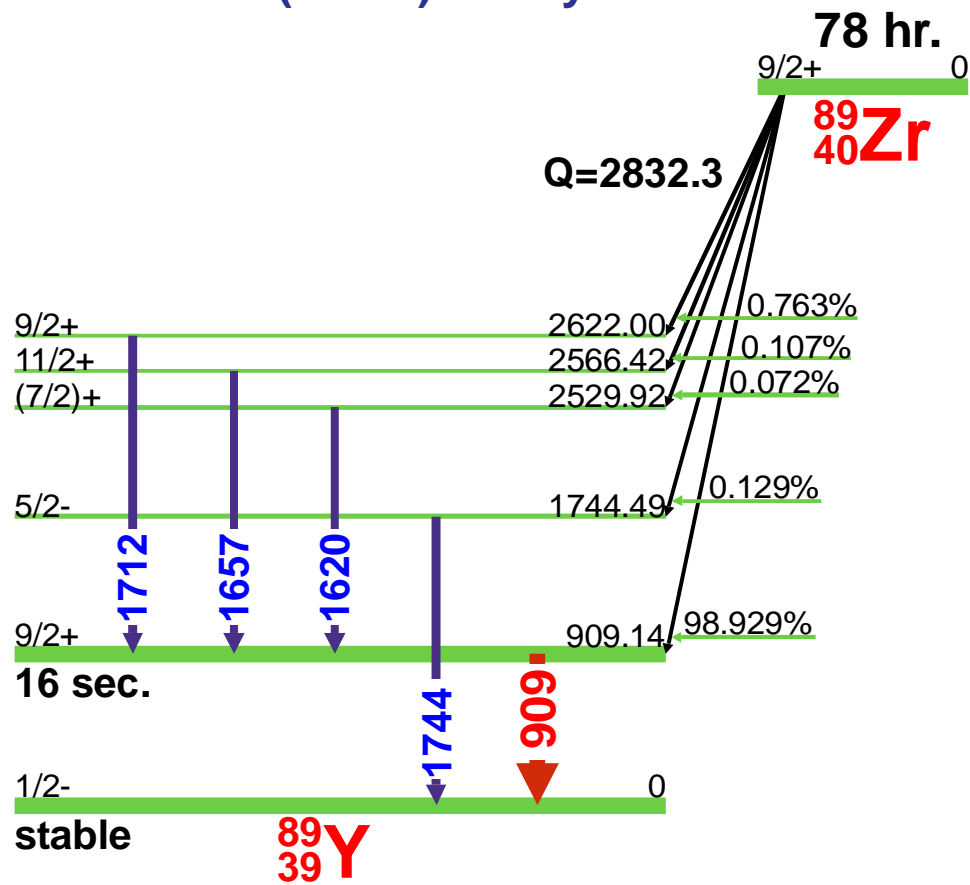
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
Ann.	511.006			3.00	0.04	1
	587.79	0.1	100	89.51	0.17	1
	1507.3	0.4	7	6.08	0.21	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁸⁹Zr(78 hr.) Decay Scheme



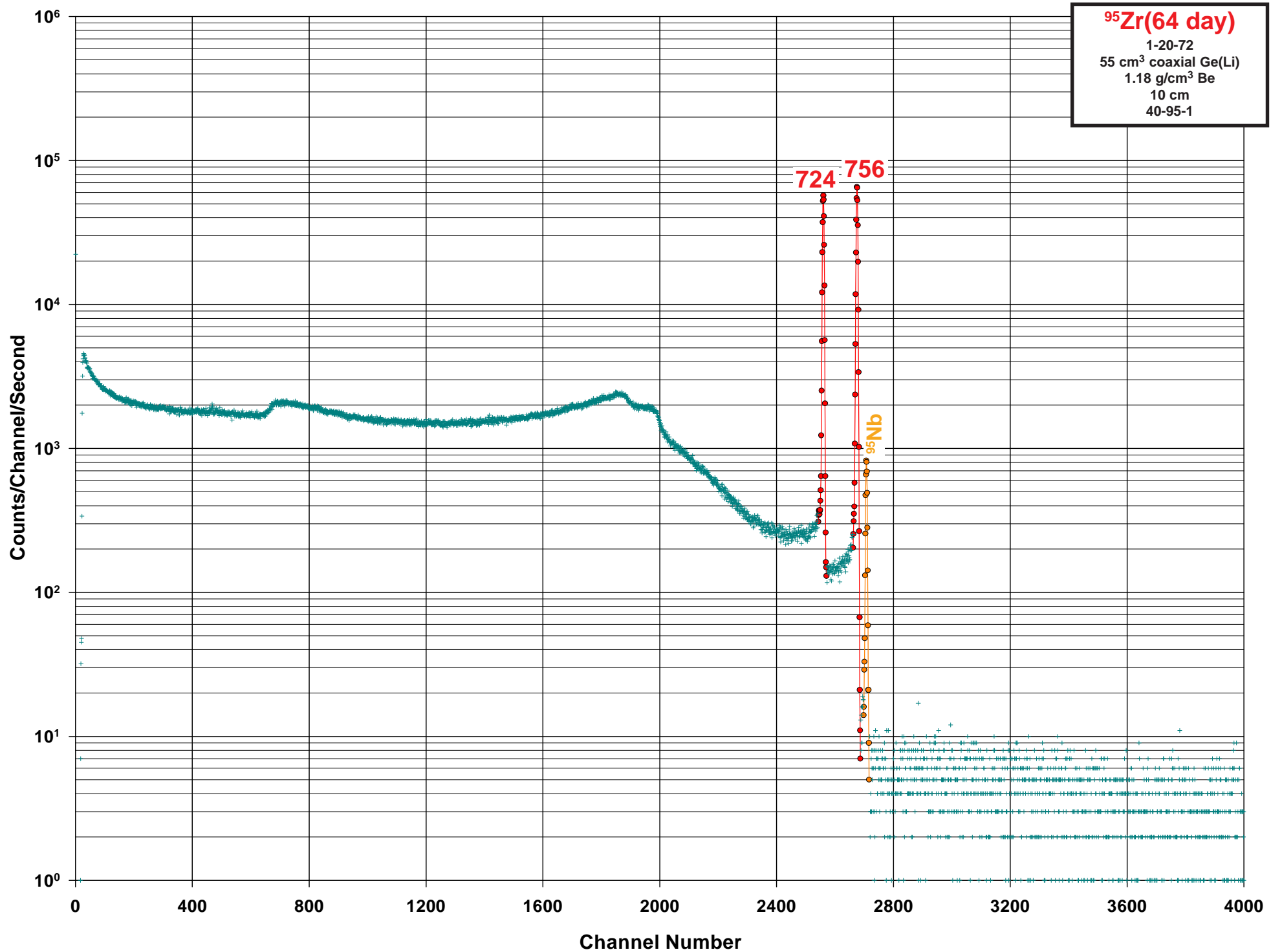
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁸⁹Zr Half Life: 78.41(12) hr.
 Detector: 4.55 cm² x 8 mm Ge (Li) Method of Production: ⁹⁰Zr(γ,n)

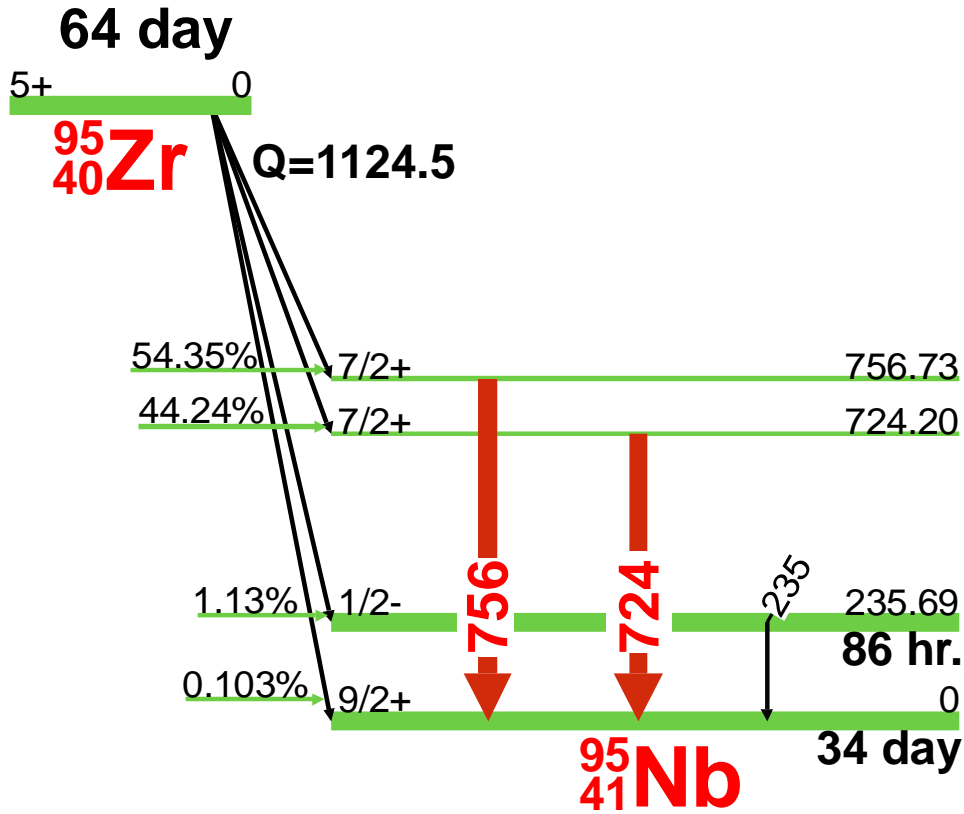
Ann.	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	511.006			45.1	0.6	1
	909.14	0.07	100	99.871	0.003	1
	1620.76	0.19	0.07	0.072	0.005	3
	1657.26	0.19	0.10	0.107	0.004	2
	1712.8	0.4	0.75	0.763	0.013	2
	1744.47	0.19	0.13	0.129	0.003	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁹⁵Zr(64 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹⁵Zr

Half Life: 64.02(5) day

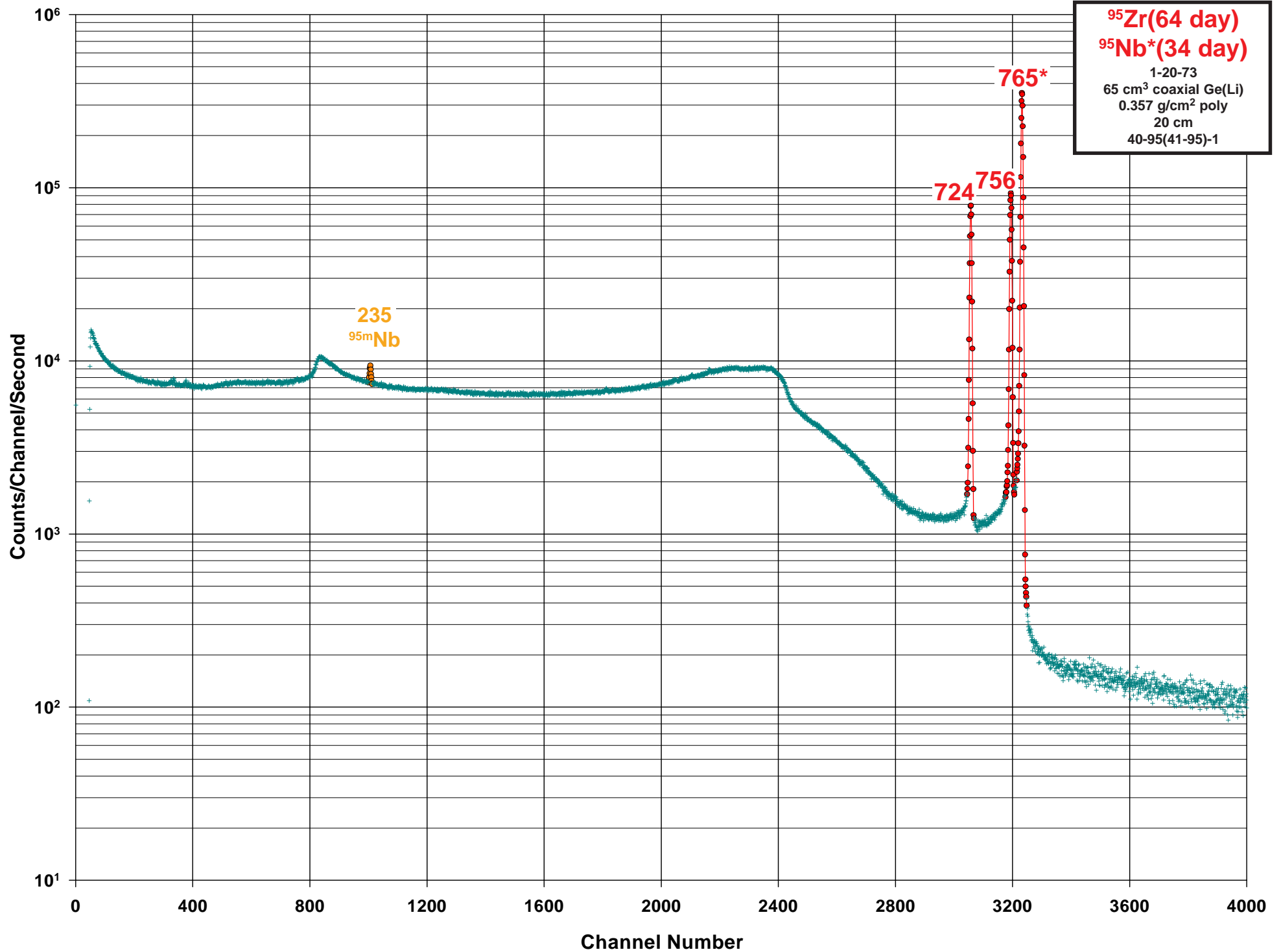
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ⁹⁴Zr(n,γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
235.69	0.02	0.44	0.294	0.016	4
724.199	0.005	80.6	44.17	0.15	1
756.729	0.012	100	54.46	0.10	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



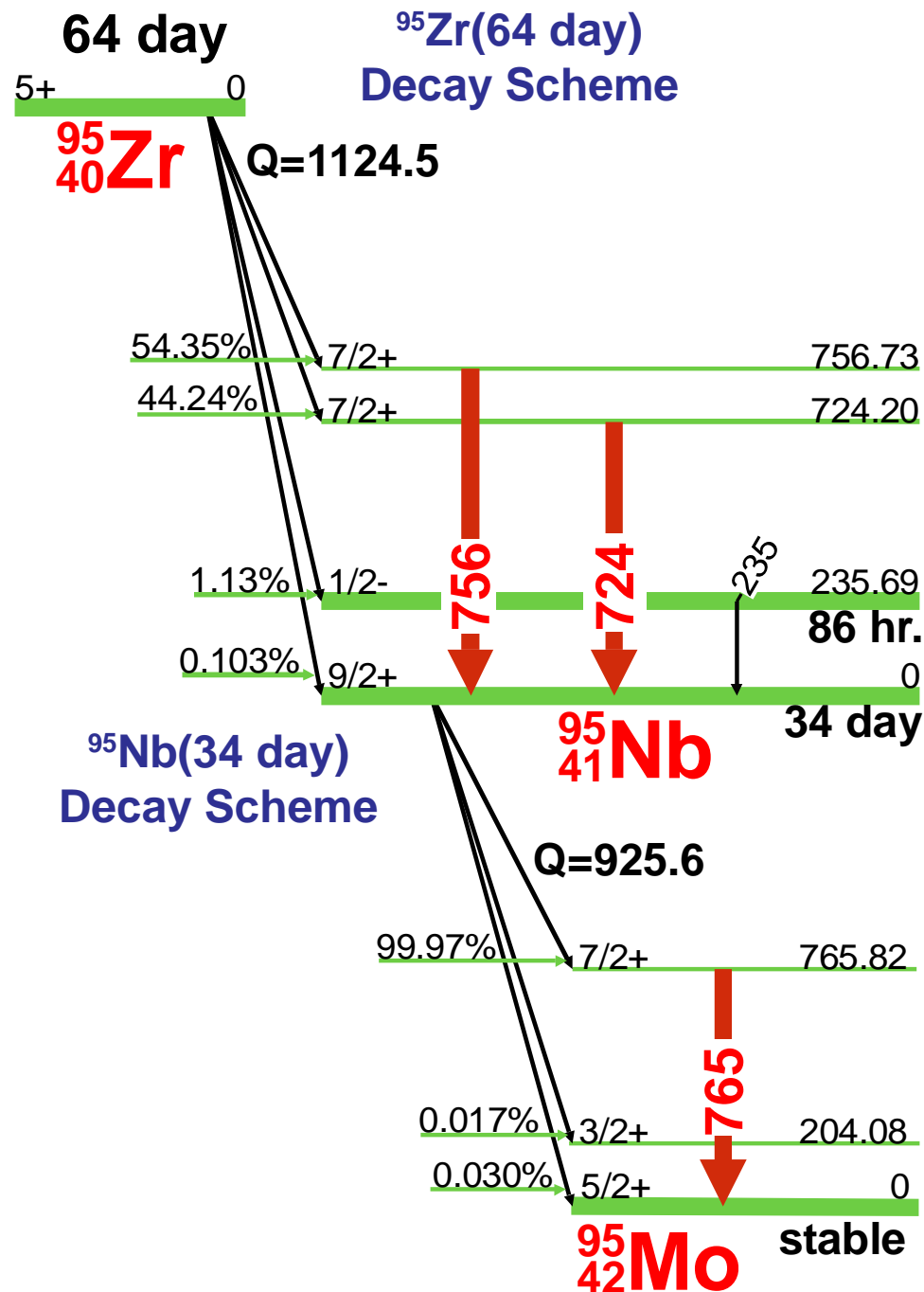


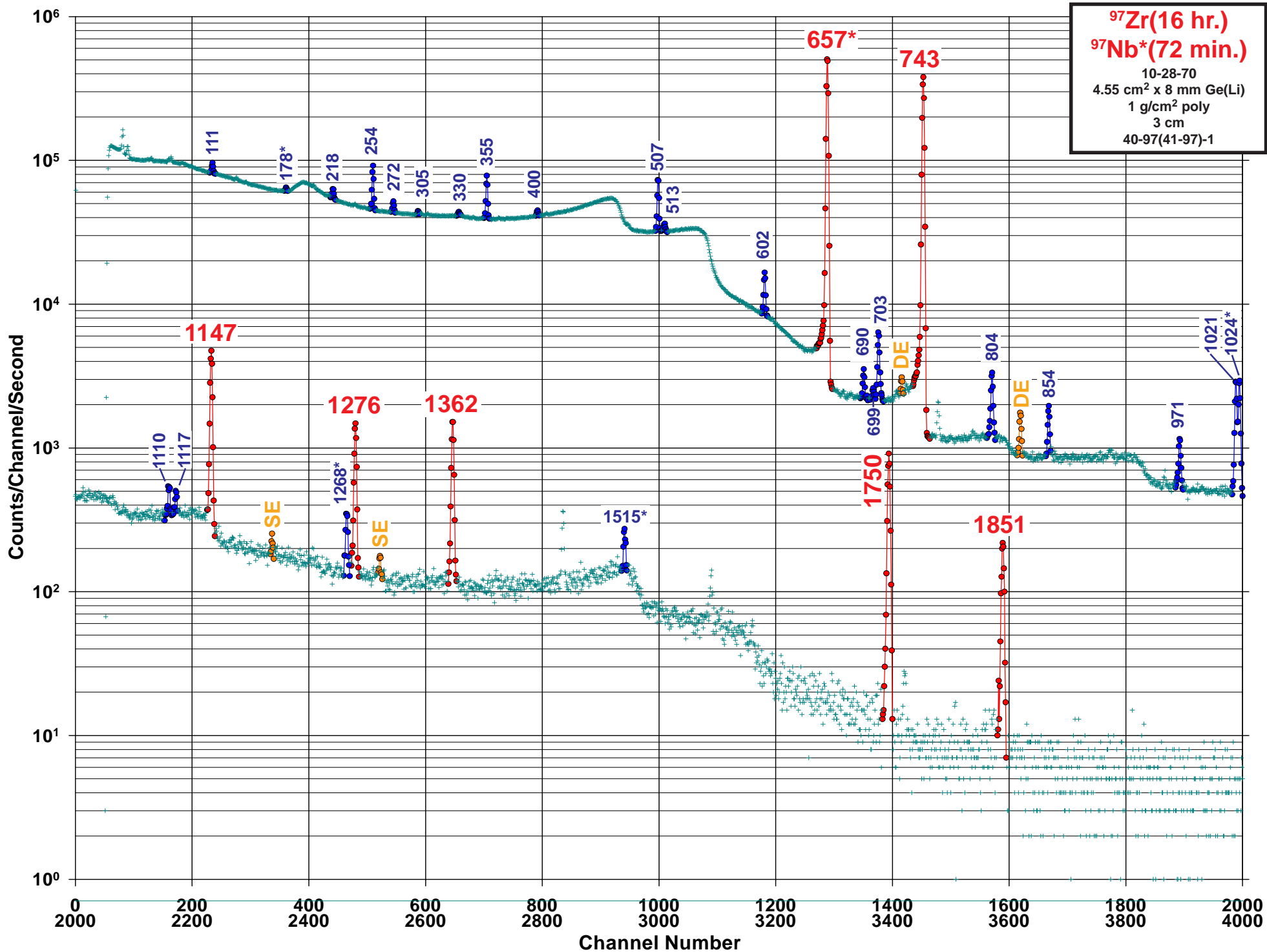
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{95}\text{Zr} - ^{95}\text{Nb}^*$ Half Life: 64.02(5) day – 34.975(7) day*
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: $^{94}\text{Zr}(n,\gamma)$

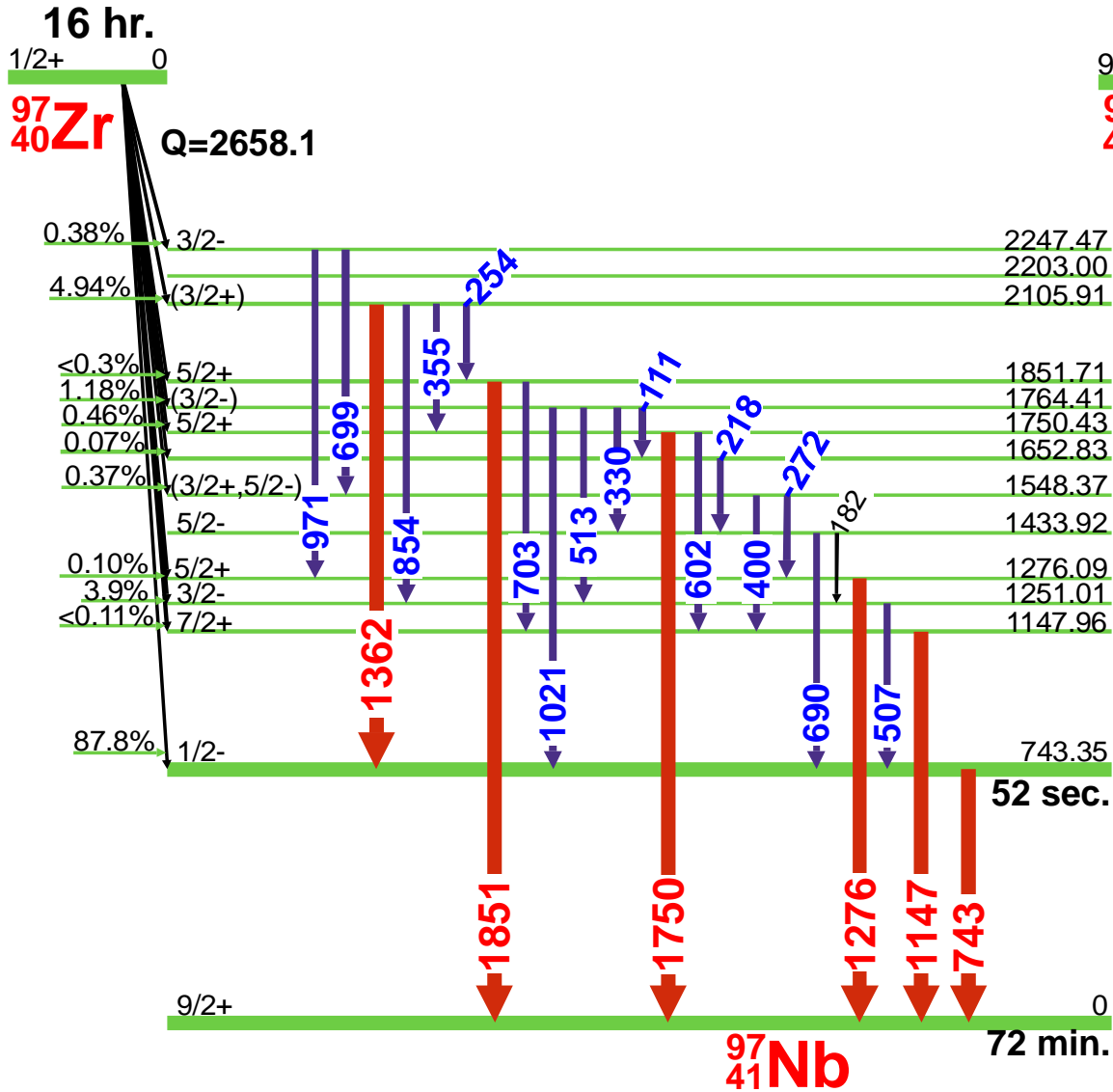
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	204.120	0.010		0.028	0.009	4
	235.69	0.02		0.294	0.016	4
*	561.880	0.020		0.013	0.003	4
	724.199	0.005	80.6	44.17	0.15	1
	756.729	0.012	100	54.46	0.10	1
*	765.807	0.006	100	99.81	0.03	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

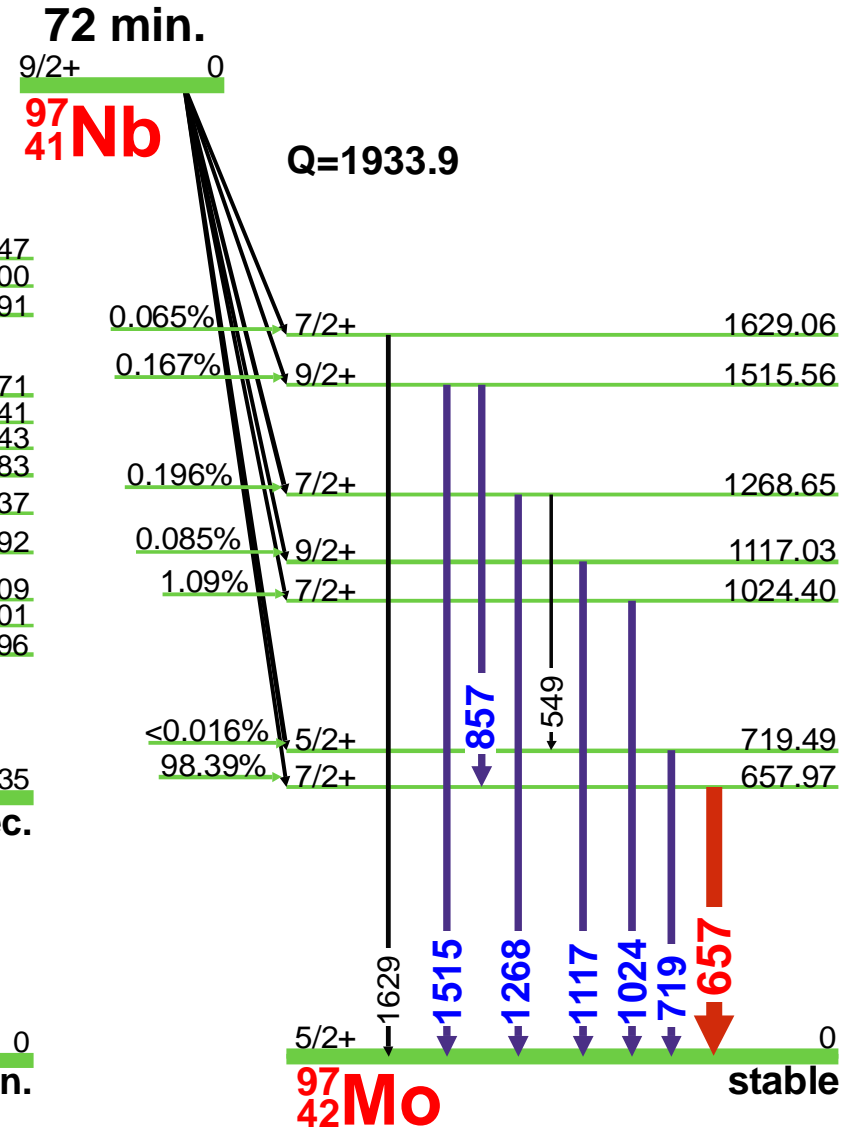




⁹⁷Zr(16 hr.) Decay Scheme



⁹⁷Nb(72 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{97}\text{Zr} - ^{97}\text{Nb}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

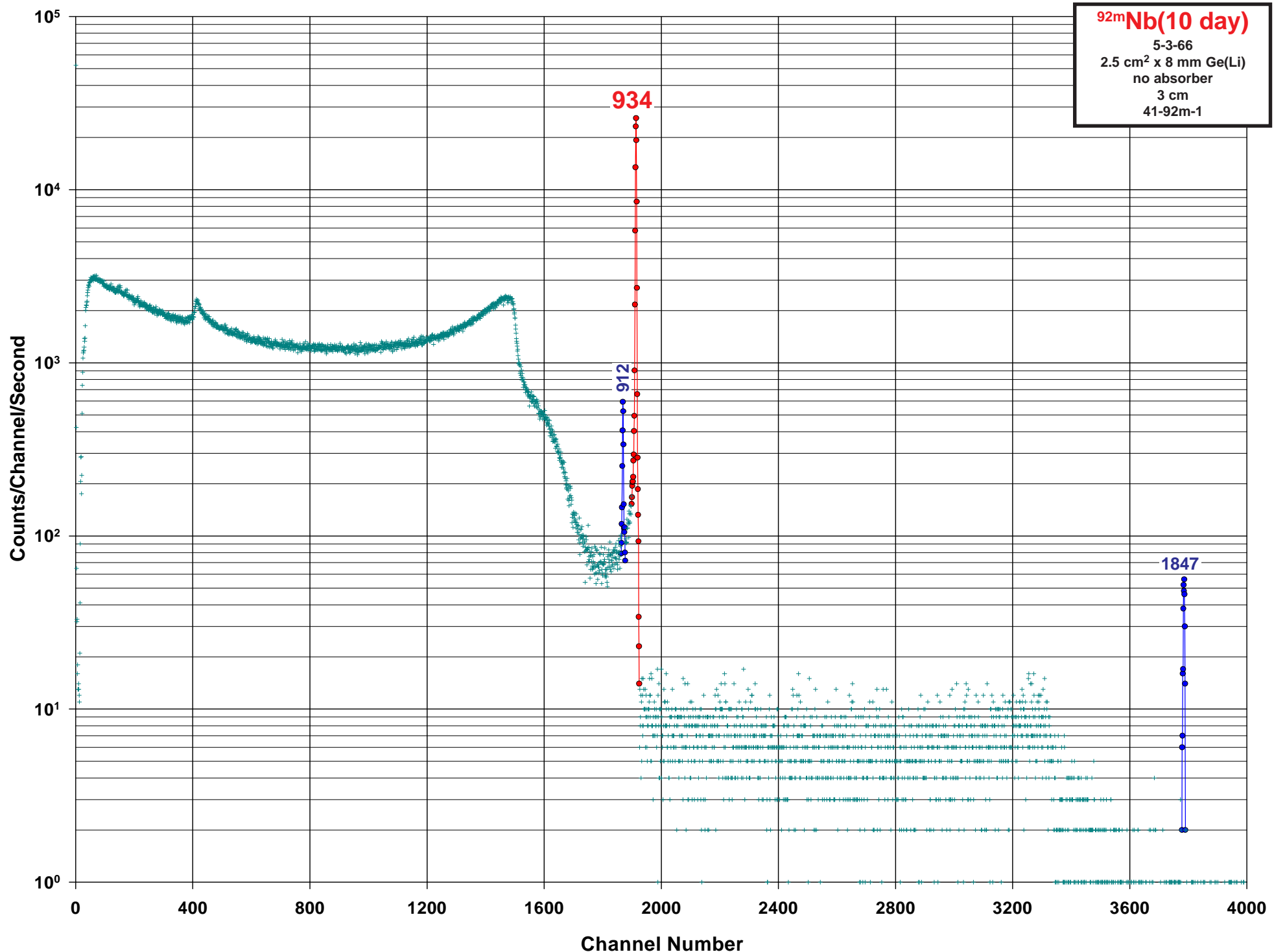
Half Life: 16.90(5) hr. – 72.1(7) min.*

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{96}\text{Zr}(n,\gamma)$

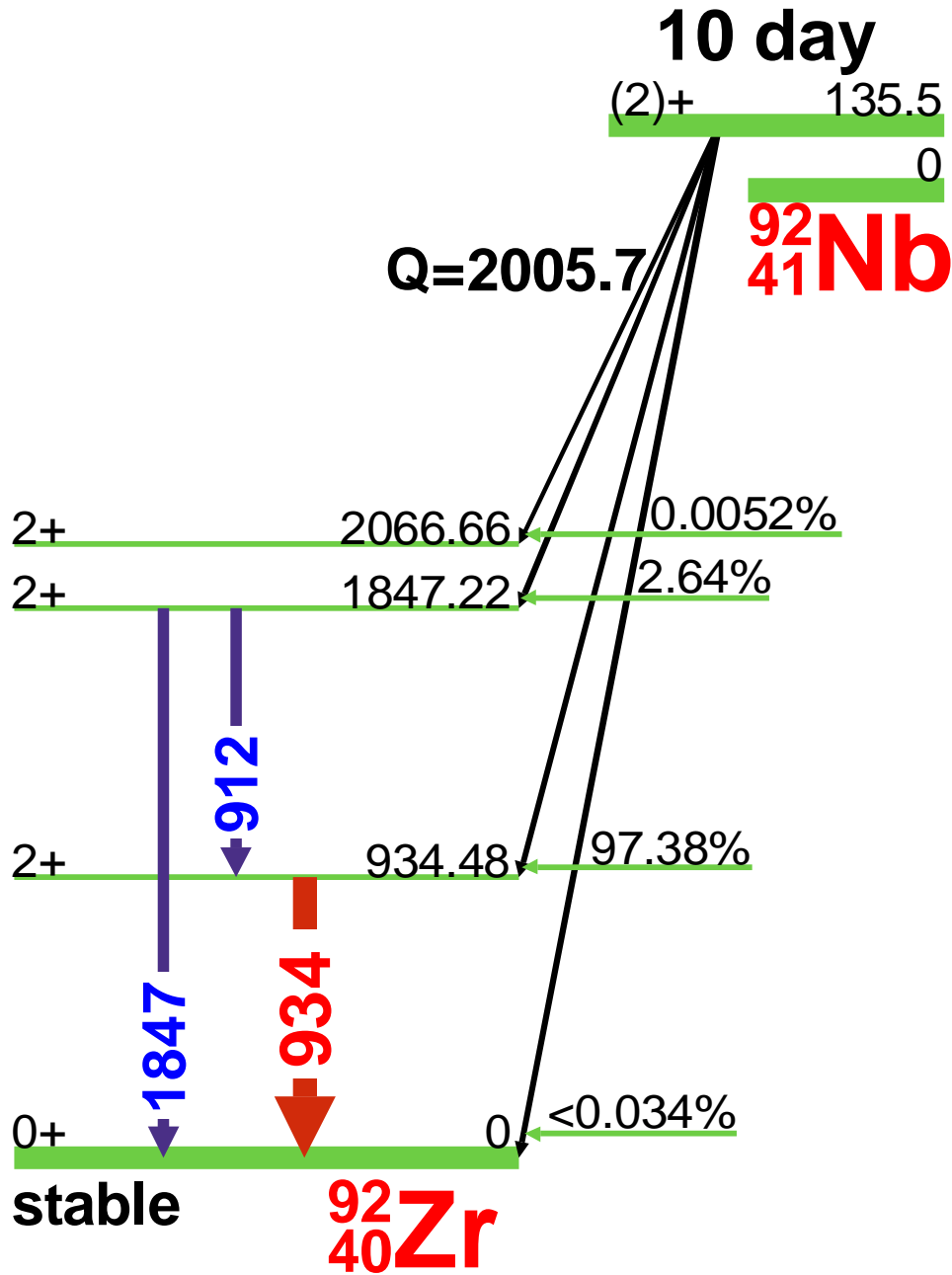
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	111.6	0.3	0.115	0.065	0.009	2
*	178.0	0.3		0.049	0.010	4
	182.9	0.5	0.072	0.032	0.006	4
	202.5	0.6		0.029	0.008	4
	218.90	0.20	0.292	0.168	0.019	4
*	238.4	0.3		0.049	0.010	4
	254.17	0.14	1.42	1.14	0.07	3
	272.40	0.16	0.32	0.233	0.028	4
	294.8	0.4		0.084	0.028	4
	297.2	0.3		0.066	0.011	4
	305.1	0.9		0.028	0.019	4
	330.43	0.19	0.25	0.143	0.015	4
	355.40	0.09	2.39	2.09	0.09	3
	400.42	0.16	0.247	0.245	0.016	4
	410.0	1.0		0.07	0.05	4
	473.5	0.6		0.07	0.04	4
	507.64	0.08	5.35	5.03	0.19	3
	513.41	0.18	0.60	0.55	0.05	4
*	549.25	0.20		0.049	0.010	4
	558.0	1.0		0.028	0.019	4
	600.6	0.6		0.1861	0.0003	4
	602.37	0.14	1.75	1.38	0.07	4
*	657.94	0.09	108.8	98.23	0.08	1
	690.52	0.16	0.29	0.183	0.018	4
	699.2	0.3	0.07	0.100	0.020	4
	703.76	0.05	1.10	1.01	0.05	3
	707.4	0.6		0.032	0.017	4
*	719.53	0.19		0.090	0.009	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	743.36	0.03	100	93.06	0.16	1
	772.0	3.0		0.24	0.13	4
	775.0	0.8		0.1861	0.0003	4
	804.52	0.09	0.72	0.61	0.07	3
	805.6	0.8		0.2792	0.0005	4
	829.79	0.09		0.239	0.018	4
	854.89	0.08	0.38	0.356	0.022	3
*	857.46	0.21		0.045	0.007	4
	971.34	0.15	0.32	0.278	0.017	3
	1018.1	0.8		0.3722	0.0006	4
	1021.2	0.3	1.36	1.01	0.17	2
*	1024.4	0.3	0.11	1.09	0.07	4
	1026.7	0.8		0.2792	0.0005	4
	1110.44	0.19	0.10	0.093	0.019	4
*	1117.02	0.18	w	0.086	0.008	4
D	1147.	0.08		2.62	0.10	
	1148.6*	0.3	2.59	0.049	0.010	1
*	1268.62	0.10	0.14	0.147	0.020	4
	1276.07	0.09	0.90	0.94	0.06	1
D	1361.0	0.8		0.6514	0.0011	
	1362.68	0.09	1.14	1.02	0.10	1
*	1515.66	0.19		0.122	0.013	4
*	1629.09	0.22		0.025	0.007	4
	1750.24	0.22	1.13	1.09	0.10	1
	1851.61	0.09	0.32	0.307	0.028	1
	2203.0	2.0				4





^{92m}Nb(10 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{92m}Nb

Half Life: 10.15(2) day

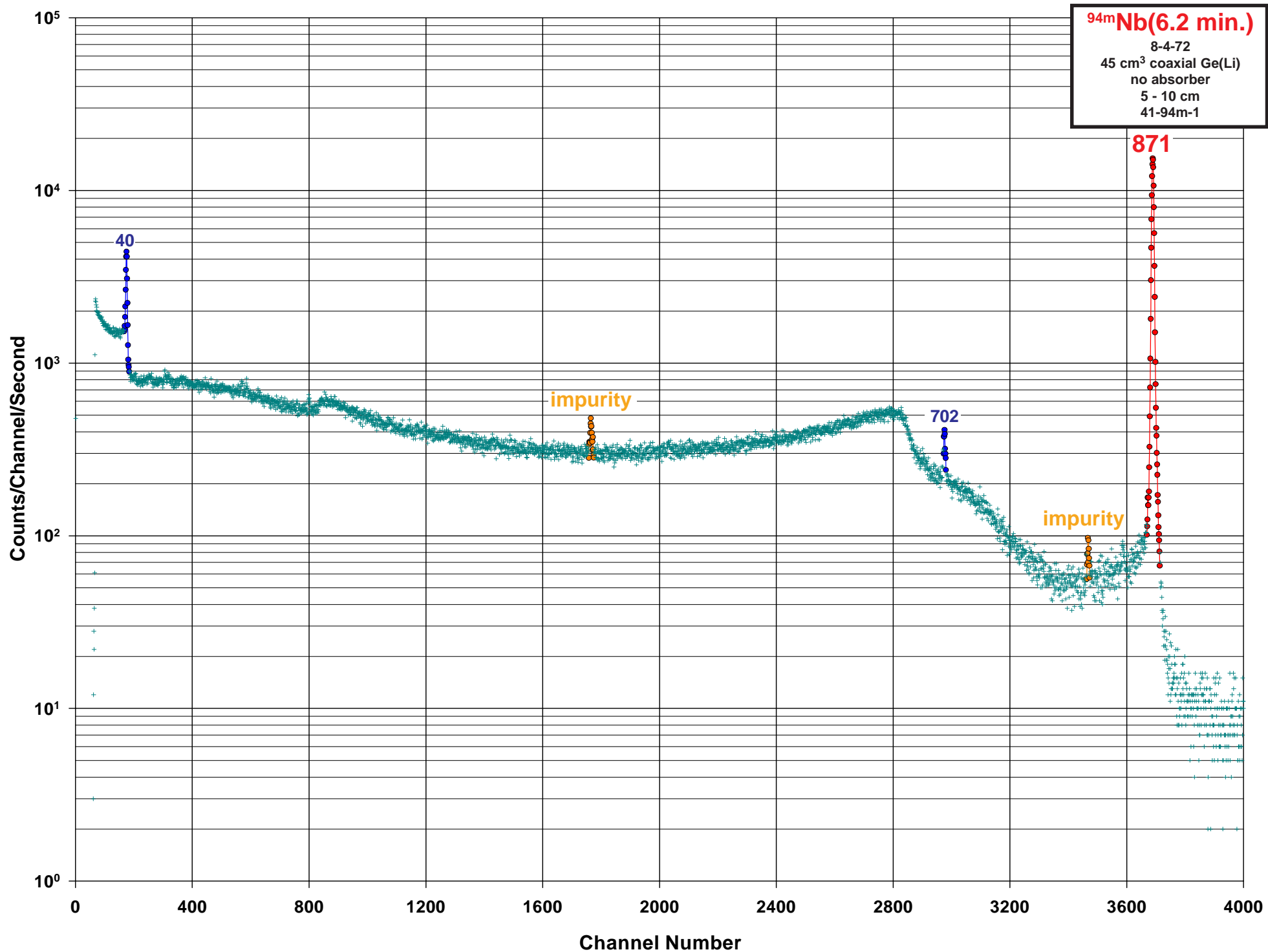
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁹³Nb(γ ,n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	449.			0.0033		4
Ann.	511.006			0.129	0.014	4
	561.			0.0045		4
	912.60	0.20	2.0	1.78	0.10	3
	934.44	0.10	100	99.07	0.04	1
	1132.17	0.14		0.0052		4
	1847.5	0.3	1.0	0.85	0.04	2

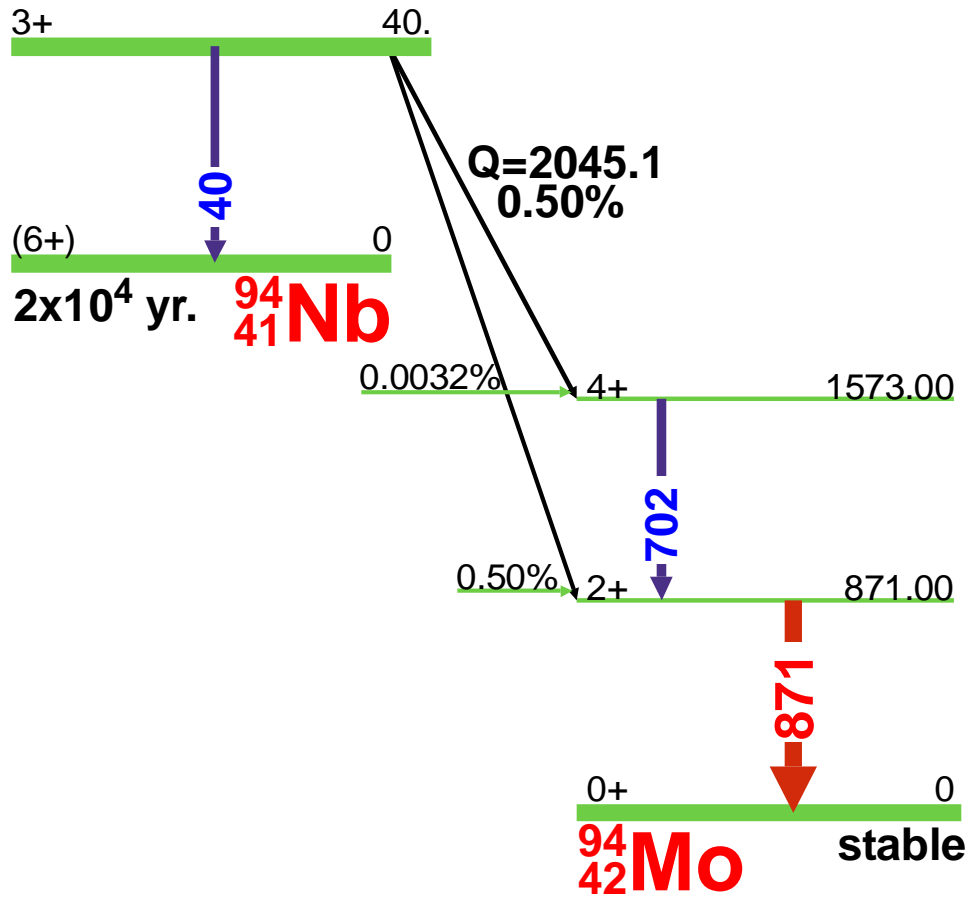
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{94m}Nb(6.2 min.) Decay Scheme

6.2 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{94m}Nb

Half Life: 6.263(4) min.

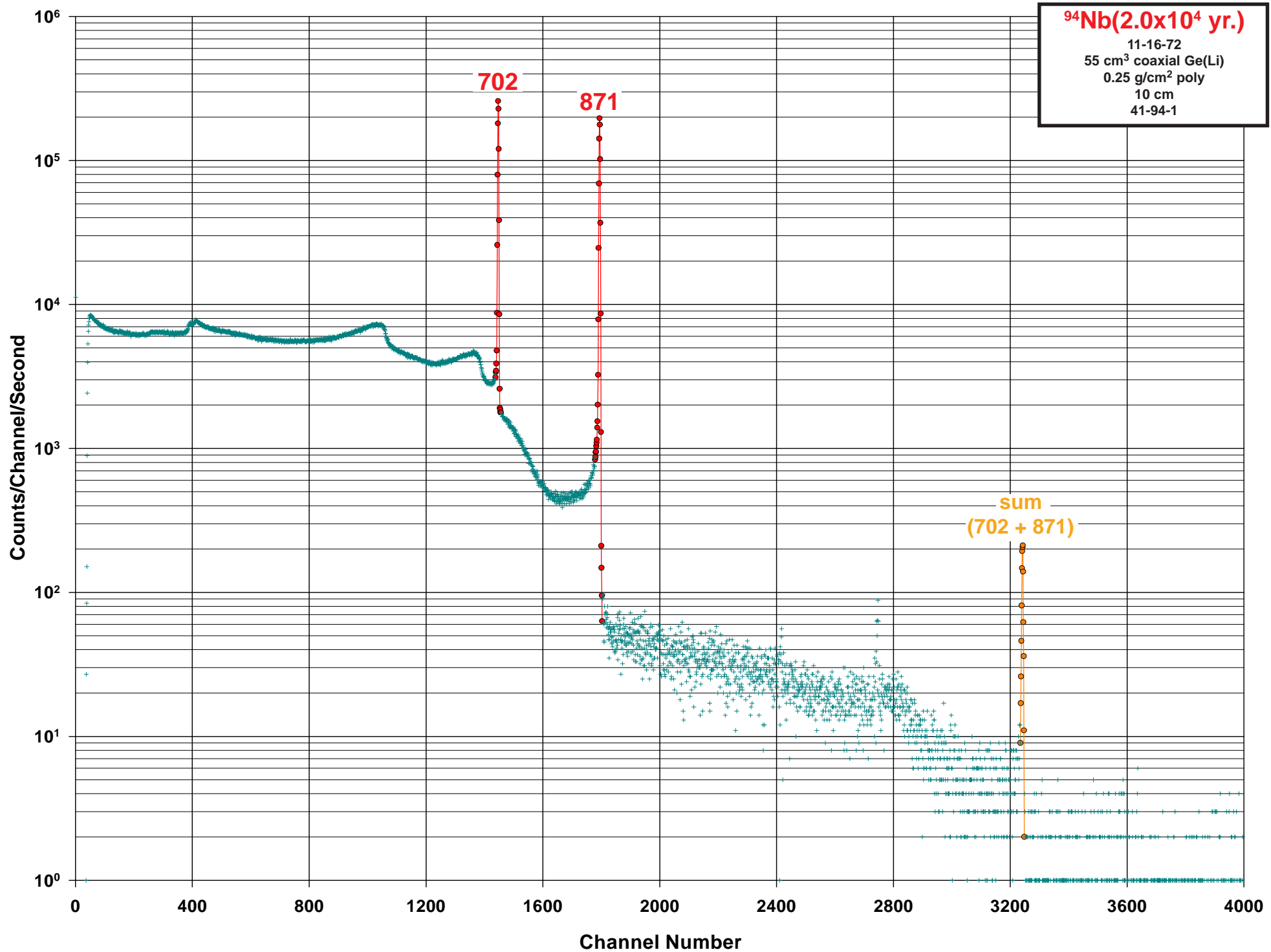
Detector: 45 cm³ coaxial Ge (Li)

Method of Production: ⁹³Nb(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
40.8	0.1		0.0731	0.0022	2
702.627	0.019	0.70	0.0032	0.0004	4
871.099	0.018	100	0.50	0.06	1
933.18	0.08		0.00075		4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





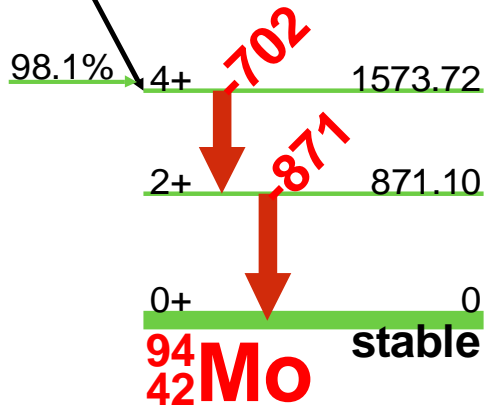
⁹⁴Nb(2.0x10⁴ yr.) Decay Scheme

2.0x10⁴ yr.

(6)+ 0

⁹⁴₄₁Nb

Q=2045.1



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹⁴Nb

Half Life: 2.03(16) x 10⁴ yr.

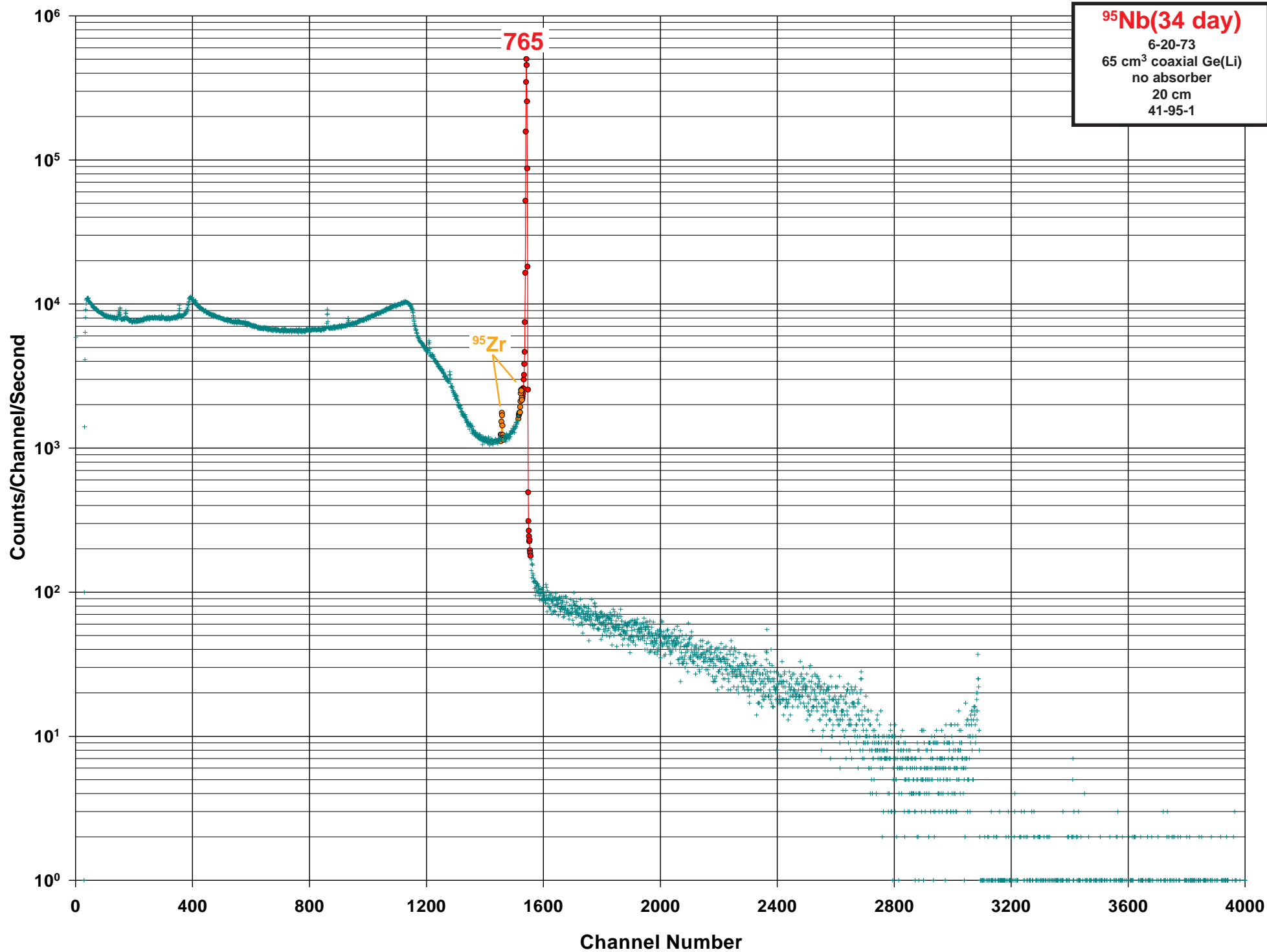
Detector: 55 cm³ coaxial Ge (Li)

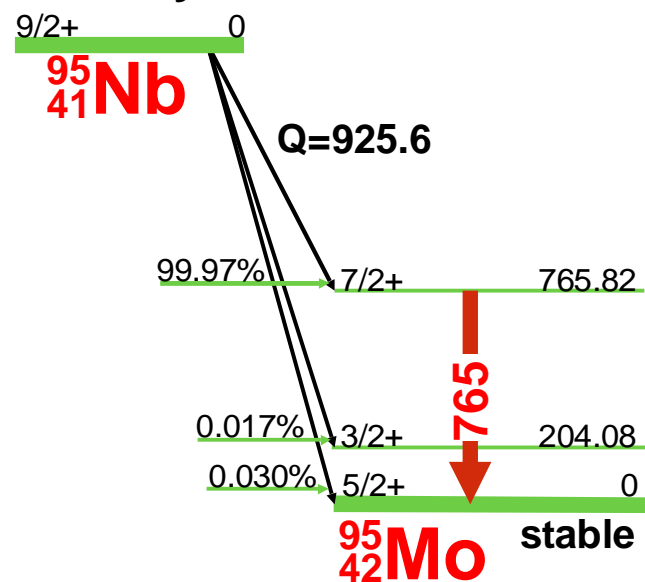
Method of Production: ⁹³Nb(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
702.622	0.019	100	97	2	1
871.091	0.018	100	99		1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





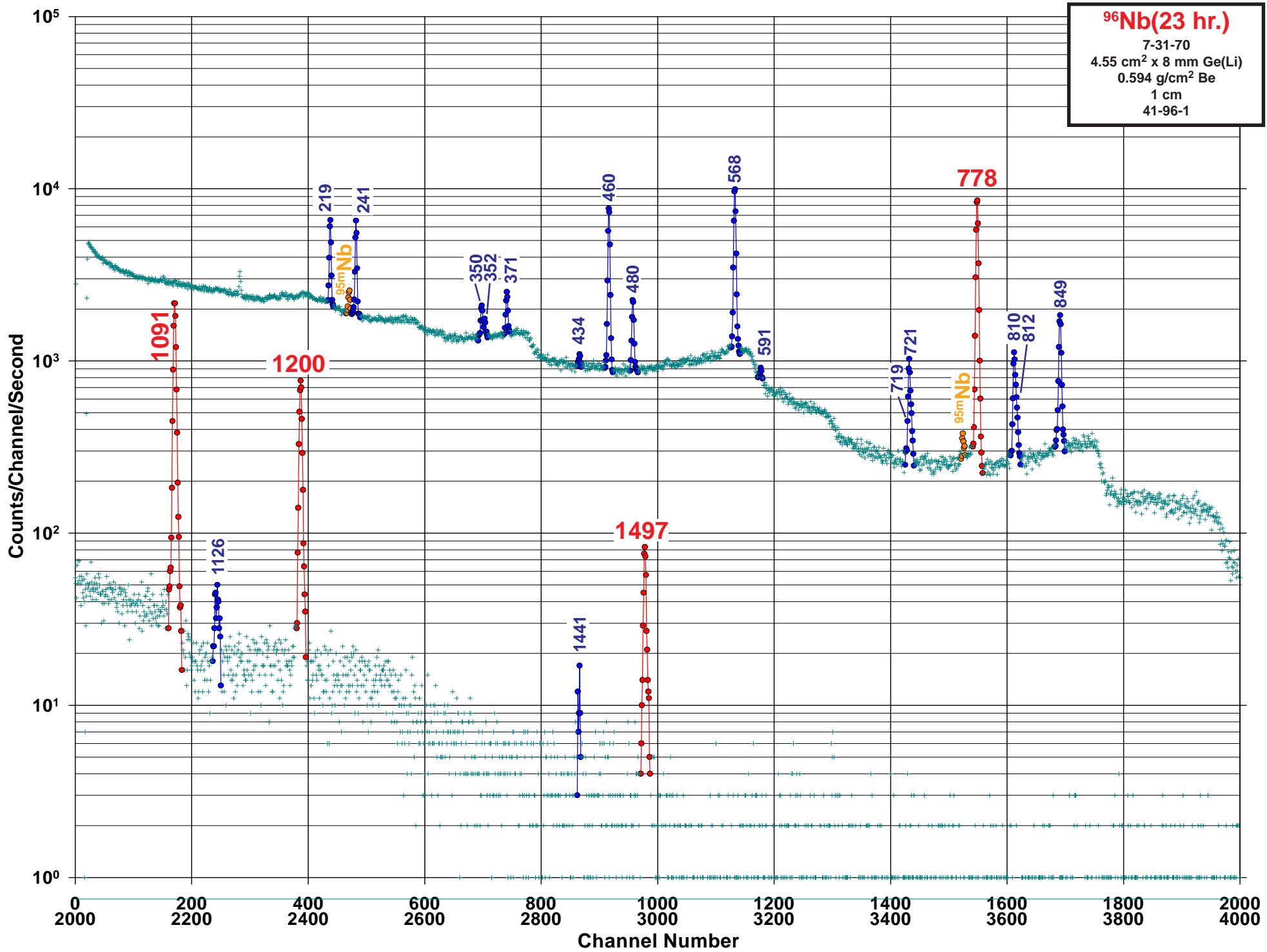
^{95}Nb (34 day) Decay Scheme**34 day****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{95}Nb

Half Life: 34.975(7) day

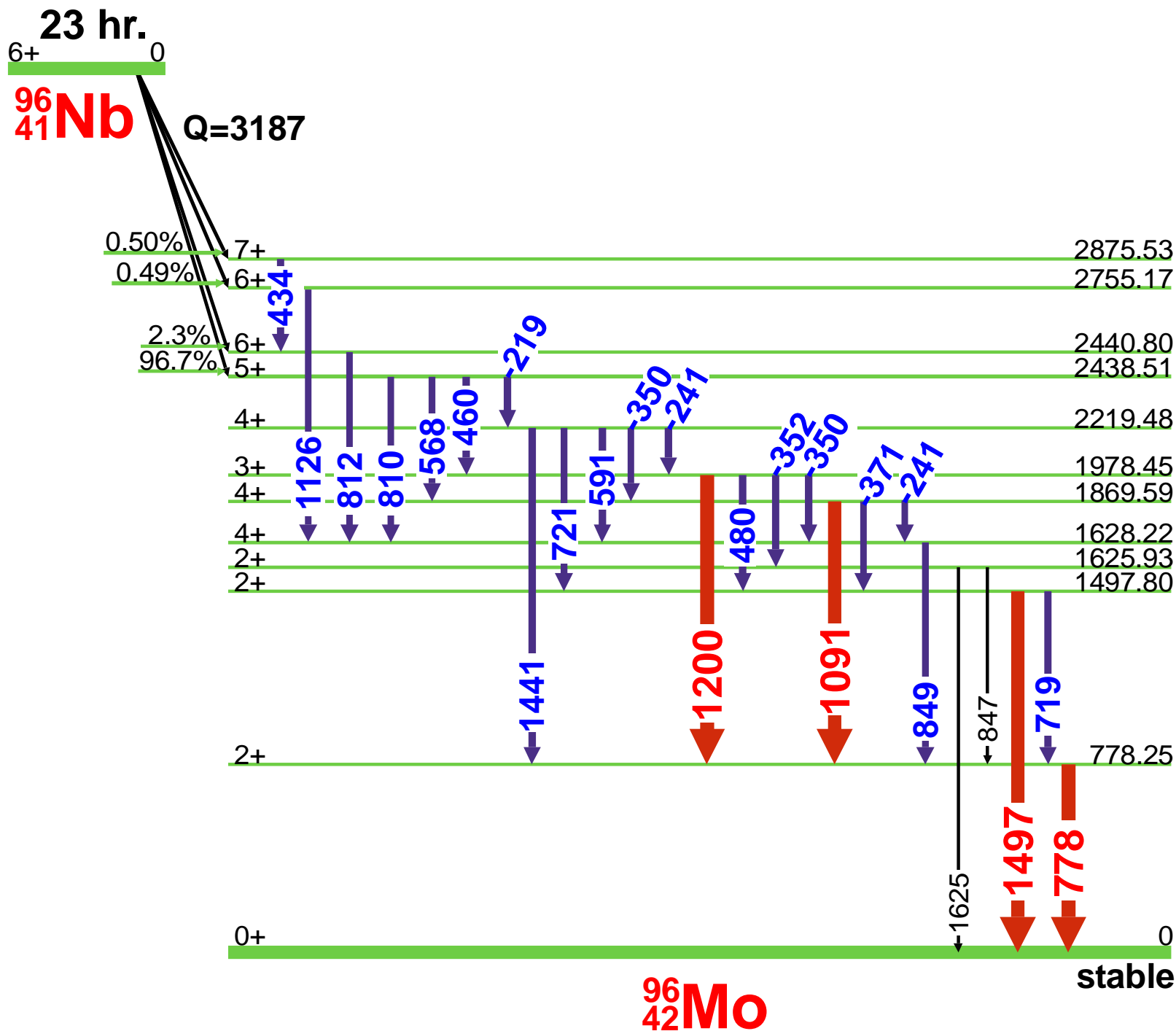
Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{94}\text{Zr}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
204.120	0.010		0.020	0.009	4
561.880	0.020		0.013	0.003	4
765.807	0.006	100	99.81	0.03	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



⁹⁶Nb(23 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{96}Nb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

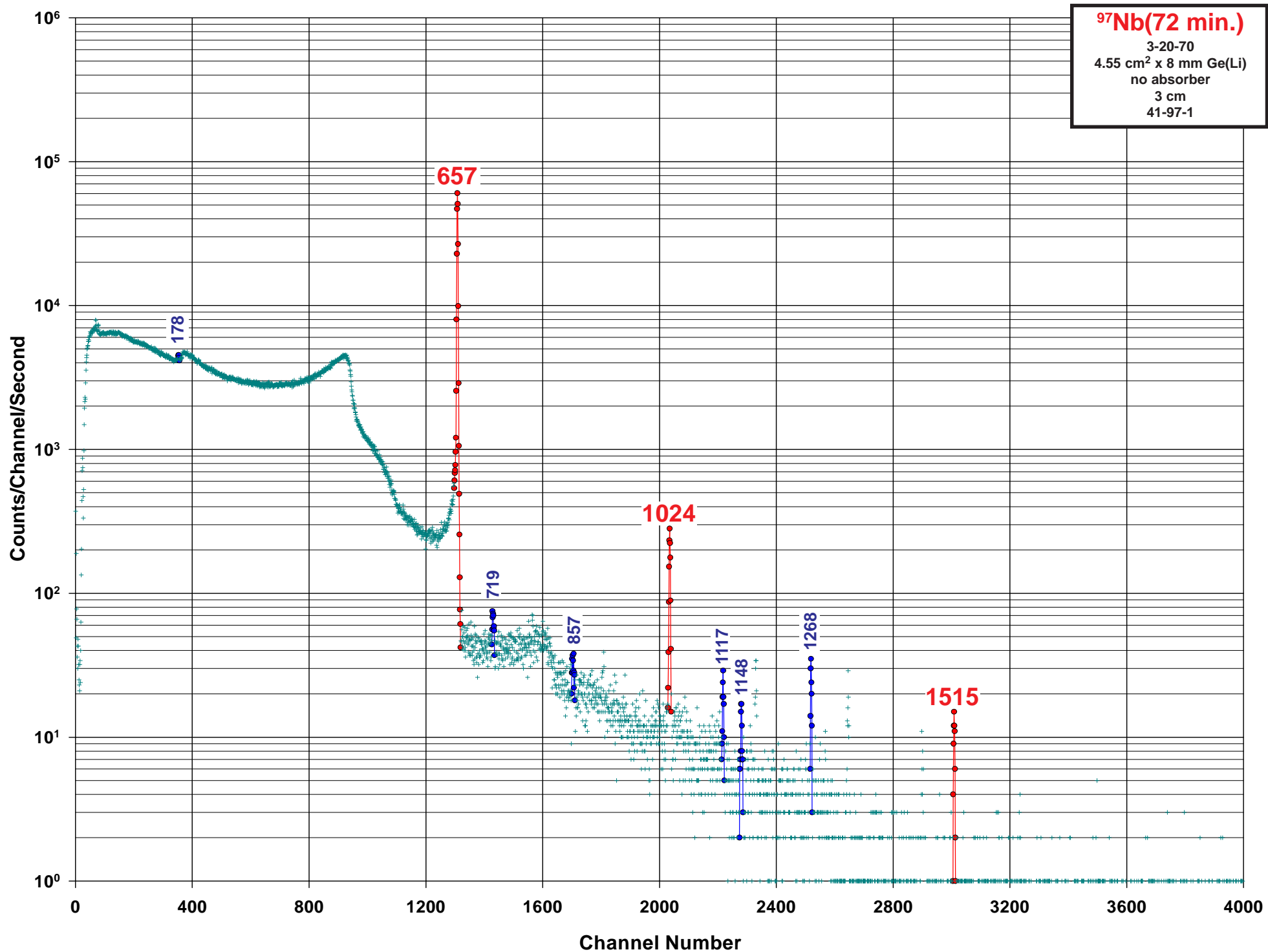
Half Life: 23.35(5) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{96}\text{Zr}(p,n)$

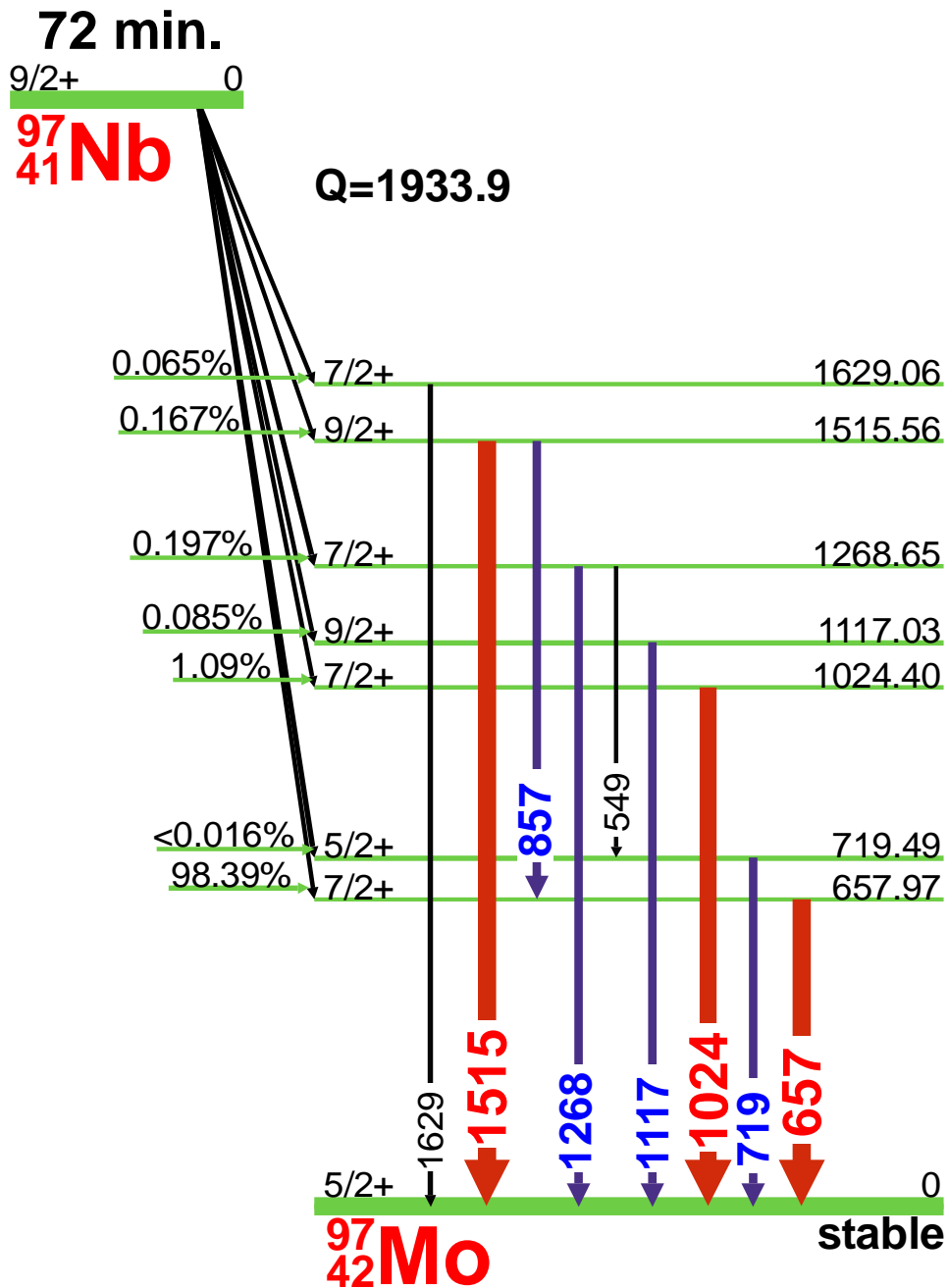
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	108.950	0.110		0.0444	0.0145	4
	120.300	0.400		0.0241	0.0096	4
	128.000	0.400		0.0164	0.0096	4
	219.081	0.018	3.9	2.9707	0.0483	3
D	241.377	0.015	4.7	3.4722	0.3858	2
	241.380	0.000		0.7523	0.0008	
	314.340	0.070		0.0743	0.0135	4
	316.270	0.090		0.0608	0.0087	4
D	350.053	0.019	1.9	0.4823	0.0965	3
	350.053	0.019		1.0610	0.0868	
	352.560	0.030	0.9	0.8295	0.0386	3
	371.807	0.015	3.0	2.6234	0.0868	3
	434.730	0.040	0.7	0.3762	0.0289	4
	460.040	0.012	28.0	26.6202	0.1949	1
	480.705	0.017	6.3	5.8352	0.0486	2
	568.871	0.012	57.0	57.9664	0.2955	1

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	591.240	0.050	2.7	0.9356	0.0868	3
	593.250	0.140		0.3086	0.0772	4
	719.562	0.017	7.3	6.8479	0.0871	3
	721.629	0.019	0.6	1.0224	0.0579	4
	778.224	0.015	100	96.4500	0.2173	1
	810.330	0.015	11.0	11.0918	0.0971	2
	812.581	0.015	2.3	2.9514	0.0772	2
	847.690	0.020		1.1381	0.0579	4
	849.929	0.013	21.0	20.4474	0.1941	1
	1091.349	0.012	50.0	48.5144	1.5440	1
	1126.965	0.021	3	0.4244	0.0193	3
	1200.231	0.013	20.0	19.9652	0.0986	1
	1346.900	0.300		0.0241	0.0096	4
	1441.129	0.024	0.5	0.4437	0.0193	4
	1497.807	0.015	3.0	3.2793	0.0676	3
	1625.900	0.050		0.1543	0.0096	4





⁹⁷Nb(72 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹⁷Nb

Half Life: 72.1(7) min.

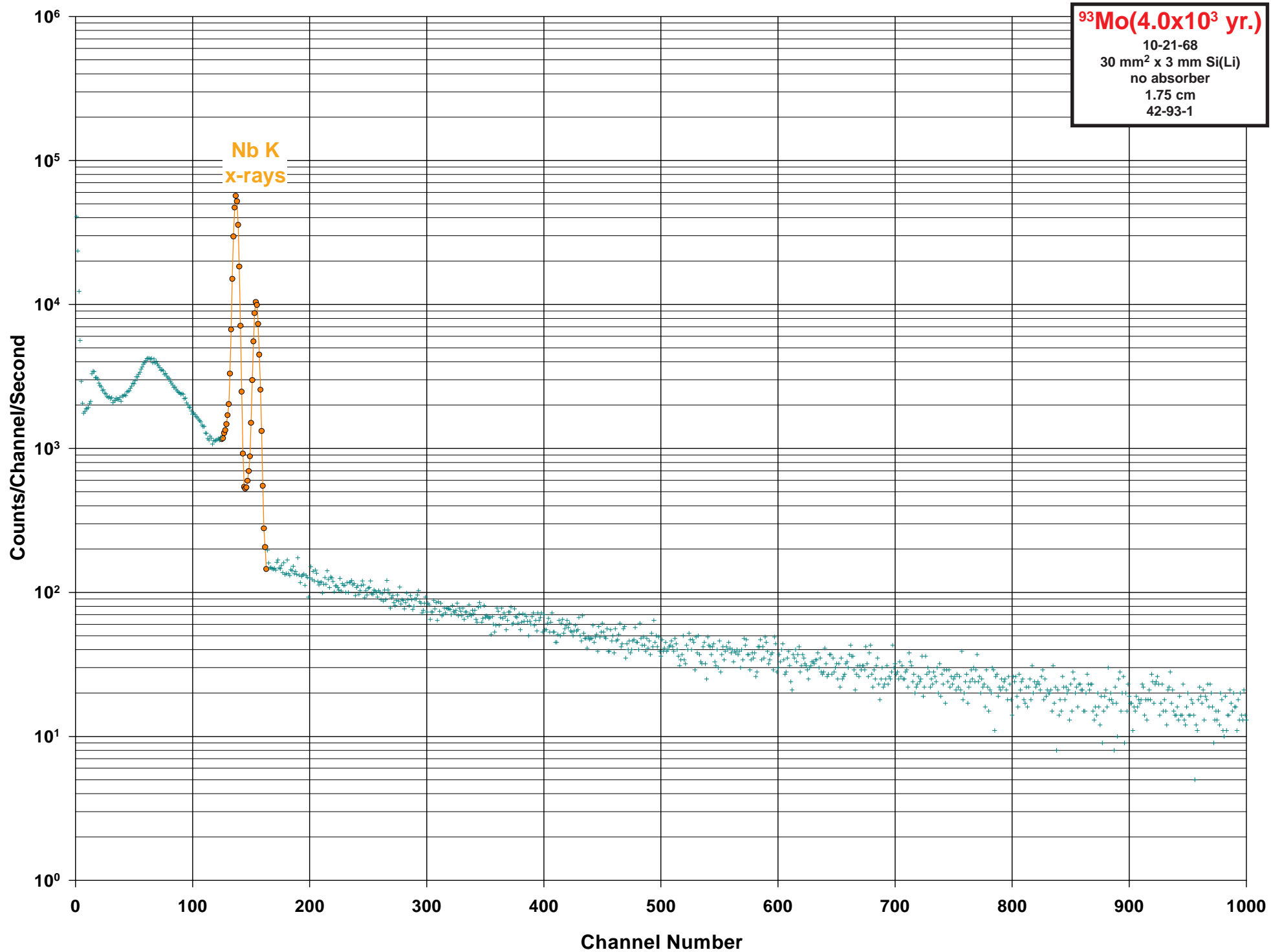
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁹⁶Zr(n,γ)β

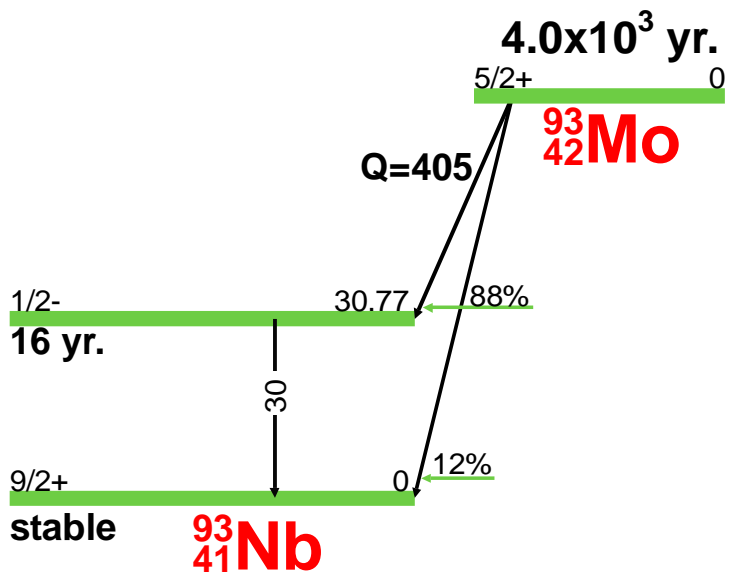
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
178.0	0.3		0.049	0.010	4
238.4	0.3		0.049	0.010	4
549.25	0.20		0.049	0.010	4
657.94	0.09	100	98.23	0.08	1
719.53	0.19	0.12	0.090	0.010	4
857.46	0.21		0.045	0.007	4
1024.4	0.3	1.12	1.09	0.07	1
1117.02	0.18	0.10	0.086	0.008	4
1148.6	0.3	0.08	0.049	0.010	4
1268.62	0.10	0.15	0.147	0.020	3
1515.66	0.19	0.12	0.122	0.013	1
1629.09	0.22		0.025	0.007	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





⁹³Mo(4.0x10³ yr.) Decay Scheme



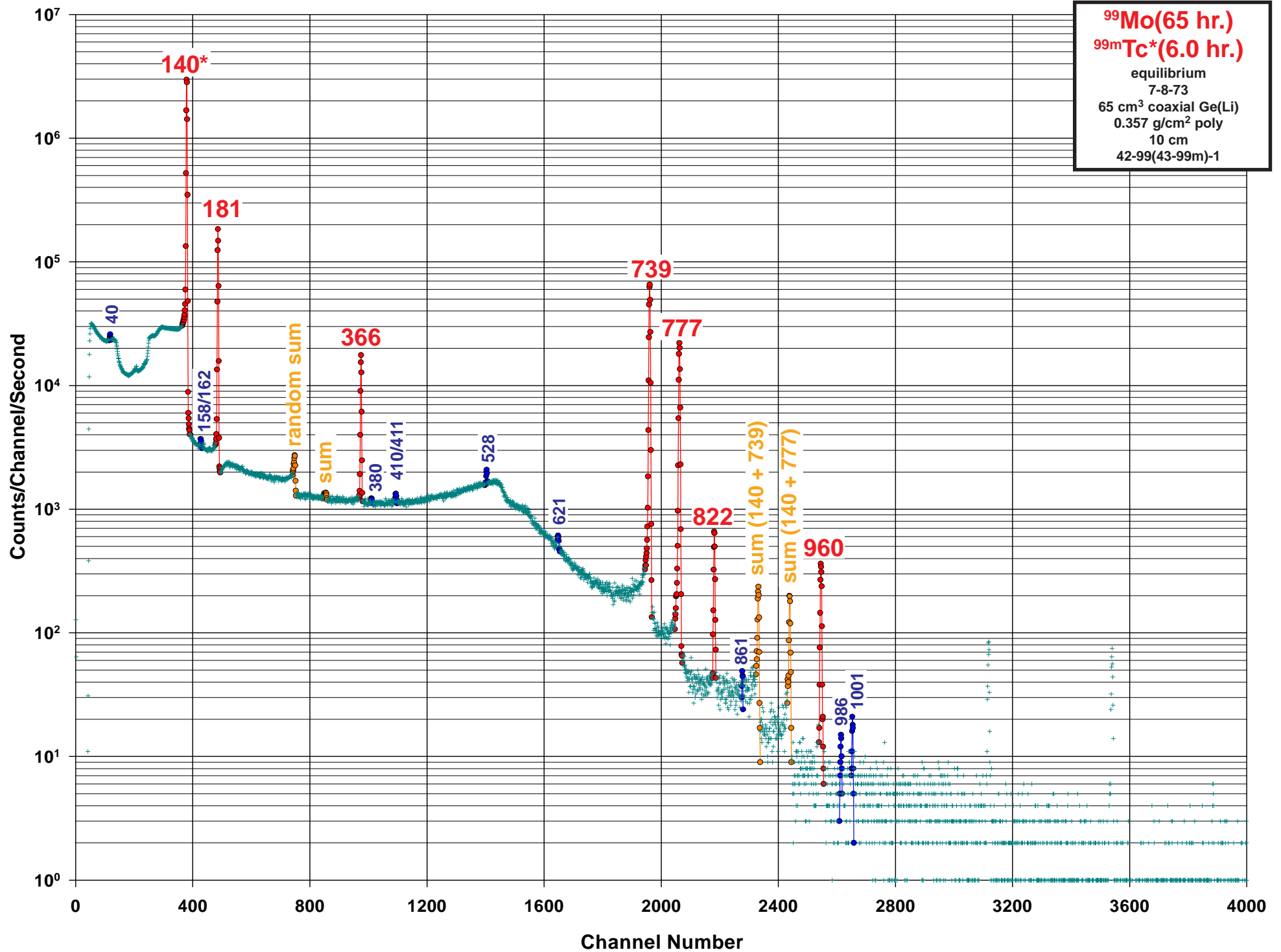
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹³Mo Half Life: 4.0(8) x 10³ yr.
 Detector: 30 mm² x 3 mm Si(Li) Method of Production: ⁹²Mo(n,γ)

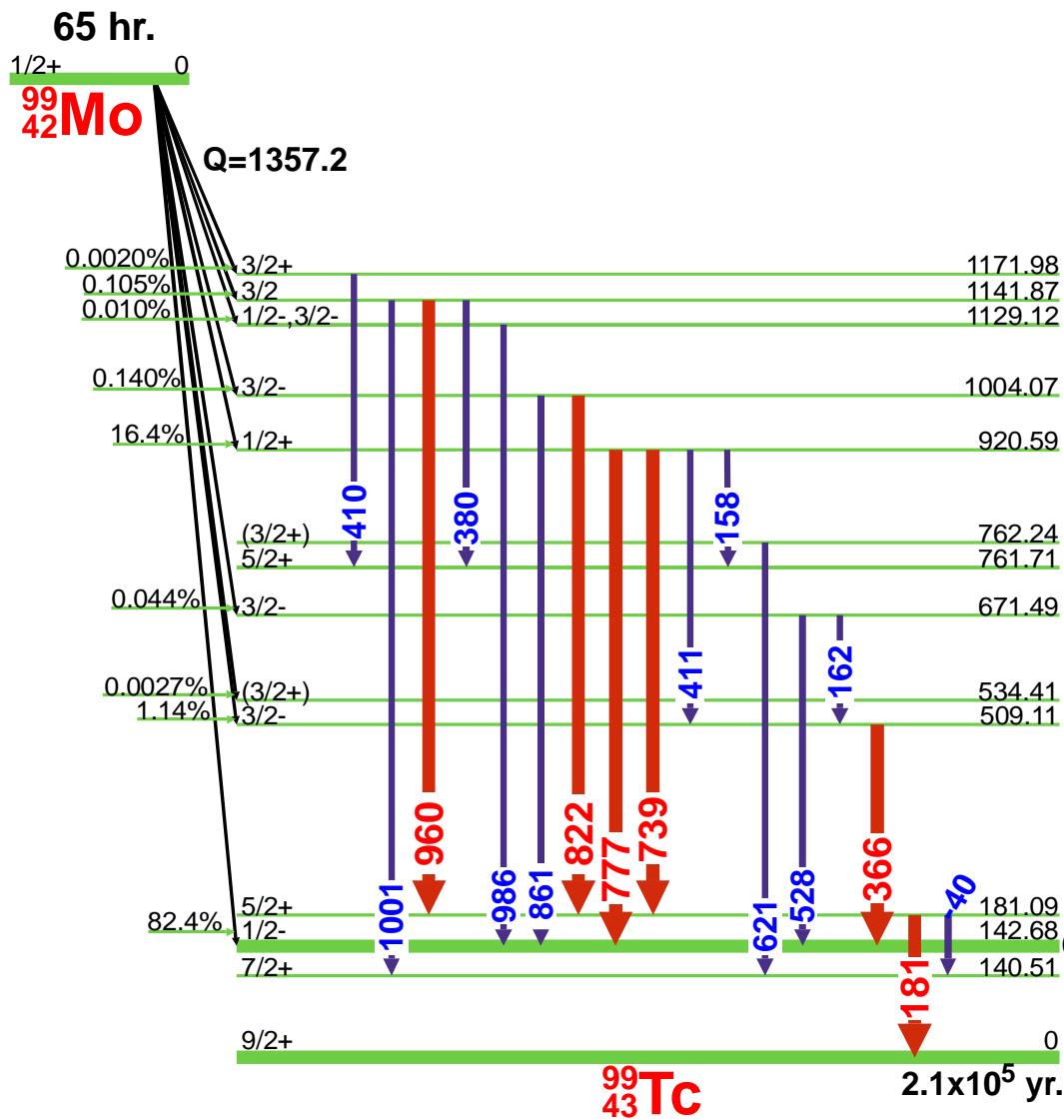
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
30.770	0.020		0.000503	0.000019	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

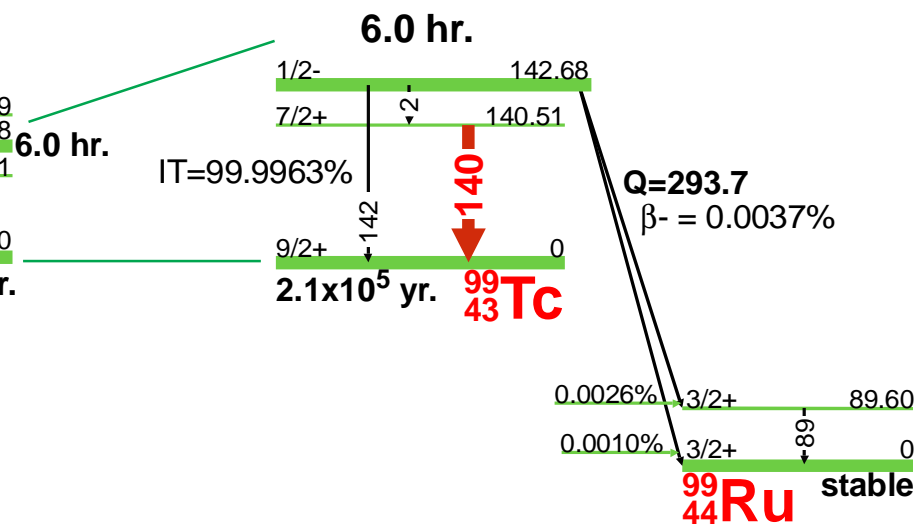




⁹⁹Mo(65 hr.) Decay Scheme



^{99m}Tc*(6.0 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{99}\text{Mo} - ^{99\text{m}}\text{Tc}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

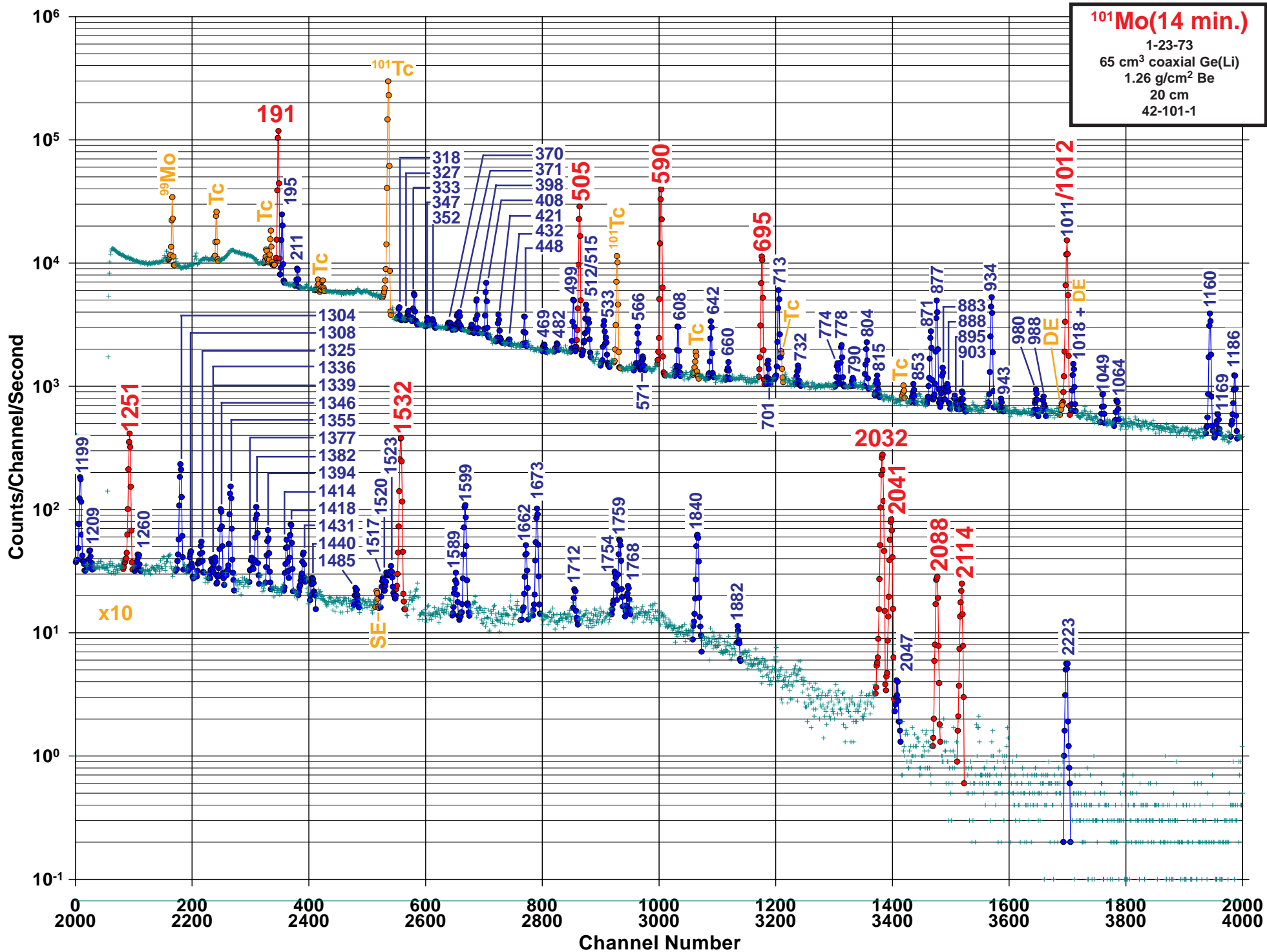
Half Life: 65.94(1) hr. – 6.01(1) hr.*

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{98}\text{Mo}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	2.173					4
	40.584	0.002	0.63	1.05	0.04	4
	89.40	0.20		0.0030	0.0021	4
*	89.6	0.3				4
*	140.511	0.001	100	4.52	0.24	1
	142.675	0.025				4
	158.782	0.015	0.013	0.0189	0.0008	4
	162.370	0.015	0.010	0.0119	0.0006	4
	181.068	0.008	6.8	5.99	0.11	1
*	232.80	0.20		0.23	0.04	4
	242.29	0.08		0.0025	0.0005	4
	249.03	0.03		0.0039	0.0005	4
*	322.40	0.20		2.62	0.14	4
	366.421	0.015	1.37	1.191	0.022	1
	380.13	0.08	0.08	0.0104	0.0009	4
	391.7	0.4		0.0032	0.0006	4
D	410.27	0.10	0.05	0.0019	0.0004	4
	411.491	0.015		0.0146	0.0006	
	455.84	0.13		0.0013	0.0006	4
	457.60	0.03		0.0081	0.0006	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	469.63	0.07		0.0027	0.0005	4
	490.53	0.15		0.0011	0.0004	4
	528.788	0.015	0.05	0.0570	0.0026	4
	537.79	0.15		0.0033	0.0006	4
	580.51	0.07		0.0032	0.0005	4
	581.30	0.12		0.0010	0.0005	4
	599.6	0.5		0.0021	0.0010	4
	620.03	0.04		0.0023	0.0008	4
	621.771	0.024	0.026	0.0258	0.0009	4
	689.6	0.9		0.0004	0.0002	4
	739.500	0.017	13.7	12.13	0.22	1
	761.77	0.08		0.0004		4
	777.921	0.020	4.9	4.26	0.08	1
	822.972	0.015	0.149	0.133	0.003	1
	861.2	0.9	0.002	0.007	0.004	4
	960.754	0.020	0.11	0.0946	0.0028	1
	986.44	0.04	0.0022	0.0015	0.0005	4
	1001.343	0.018	0.0037	0.0055	0.0005	4
	1017.0	0.5		0.0006	0.0002	4
	1056.20	0.05		0.0011	0.0001	4

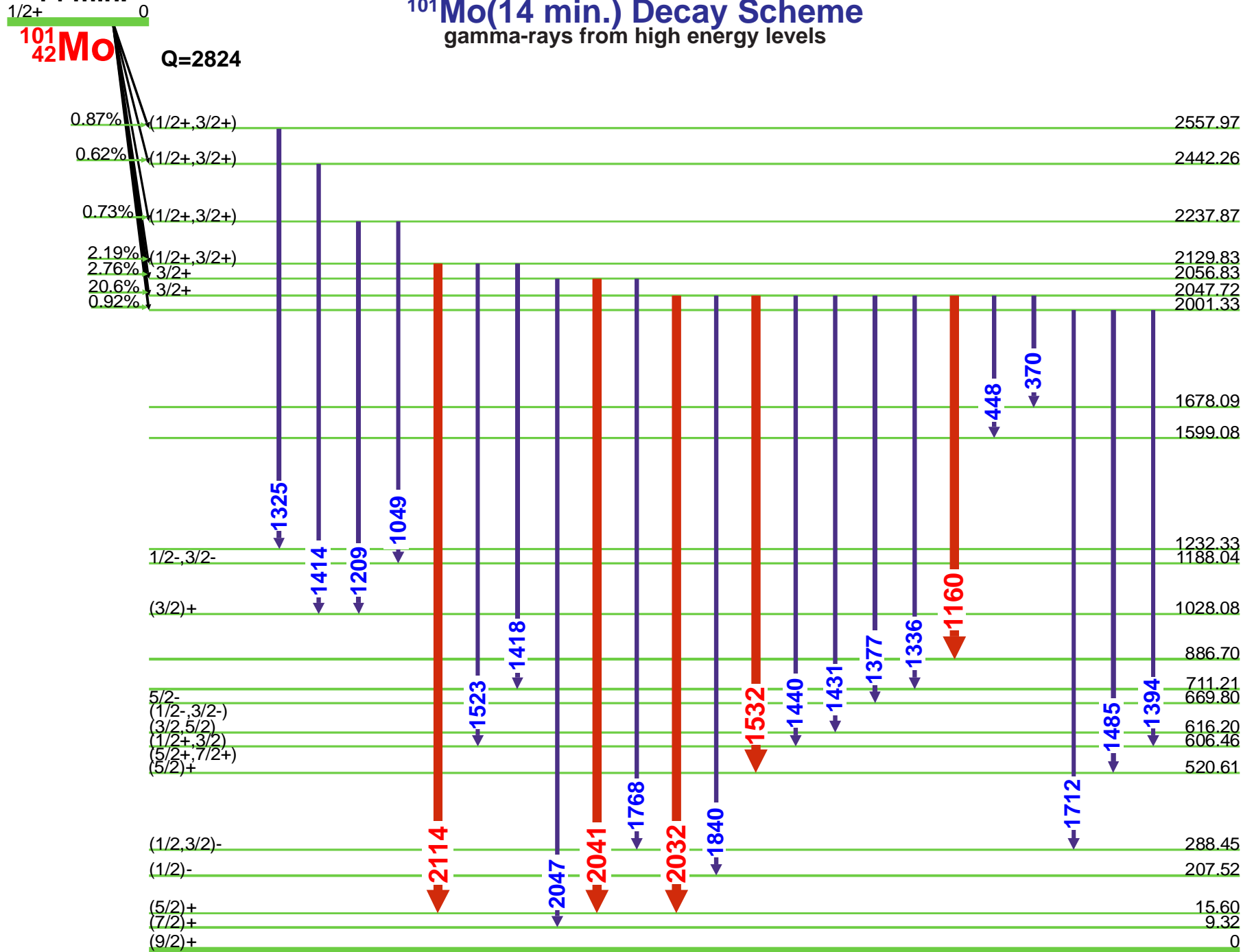




14 min.

¹⁰¹Mo(14 min.) Decay Scheme

gamma-rays from high energy levels



¹⁰¹Tc

14 min.



14 min.

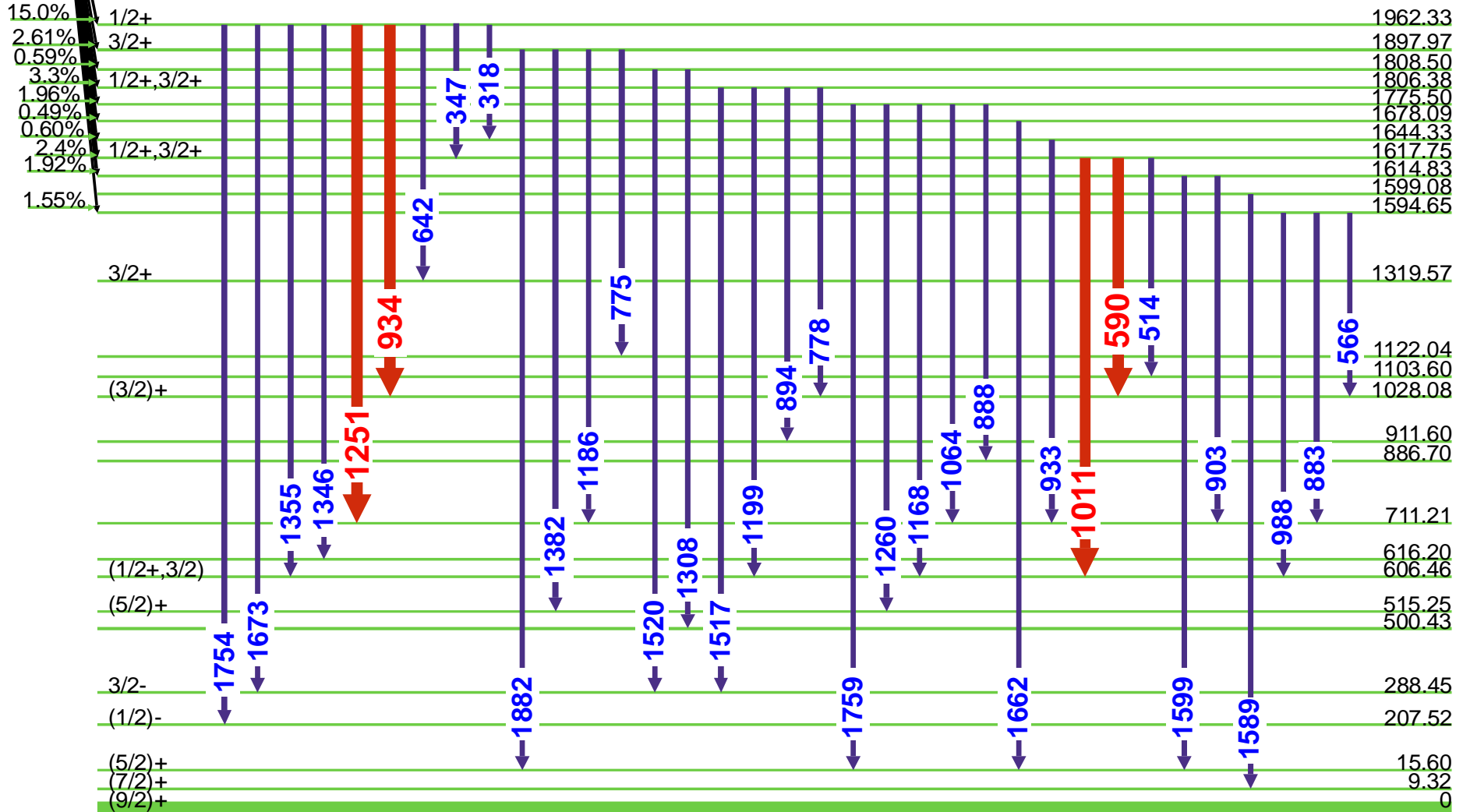
¹⁰¹Mo(14 min.) Decay Scheme

gamma-rays from medium energy levels

1/2+ 0

¹⁰¹₄₂Mo

Q=2824



¹⁰¹₄₃Tc

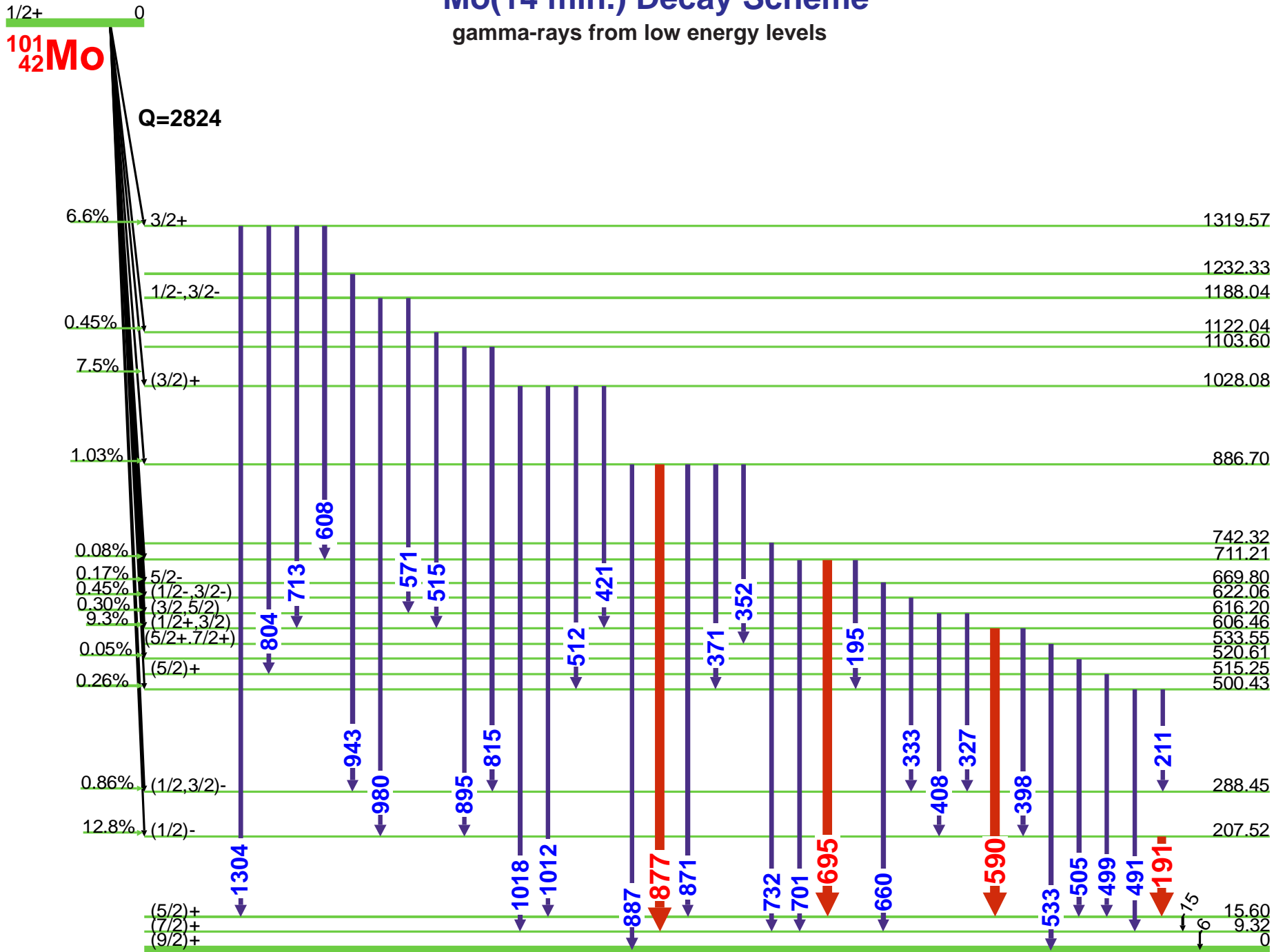
14 min.



14 min.

¹⁰¹Mo(14 min.) Decay Scheme

gamma-rays from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{101}Mo E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 14.61(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{100}\text{Mo}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
6.281	0.007		0.543	0.006	4
9.317	0.010		2.107	0.024	4
15.606	0.015		0.0013		4
80.92	0.03		3.73	0.12	4
104.70	0.08		0.157	0.013	4
105.95	0.05		0.275	0.015	4
115.76	0.13		0.029	0.004	4
169.0	0.3		0.027	0.007	4
187.41	0.20		0.437	0.019	4
191.920	0.020	81.9	18.21	0.21	1
195.93	0.04	11.52	2.77	0.08	3
211.98	0.03	2.20	0.455	0.024	4
221.80	0.20		0.098	0.007	4
274.97	0.20		0.086	0.009	4
318.00	0.06	1.03	0.229	0.011	4
327.70	0.07	1.31	0.209	0.009	4
333.61	0.06	3.36	0.71	0.03	3
347.56	0.09	0.77	0.102	0.009	4
352.97	0.09	0.84	0.140	0.009	4
358.2	0.5		0.044	0.009	4
368.4	0.5		0.098	0.015	4
370.0	0.8	1.0	0.118	0.015	4
371.6	0.8	0.8	0.153	0.013	4
377.9	0.5		0.16	0.04	4
378.99	0.21		0.308	0.015	4
381.12	0.10		0.317	0.019	4
384.4	0.4		0.051	0.007	4
398.84	0.07	4.13	0.865	0.027	3
408.69	0.06	7.45	1.53	0.06	3
421.67	0.10	3.01	0.54	0.04	3
422.4	0.5		0.095	0.016	4
432.65	0.14	0.46	0.109	0.011	4
442.0	0.3		0.053	0.007	4
448.60	0.06	3.46	0.67	0.03	3
452.5	0.3		0.076	0.006	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
469.02	0.12	0.76	0.076	0.006	4
482.52	0.12	0.73	0.086	0.011	4
491.5	0.3		0.067	0.006	4
497.0	0.8		0.146	0.016	4
499.65	0.03	7.21	1.39	0.05	3
505.05	0.18	57.1	0.36	0.04	1
505.92	0.03		11.62	0.28	
510.21	0.12		0.25	0.03	4
512.83	0.05	7.28	1.40	0.09	3
514.1	0.4	3.99	0.81	0.03	3
515.42	0.10		0.81	0.03	
523.83	0.12		0.158	0.009	4
533.57	0.07	2.1	0.397	0.019	3
540.1	0.5		0.095	0.013	4
560.3	0.3		0.069	0.007	4
566.62	0.05	4.06	0.82	0.04	3
571.62	0.17		0.177	0.011	4
582.9	0.9		0.080	0.013	4
590.10	0.19	100	1.11	0.11	1
590.10	0.19		19.2	0.9	
602.98	0.23		0.093	0.009	4
606.8	0.3		0.073	0.018	4
608.34	0.04	5.09	1.02	0.04	3
611.6	0.5		0.133	0.018	4
625.3	0.6		0.091	0.013	4
642.71	0.07	6.65	1.21	0.05	3
650.9	0.7		0.026	0.006	4
652.7	1.1		0.027	0.009	4
660.64	0.07	1.10	0.224	0.011	4
675.9	0.6		0.046	0.007	4
686.0	0.3		0.067	0.006	4
695.56	0.06	34.7	6.66	0.16	1
701.80	0.13	1.66	0.357	0.020	4
707.8	0.8		0.064	0.013	4
713.04	0.09	16.82	3.33	0.15	2



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{101}Mo E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 14.61(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{100}\text{Mo}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	728.19	0.16	0.53	0.098	0.009	4
	732.98	0.07	1.66	0.268	0.015	4
	737.3	0.8		0.035	0.007	4
	739.54	0.13		0.297	0.015	4
D	774.15	0.10	2.19	0.350	0.017	4
	775.8	0.8		0.104	0.018	
	778.29	0.05	4.64	0.97	0.04	3
	790.04	0.13	0.63	0.126	0.009	4
	798.0	0.5		0.069	0.009	4
	804.29	0.05	4.98	0.96	0.04	3
	815.29	0.08	1.33	0.188	0.026	4
	847.24	0.24		0.075	0.009	4
	853.09	0.07	1.20	0.240	0.011	4
	859.13	0.18		0.124	0.009	4
	869.7	0.3		0.288	0.018	4
	871.08	0.05	8.94	1.71	0.08	3
	877.39	0.04	17.04	3.22	0.19	2
	883.39	0.06	3.14	0.65	0.03	3
D	887.0	0.3	2.40	0.188	0.013	4
	888.7	0.3		0.237	0.015	
D	894.4	1.6	1.38	0.056	0.024	4
	895.89	0.20		0.173	0.011	
	903.55	0.09	1.32	0.218	0.011	4
D	933.3	0.3	21.84	0.60	0.06	2
	934.21	0.03		4.12	0.26	
	943.98	0.21	0.67	0.107	0.011	4
	980.52	0.07	1.73	0.273	0.015	4
	988.05	0.12	1.09	0.177	0.011	4
	1007.4	0.3		0.173	0.015	4
D	1011.05	0.14	76.63	0.89	0.07	1
	1012.47	0.04		13.0	0.7	
	1018.58	0.25	4.98	0.73	0.04	3
	1020.0	0.3		0.386	0.017	4
	1030.1	0.4		0.069	0.007	4
	1049.80	0.06	1.90	0.348	0.019	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1064.59	0.11	1.60	0.275	0.015	4
	1065.9	0.4		0.157	0.011	4
	1160.98	0.04	22.0	4.02	0.14	2
	1169.23	0.17	4.24	0.220	0.017	4
	1184.19	0.23		0.182	0.013	4
	1186.76	0.04	5.09	1.01	0.04	3
	1199.94	0.04	9.50	1.78	0.06	2
	1209.92	0.21		0.131	0.011	4
	1218.0	0.5		0.056	0.007	4
	1249.4	0.5		0.231	0.017	4
	1251.10	0.04	25.77	4.72	0.16	1
	1260.21	0.15	0.83	0.148	0.013	4
	1286.26	0.17		0.107	0.009	4
	1290.7	0.3		0.113	0.007	4
	1293.29	0.17		0.211	0.009	4
	1304.00	0.04	15.1	2.71	0.08	2
	1308.13	0.20	0.49	0.087	0.009	4
	1310.7	1.3		0.031	0.007	4
	1314.28	0.25		0.213	0.011	4
	1325.65	0.15	2.05	0.28	0.03	3
	1336.40	0.13	0.77	0.153	0.008	4
	1339.42	0.09	1.10	0.178	0.011	4
	1346.09	0.07	5.69	0.94	0.04	3
	1350.8	0.7		0.049	0.006	4
	1355.89	0.05	9.93	1.69	0.08	2
	1377.95	0.17	1.22	0.239	0.013	4
	1380.4	0.8		0.115	0.011	4
	1382.71	0.06	6.47	1.13	0.04	2
	1387.6	0.3		0.073	0.006	4
	1394.86	0.06	3.64	0.625	0.028	3
	1414.20	0.06	3.00	0.495	0.024	3
	1418.56	0.06	4.70	0.89	0.04	3
	1426.9	0.9		0.035	0.006	4
	1429.21	0.20		0.07	0.04	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{101}Mo E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

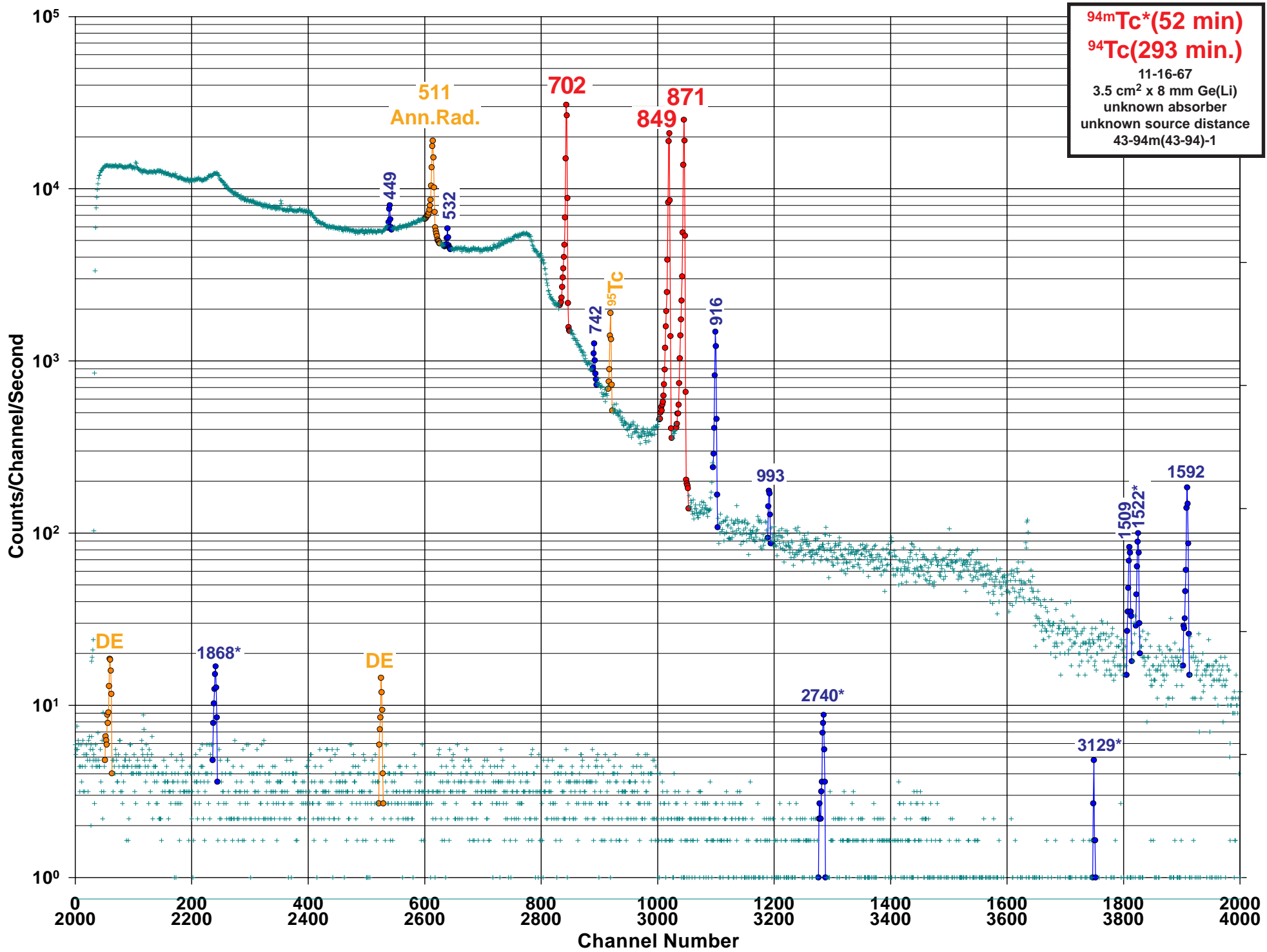
Half Life: 14.61(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{100}\text{Mo}(n,\gamma)$

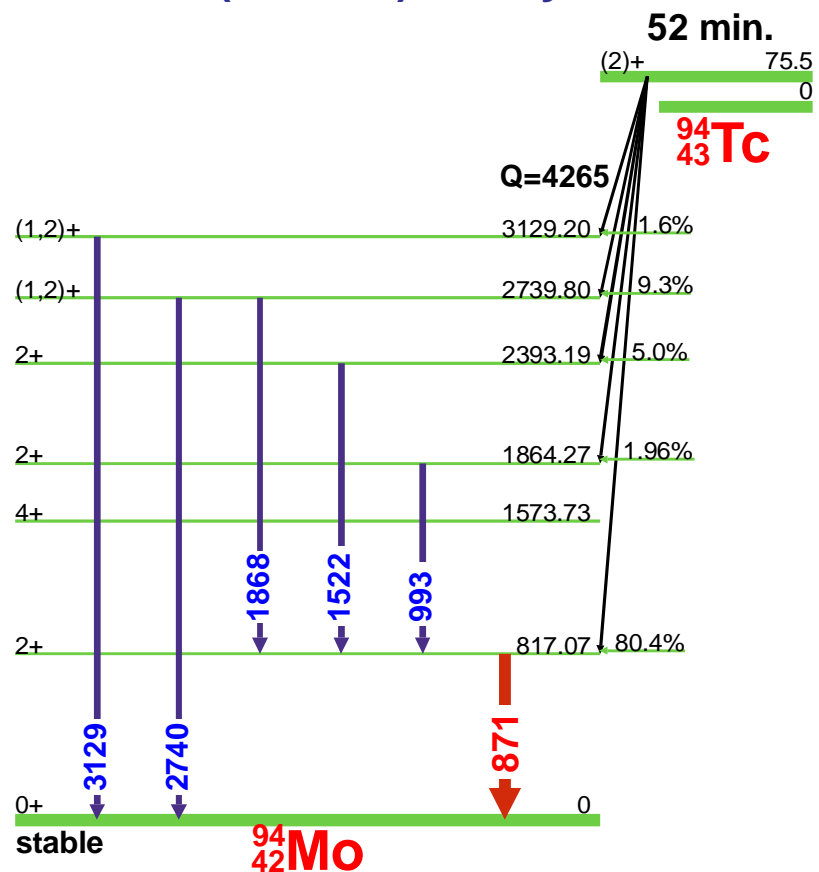
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	1431.68	0.18	1.8	0.362	0.013	3
	1431.68	0.18		0.128	0.018	
	1435.1	0.4		0.082	0.007	4
	1440.84	0.11	1.09	0.151	0.009	4
	1451.1	0.4		0.064	0.007	4
	1485.90	0.20		0.100	0.006	4
	1507.0	0.7		0.049	0.013	4
	1514.10	0.22		0.177	0.011	4
	1517.8	0.4		0.217	0.017	4
	1520.4	0.5		0.228	0.029	4
	1523.0	0.3		0.280	0.013	4
	1526.6	0.5		0.098	0.009	4
	1530.3	0.5		0.146	0.055	4
	1532.49	0.04	32.91	6.14	0.20	1
	1548.68	0.24		0.149	0.011	4
	1583.1	0.3		0.082	0.007	4
	1589.67	0.09	1.57	0.271	0.011	3
	1594.8	0.9		0.022	0.006	4
	1599.26	0.05	9.47	1.75	0.08	2
	1605.3	0.6		0.042	0.006	4
	1609.2	0.3		0.089	0.007	4
	1615.0	0.4		0.056	0.006	4
	1629.4	0.5		0.049	0.006	4
	1646.4	0.3		0.078	0.007	4
	1653.3	0.4		0.076	0.006	4
	1662.49	0.06	3.78	0.699	0.015	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1673.91	0.06	8.83	1.68	0.08	2
	1712.93	0.15	1.0	0.198	0.011	4
	1722.1	0.6		0.033	0.009	4
	1754.90	0.08	2.0	0.373	0.017	3
	1759.72	0.06	5.54	1.01	0.05	3
	1768.22	0.19		0.142	0.009	4
	1840.24	0.05	7.45	1.40	0.09	2
	1876.3	0.9		0.026	0.004	4
	1882.26	0.25		0.086	0.006	4
	1888.3	0.5		0.044	0.007	4
	1921.4	0.5		0.053	0.007	4
	1941.8	0.4		0.055	0.006	4
	1946.54	0.24		0.080	0.006	4
	2024.4	0.8		0.067	0.007	4
	2028.1	0.9		0.100	0.016	4
	2032.10	0.05	36.94	6.59	0.20	1
	2038.4	0.5		0.208	0.027	4
	2041.24	0.05	11.94	2.15	0.08	1
	2047.31	0.14	0.39	0.089	0.007	4
	2088.79	0.05	4.13	0.79	0.04	1
	2112.77	0.25		0.144	0.026	4
	2114.34	0.08	3.07	0.575	0.026	1
	2131.4	0.4		0.035	0.007	4
	2223.26	0.11	0.87	0.164	0.007	3
	2337.8	0.8		0.015	0.004	4
	2404.7	0.8		0.0195	0.0024	4

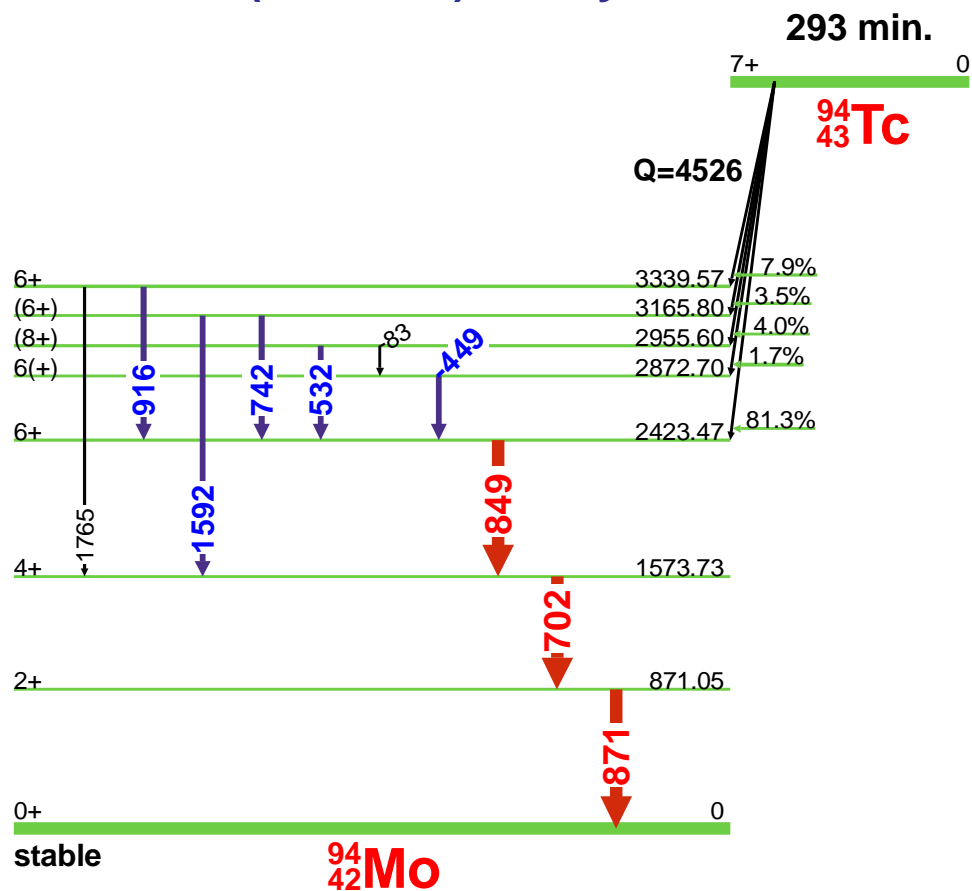




^{94m}Tc*(52 min.) Decay Scheme



⁹⁴Tc(293 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{94m}\text{Tc}^* - ^{94}\text{Tc}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 52.0(10) min.* – 293(1) min.

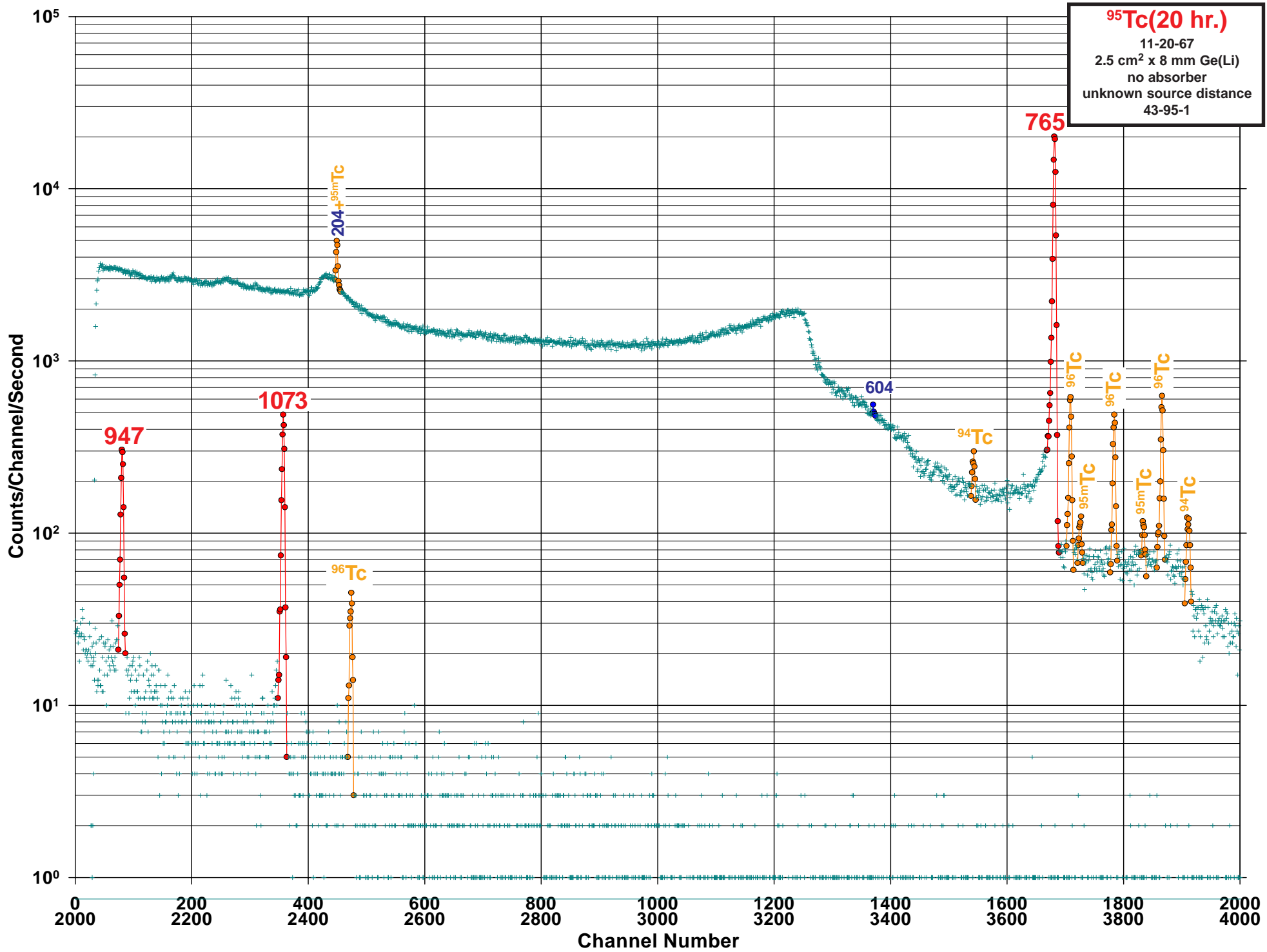
Detector: 3.5 cm² x 8 mm Ge (Li)

Method of Production: Mo(p,xn)

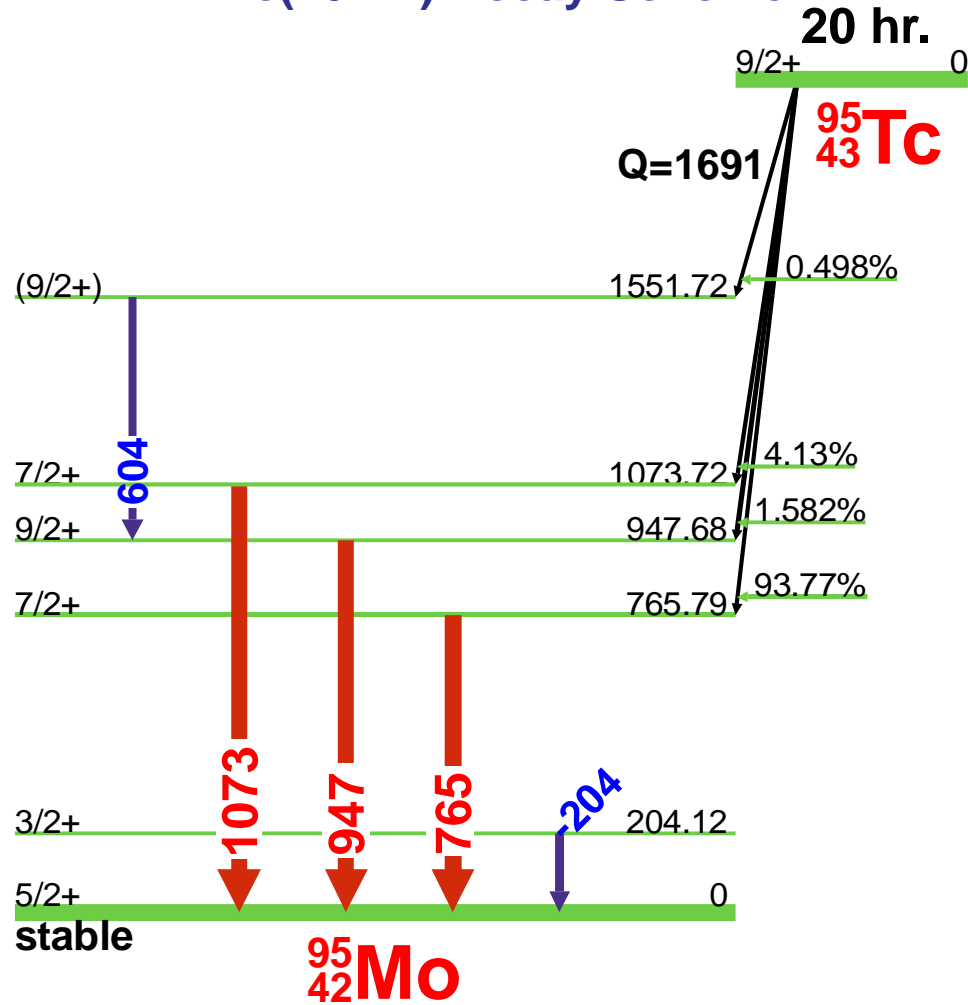
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	83.	0.		0.49		4
	449.2	0.3	2.7	3.3	0.3	3
Ann.	511.006			20.8	0.6	2
* Ann.	511.006			139.0	1.2	
	532.1	0.3	2.2	2.35	0.25	4
	702.67	0.07	99.8	99.6	1.8	1
	742.30	0.20	1.2	1.21	0.18	4
	849.74	0.07	97.7	95.7	1.8	1
*	871.05	0.07	100	94.2	0.5	1
	871.05	0.07		99.9		
*	875.1	0.3	1.6	0.79	0.19	4
	916.10	0.15	7.4	7.6	0.4	2
*	993.19	0.09	2.3	2.21	0.03	4
*	998.2	0.3		0.217	0.019	4
*	1005.8	0.3		0.15	0.08	4
*	1022.2	0.3		0.27	0.14	4
*	1037.2	0.3		0.044	0.014	4
*	1101.3	0.3		0.042	0.014	4
*	1196.4	0.3		0.75	0.09	4
*	1264.9	0.4		0.22	0.08	4
*	1357.4	1.5		0.19	0.08	4
*	1499.0	0.3		0.058	0.019	4
	1509.3	0.4	0.7	0.68	0.07	4
*	1522.10	0.20	5.6	4.52	0.28	3
	1592.1	0.3	2.4	2.25	0.20	2
*	1670.1	0.3		0.035	0.011	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	1757.9	0.3		0.151	0.019	4
	1765.6	0.7		0.29	0.05	4
*	1769.9	0.3		0.019	0.008	4
*	1864.			0.2355	0.0013	4
*	1868.68	0.08	6.2	5.75	0.28	2
*	1928.8	2.0		0.08	0.05	4
*	2027.5	0.3		0.024	0.006	4
*	2067.4	0.5		0.085	0.028	4
*	2257.5	0.3		0.053	0.017	4
*	2292.2	0.3		0.050	0.017	4
*	2393.2	0.4		0.47	0.19	4
*	2529.8	0.3		0.31	0.08	4
*	2577.2	2.0		0.12	0.05	4
*	2641.6	1.5		0.035	0.008	4
*	2664.1	2.0		0.07	0.06	4
*	2740.1	0.3	4.5	3.5	0.3	2
*	2869.9	0.3		0.021	0.007	4
*	3021.6	1.0		0.08	0.06	4
*	3065.6	0.3		0.011	0.004	4
*	3085.8	0.3		0.016	0.004	4
*	3129.1	0.5	2.7	1.38	0.14	2
*	3400.8	0.3		0.0047	0.0019	4
*	3447.0	0.3		0.0047	0.0019	4
*	3512.5	1.5		0.056	0.019	4
*	3640.6	0.3		0.0066	0.0019	4
*	3793.1	1.5		0.047	0.019	4
*	3892.7	2.5		0.015	0.009	4
*	4136.2	0.3		0.0066	0.0009	4





⁹⁵Tc(20 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ⁹⁵Tc

Half Life: 20.0(1) hr.

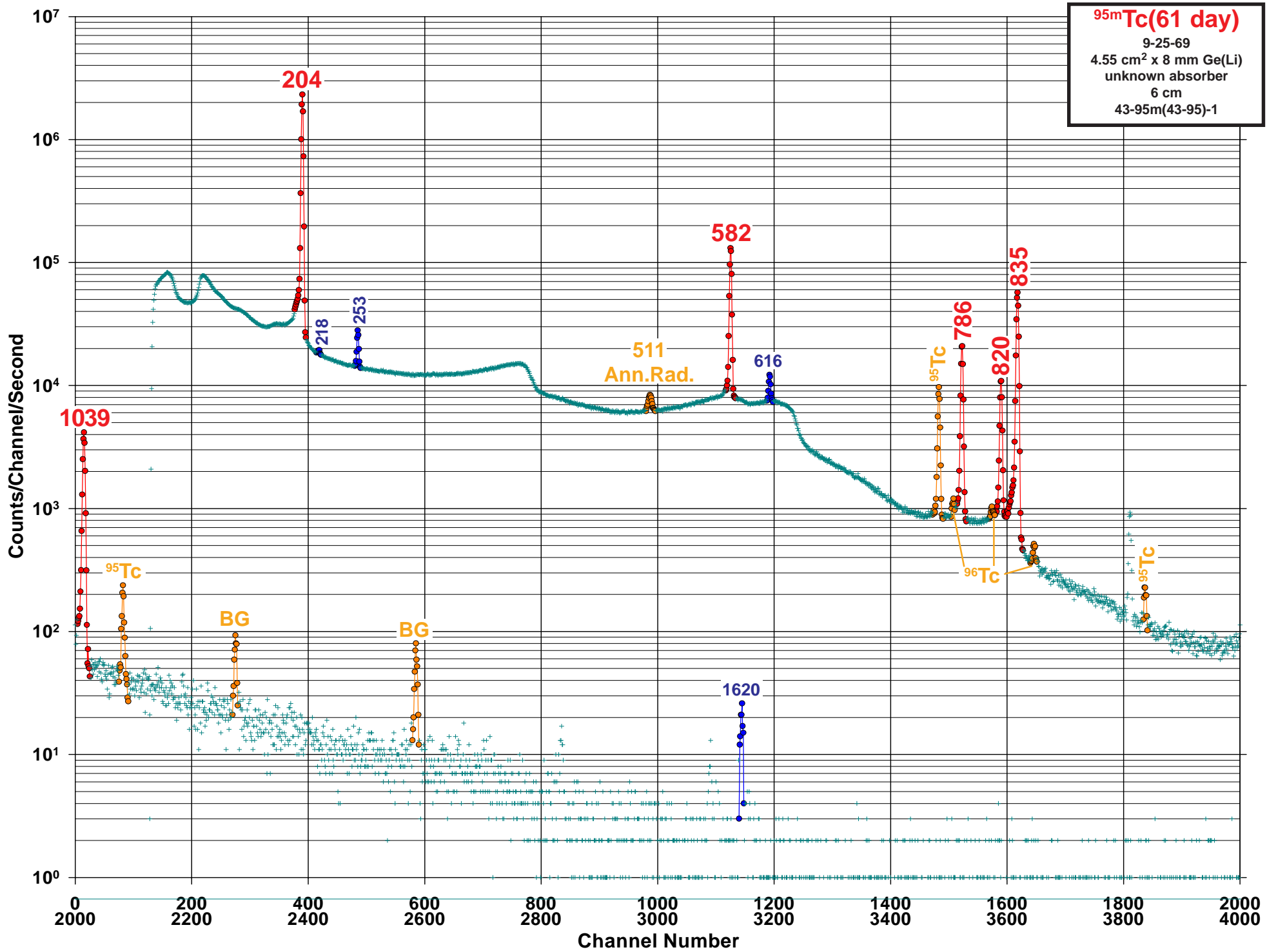
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ⁹⁵Mo (p,n)

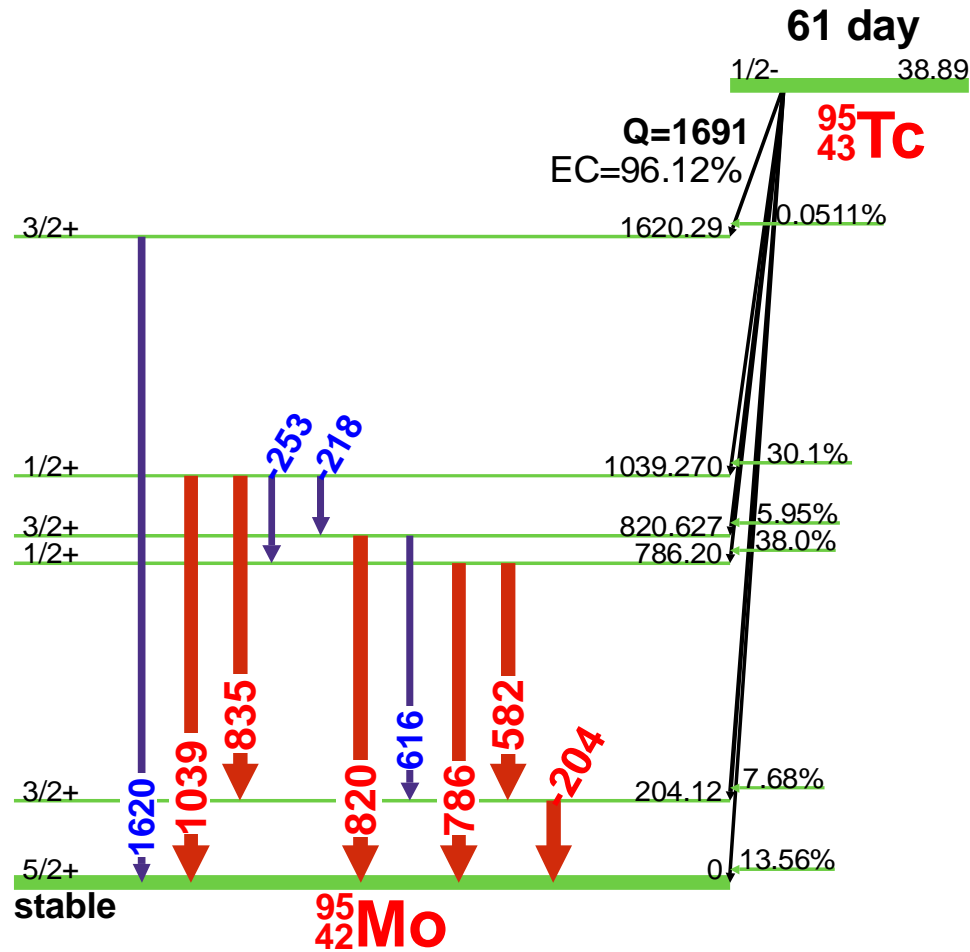
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
125.8	0.3		0.041	0.004	4
126.03	0.04		0.0103	0.0009	4
181.88	0.05		0.0025	0.0008	4
204.1161	0.0017		0.304	0.022	3
307.930	0.020		0.0347	0.0009	4
467.1			0.0001		4
477.7	0.4		0.013	0.005	4
495.16			0.0014		4
561.67	0.10		0.014	0.006	4
593.16	0.06		0.022	0.007	4
604.040	0.020		0.304	0.008	4
765.803	0.006	100	93.82	0.27	1
774.990	0.010		0.017	0.005	4
785.93	0.02		0.145	0.008	4
869.60	0.03		0.317	0.008	4
947.670	0.020	2.10	1.952	0.019	1
1056.70	0.25		0.0015	0.0008	4
1073.710	0.020	3.9	3.74	0.04	1
1221.90	0.15		0.009	0.004	4
1441.0	0.9		0.0007	0.0004	4
1551.71	0.05		0.0205	0.0017	4
1645.0	0.9		0.0006	0.0003	4
1683.					4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{95m}Tc(61 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{95m}Tc

Half Life: 61(2) day

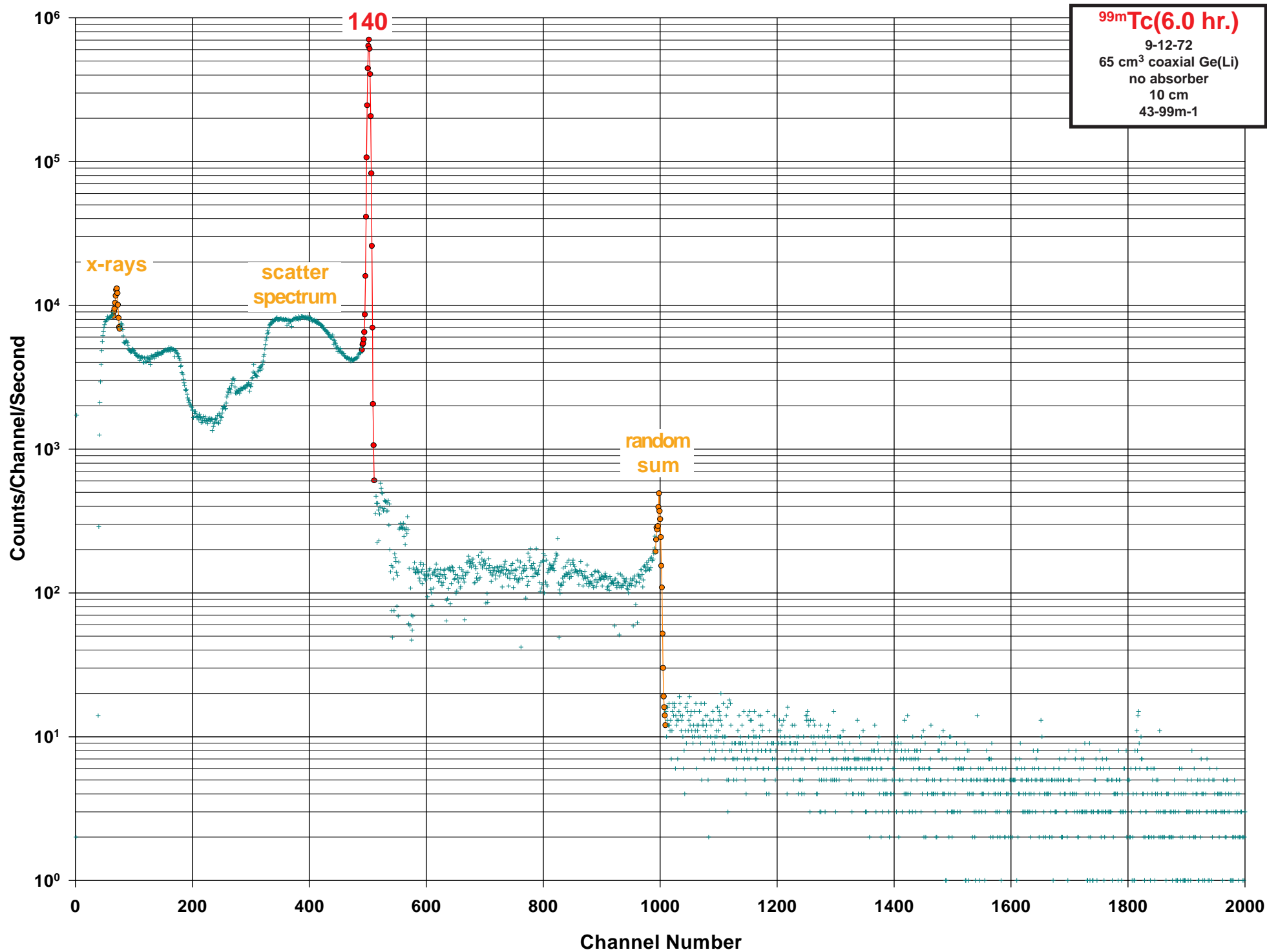
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ⁹⁵Mo(p,n)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
38.9	0.1		0.000073	0.000007	4
54.88			0.0002		4
204.1161	0.0017	100	65.8	0.8	1
218.66	0.08	0.06	0.0447	0.0020	4
245.83	0.09		0.0018	0.0005	4
253.068	0.004	0.95	0.636	0.009	3
263.			0.0001		4
291.67	0.04		0.0058	0.0005	4
318.27	0.10		0.0011	0.0004	4
Ann. 511.006			0.87	0.06	4
515.6	0.4		0.0003	0.0003	4
563.48	0.06		0.0099	0.0013	4
582.0775	0.0021	49.6	31.2	0.4	1
589.29	0.25		0.0011	0.0003	4
616.490	0.020	2.23	1.336	0.021	3
623.29	0.15		0.0059	0.0020	4
786.1922	0.0027	14.5	9.01	0.12	1
799.60	0.15		0.0015	0.0005	4
820.622	0.007	7.9	4.90	0.06	1
835.146	0.006	44.9	27.7	0.4	1
844.1	0.7		0.012	0.003	4
852.600	0.020		0.0217	0.0007	4
1039.260	0.006	4.6	2.89	0.04	1
1056.790	0.020		0.0092	0.0003	4
1098.					4
1165.5			0.0001		4
1222.00	0.03		0.0087	0.0002	4
1302.					4
1369.75	0.15		0.0001		4
1416.09	0.08		0.0019	0.0001	4
1426.11	0.15				4
1620.20	0.04	0.06	0.0397	0.0018	2
1660.27	0.25		0.	0.	4

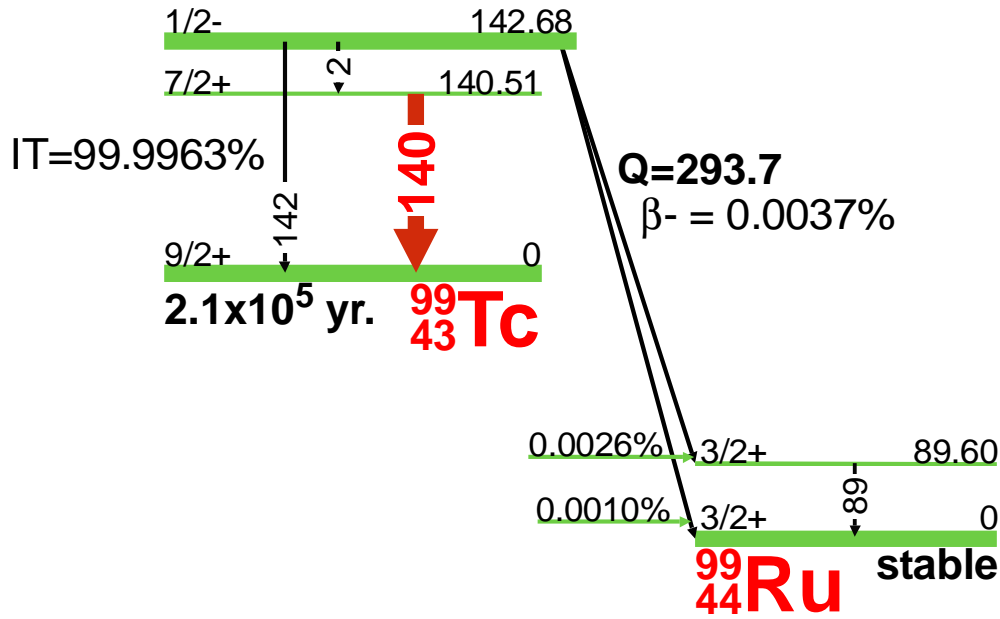
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{99m}Tc(6.0 hr.) Decay Scheme

6.0 hr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{99m}Tc

Half Life: 6.01(1) hr.

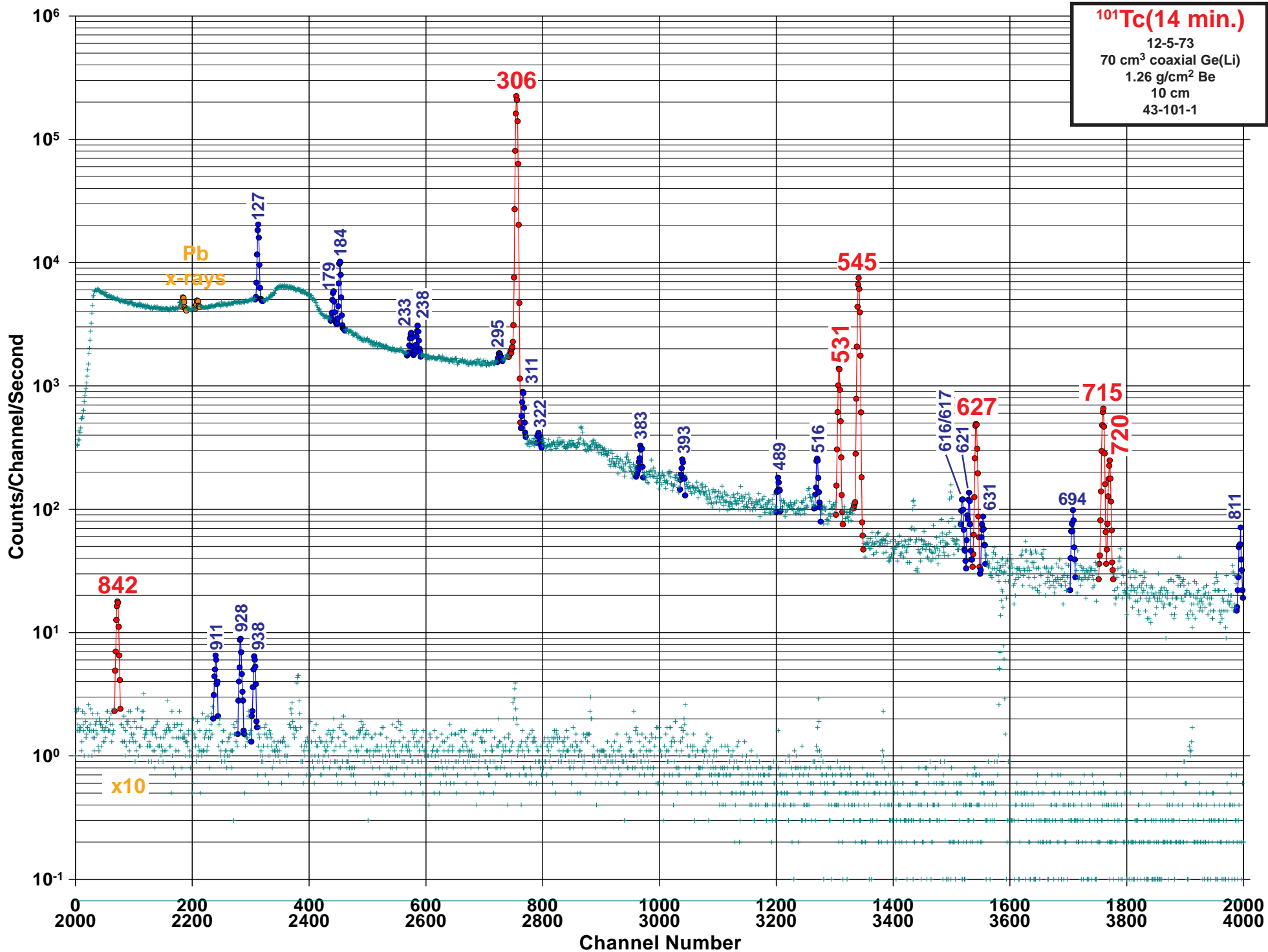
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ⁹⁸Mo(n,γ)β

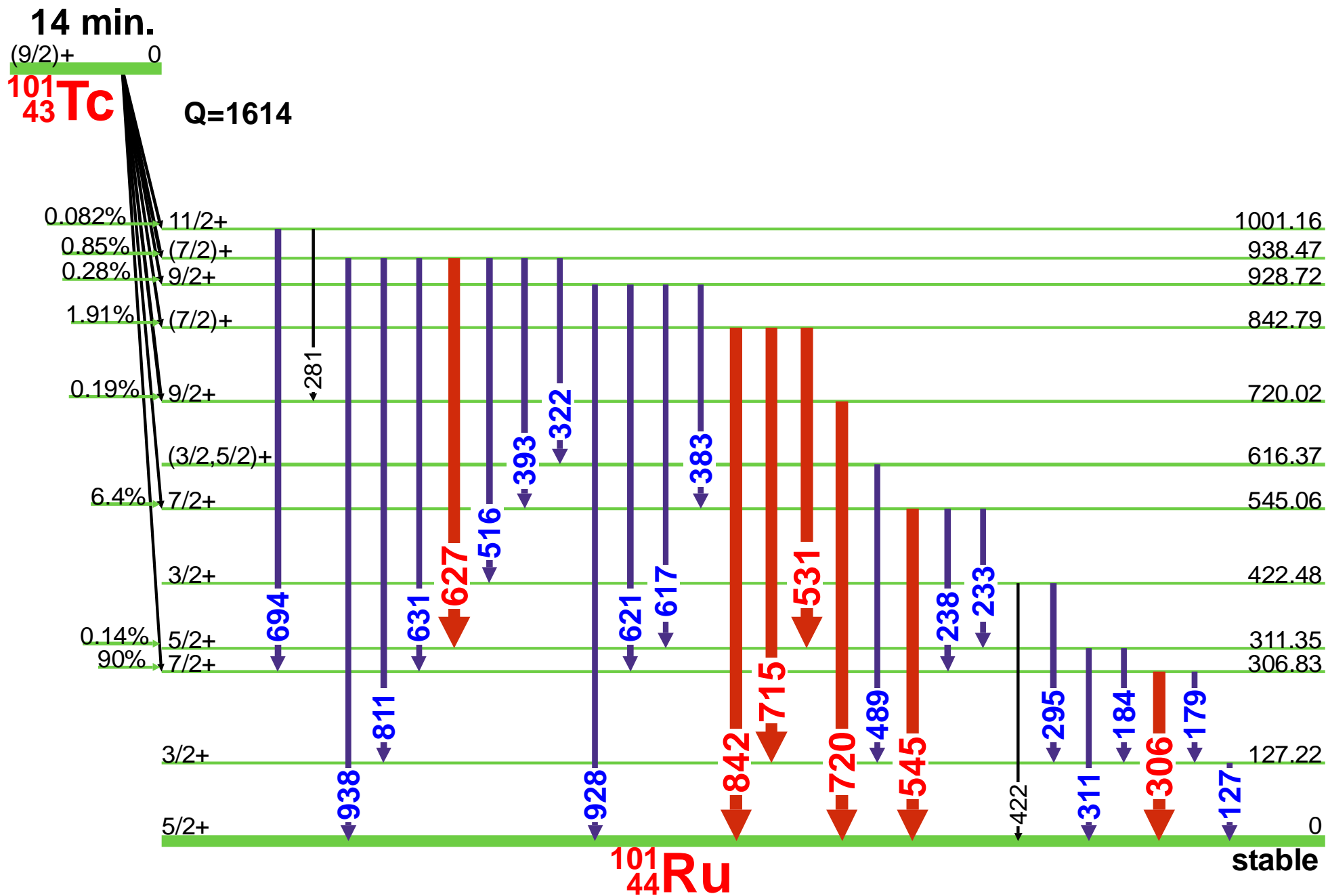
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
2.1726	0.0004				4
89.6	0.3				4
140.5110	0.0010	100	89.06	0.24	1
142.63	0.03		0.0187	0.0018	4
232.80	0.20		0.23	0.04	4
322.40	0.20		2.62	0.14	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁰¹Tc(14 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{101}Tc E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

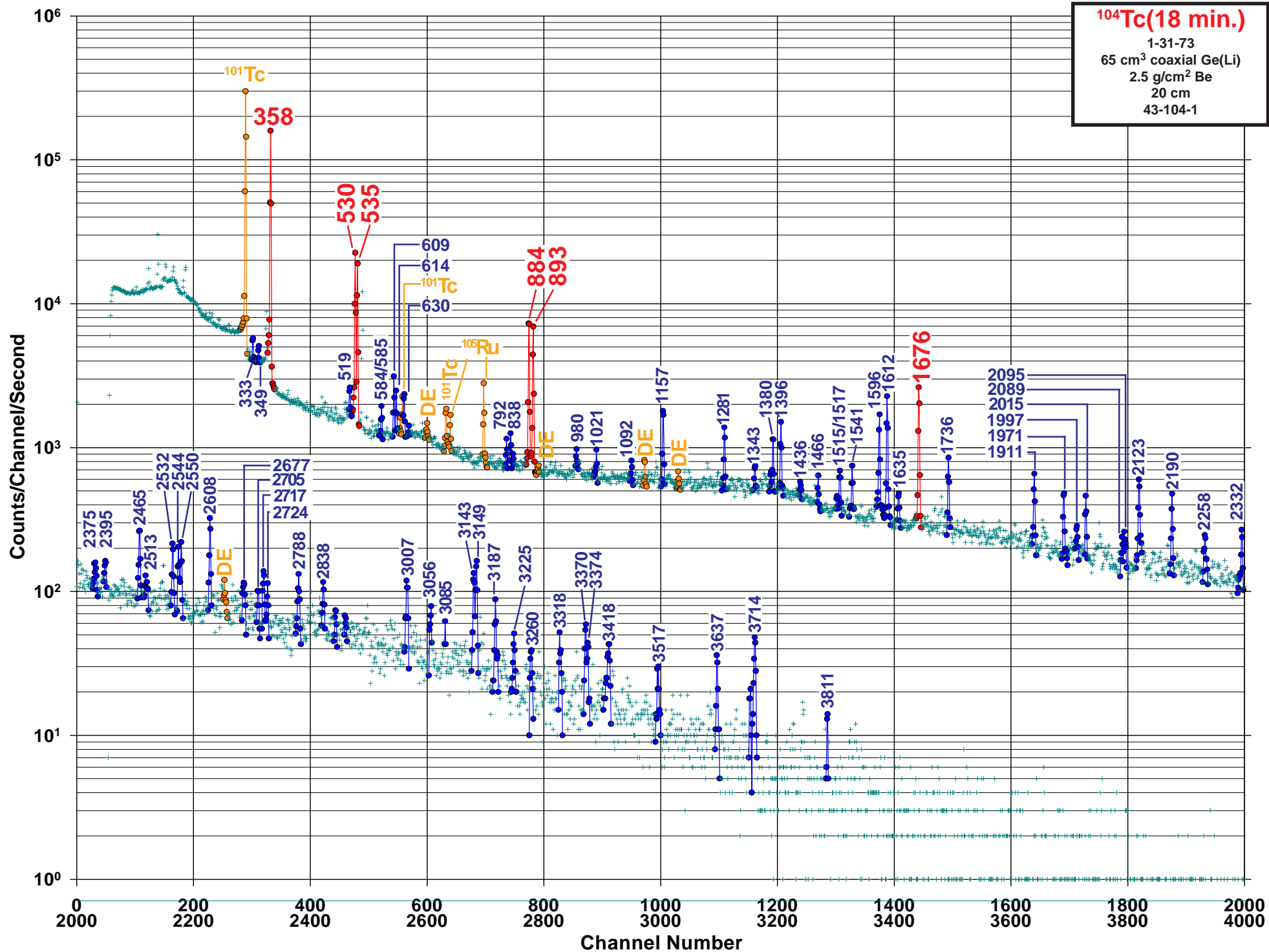
Half Life: 14.22(1) min.

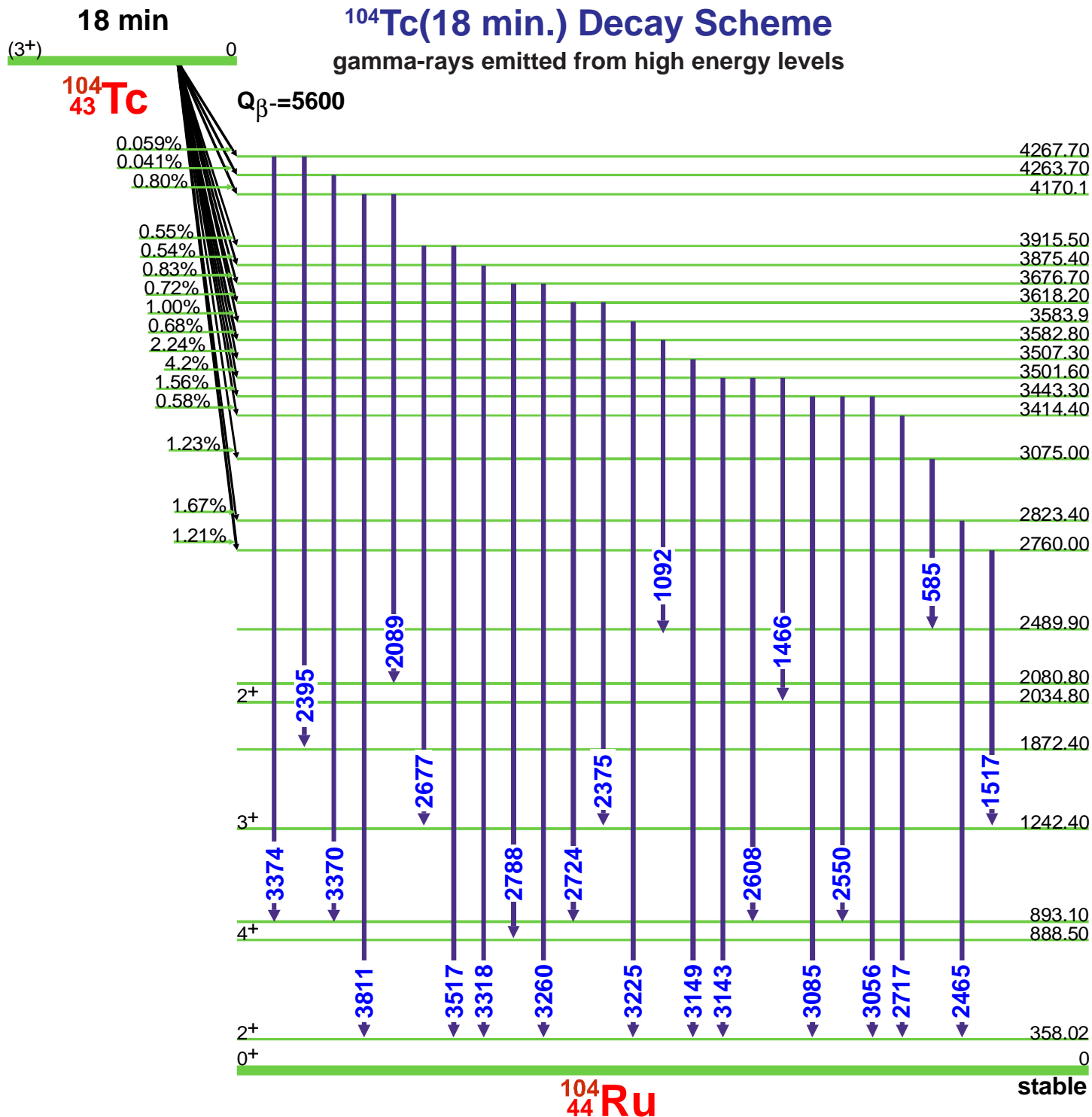
Detector: 70 cm³ coaxial Ge (Li)Method of Production: $^{100}\text{Mo}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
127.22	0.03	3.2	2.63	0.08	3
179.60	0.04	1.2	0.58	0.04	4
184.12	0.05	2.2	1.60	0.05	3
233.70	0.05	0.41	0.266	0.012	4
238.25	0.05	0.55	0.300	0.012	4
281.6	0.7		0.027	0.005	4
295.17	0.13	0.05	0.049	0.008	4
306.83	0.03	100	89.	4.	1
311.28	0.08	0.27	0.209	0.022	4
322.01	0.14	0.06	0.036	0.004	4
383.83	0.10	0.08	0.028	0.006	4
393.30	0.08	0.11	0.100	0.008	4
422.02	0.16		0.032	0.004	4
489.10	0.15	0.06	0.033	0.004	4
516.13	0.08	0.15	0.098	0.007	3
531.42	0.05	1.16	1.00	0.04	1

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
545.05	0.06	6.92	5.96	0.16	1
616.3		0.11	0.015	0.004	4
617.31	0.09		0.053	0.004	
621.99	0.12	0.12	0.082	0.005	3
627.00	0.06	0.54	0.435	0.018	1
631.74	0.12	0.06	0.0399	0.0027	3
673.4	0.6		0.031	0.004	4
694.30	0.15	0.08	0.054	0.006	3
715.53	0.04	0.834	0.674	0.027	1
720.02	0.05	0.31	0.215	0.011	1
811.13	0.09	0.08	0.058	0.005	3
842.73	0.07	0.29	0.224	0.009	1
911.57	0.12	0.10	0.053	0.018	3
928.72	0.06	0.13	0.111	0.007	2
938.65	0.20	0.10	0.082	0.005	3

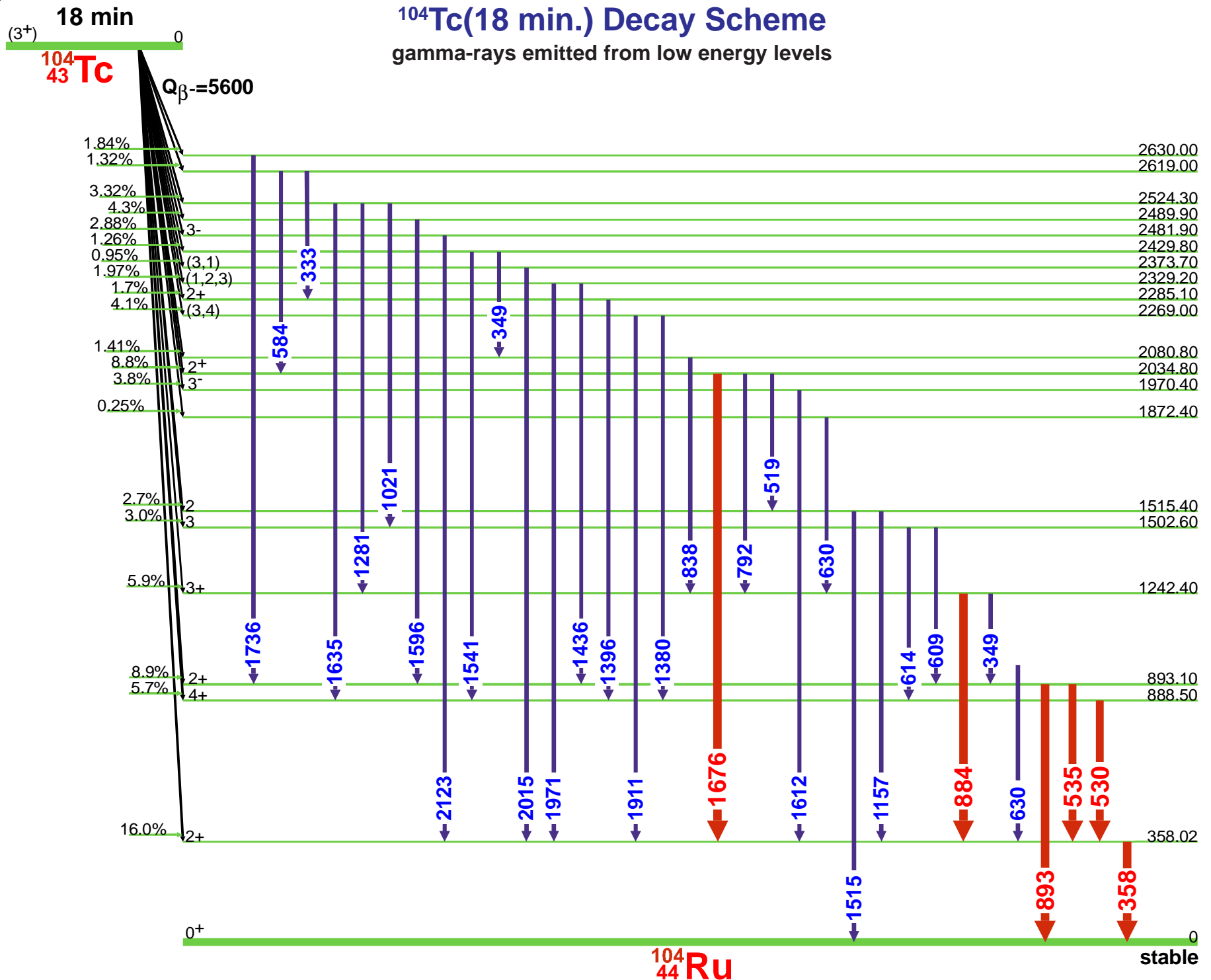






¹⁰⁴Tc(18 min.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{104}Tc E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 18.3(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{98}\text{Mo}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	
135.3	0.8		0.18	0.09	4		584.0	0.3	1.1	0.62	0.09	4	
150.8	0.7		0.44	0.09	4	D	585.1	0.3		0.20	0.05		
153.4	0.8		0.27	0.09	4		605.2	0.6		0.71	0.18	4	
160.4	0.3		1.9	0.4	4		609.50	0.10	2.2	1.96	0.28	3	
163.2	0.8		0.36	0.09	4		614.20	0.10		1.16	0.10	3	
170.0	0.7		0.27	0.09	4		627.00	0.20		0.22	0.05	4	
176.8	0.4		0.62	0.18	4		D	630.0	0.3		0.44	0.18	4
179.1	0.7		0.44	0.18	4	D	630.30	0.10		0.9	0.4		
219.0	0.6		0.36	0.18	4		648.7	0.3		0.23	0.05	4	
245.5	0.6		0.44	0.18	4		659.3	0.3		0.089	0.003	4	
272.0	1.0		0.19	0.09	4		668.00	0.10		0.35	0.05	4	
277.1	1.0		0.27	0.09	4		792.50	0.10	3.50	2.49	0.28	4	
280.8	1.0		0.18	0.09	4		795.4	0.3		0.17	0.04	4	
285.5	0.5		0.36	0.27	4		838.60	0.10	0.85	0.78	0.08	4	
294.9	0.5		0.6	0.4	4		884.40	0.10	13.0	10.9	1.2	1	
298.60	0.20		0.107	0.027	4		893.10	0.10	12.0	10.2	1.1	1	
314.7	0.3		0.19	0.04	4		919.00	0.20		0.12	0.04	4	
333.8	0.3		0.63	0.09	4		977.20	0.20		0.134	0.027	4	
D	349.1	3.3	0.09	0.04	4		980.80	0.20	0.7	0.51	0.06	4	
	349.30		2.49	0.28			984.00	0.20			0.151	0.027	4
	353.7		0.98	0.18	4		986.60	0.20		0.21	0.04	4	
	358.00	100	89.	3.	1		1021.80	0.10	0.8	0.46	0.05	4	
	407.1		0.27	0.09	4		1092.90	0.10	0.75	0.45	0.05	4	
	413.20		0.12	0.04	4		1119.40	0.10		0.61	0.07	4	
	421.8		0.27	0.09	4		1128.0	0.3		0.31	0.09	4	
	459.60		0.107	0.027	4		1133.4	0.3		0.22	0.09	4	
	475.00		0.27	0.07	4		1142.30	0.20		0.33	0.05	4	
	511.6		0.14	0.04	4		1144.70	0.20		0.41	0.05	4	
	519.40	1.20	0.89	0.09	4		1157.40	0.10	3.50	2.85	0.28	3	
	527.20		0.39	0.07	4		1187.70	0.20		0.34	0.04	4	
	530.50	22.1	15.6	1.2	1		1201.60	0.20		0.44	0.06	4	
	535.10	18.2	14.7	1.2	1		1210.0	0.3		0.29	0.04	4	
	542.7		0.267	0.009	4		1239.60	0.20		0.178	0.027	4	
	553.80		0.30	0.06	4		1247.60	0.10		0.56	0.07	4	
	565.5		0.089	0.003	4		1269.00	0.20		0.44	0.06	4	
	581.2		0.27	0.09	4		1281.80	0.10	2.70	2.05	0.19	3	

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{104}Tc E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 18.3(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{98}\text{Mo}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1343.90	0.10	0.81	0.67	0.07	4
1363.3	0.3		0.24	0.05	4
1376.10	0.20		0.36	0.05	4
1380.50	0.10	2.35	1.69	0.19	3
1396.60	0.10	3.40	2.40	0.28	3
1436.3	0.3		0.36	0.09	4
1466.70	0.10	1.30	0.89	0.09	4
1472.50	0.10		0.69	0.07	4
1515.50	0.20	1.62	0.79	0.09	4
1517.40	0.20		0.74	0.09	
1531.2	0.3		0.40	0.08	4
1536.7	0.4		0.17	0.04	4
1541.30	0.10	1.9	1.07	0.10	3
1580.9	0.3		0.29	0.05	4
1593.6	0.3		0.34	0.05	4
1596.70	0.10	5.30	4.2	0.4	2
1601.50	0.20		0.19	0.04	4
1609.0	0.3		0.12	0.04	4
1612.40	0.10	7.0	5.8	0.6	2
1633.70	0.20		0.12	0.04	4
1635.80	0.20	1.0	0.63	0.07	4
1676.80	0.10	9.80	7.8	0.8	1
1708.90	0.20		0.36	0.09	4
1722.70	0.10		0.69	0.07	4
1736.90	0.10	2.51	1.87	0.19	3
1840.5	0.3		0.18	0.09	4
1871.6	0.3		0.22	0.09	4
1911.00	0.10	2.30	1.96	0.19	3
1927.9	0.3		0.42	0.06	4
1931.2	0.3		0.36	0.05	4
1934.8	0.3		0.22	0.04	4
1937.3	0.3		0.20	0.04	4
1971.10	0.20	1.70	1.60	0.19	3
1986.20	0.20		0.18	0.09	4
1997.10	0.20		0.55	0.06	4
2015.70	0.10	1.60	1.78	0.19	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2061.80	0.20		0.31	0.05	4
2089.30	0.20	0.45	0.41	0.05	4
2095.30	0.20		0.54	0.06	4
2123.80	0.10	3.20	2.22	0.19	2
2151.10	0.20		0.214	0.028	4
2181.90	0.10	0.7	0.44	0.05	4
2190.50	0.10	1.85	1.78	0.19	3
2239.30	0.20		0.33	0.05	4
2258.10	0.20	0.80	0.65	0.07	4
2332.20	0.20	1.0	0.98	0.09	3
2340.4	0.5		0.22	0.05	4
2375.80	0.20		0.19	0.04	4
2395.30	0.20	0.7	0.35	0.05	4
2465.50	0.20	1.50	1.16	0.10	3
2513.80	0.20	0.61	0.51	0.06	4
2525.8	0.3		0.098	0.018	4
2532.90	0.20	1.15	0.86	0.09	3
2544.30	0.20	1.20	0.69	0.07	3
2550.20	0.20	1.10	0.872	0.085	3
2608.50	0.20	1.75	1.60	0.19	3
2633.0	0.3		0.10	0.04	4
2653.9	0.3		0.231	0.028	4
2658.8	0.3		0.249	0.028	4
2677.00	0.20		0.33	0.05	4
2690.90	0.20		0.18	0.04	4
2705.90	0.20		0.258	0.028	4
2717.00	0.20	0.5	0.59	0.07	3
2724.90	0.20	0.40	0.36	0.05	3
2788.20	0.20	0.70	0.53	0.06	3
2813.2	0.3		0.205	0.028	4
2816.8	0.3		0.142	0.027	4
2830.2	0.3		0.214	0.028	4
2838.3	0.3	0.60	0.37	0.05	4
2927.9	0.5		0.13	0.04	4
2975.8	0.3		0.222	0.028	4
2982.3	0.3		0.107	0.018	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{104}Tc E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

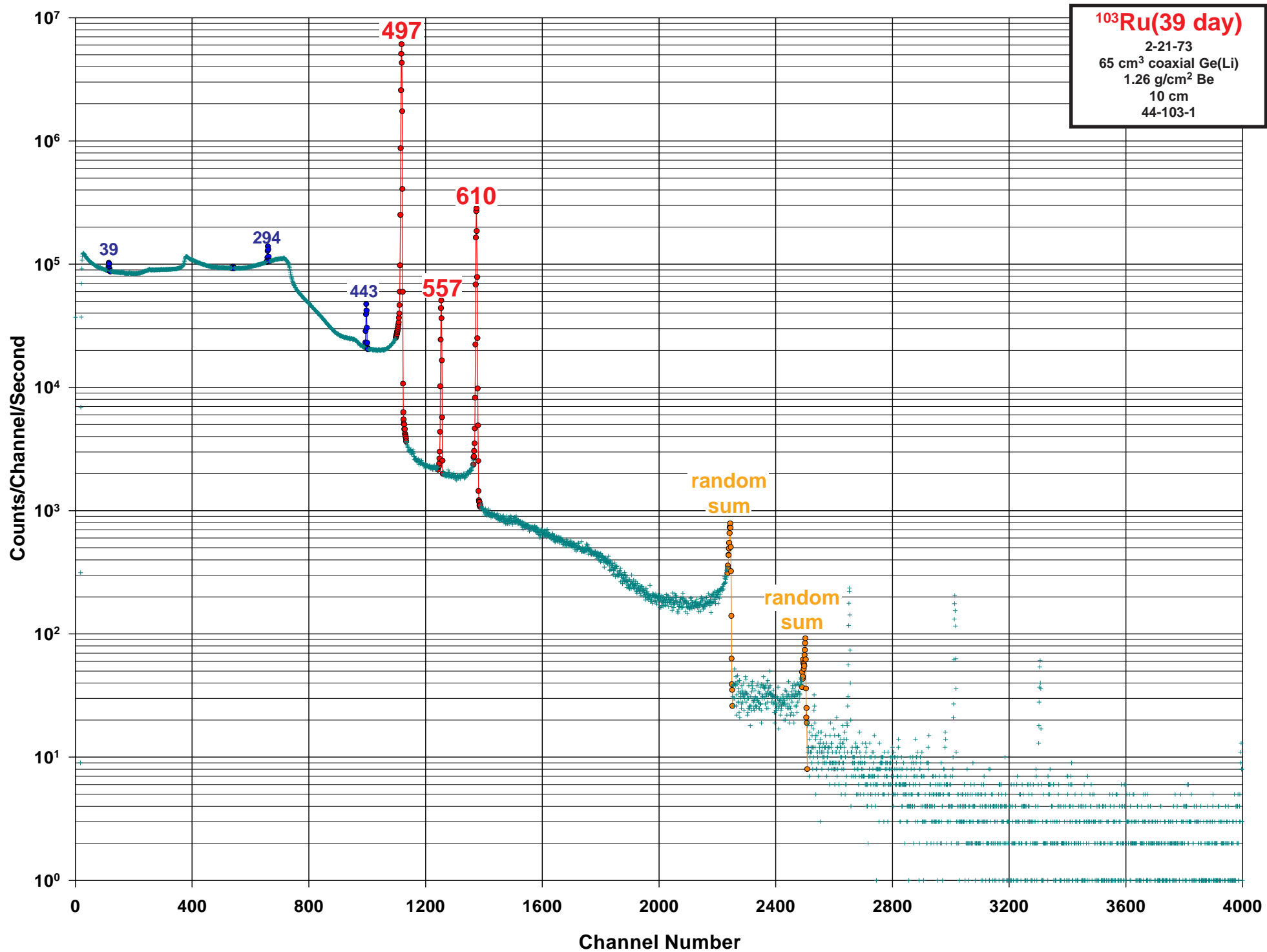
Half Life: 18.3(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{98}\text{Mo}(n,\gamma)\beta$

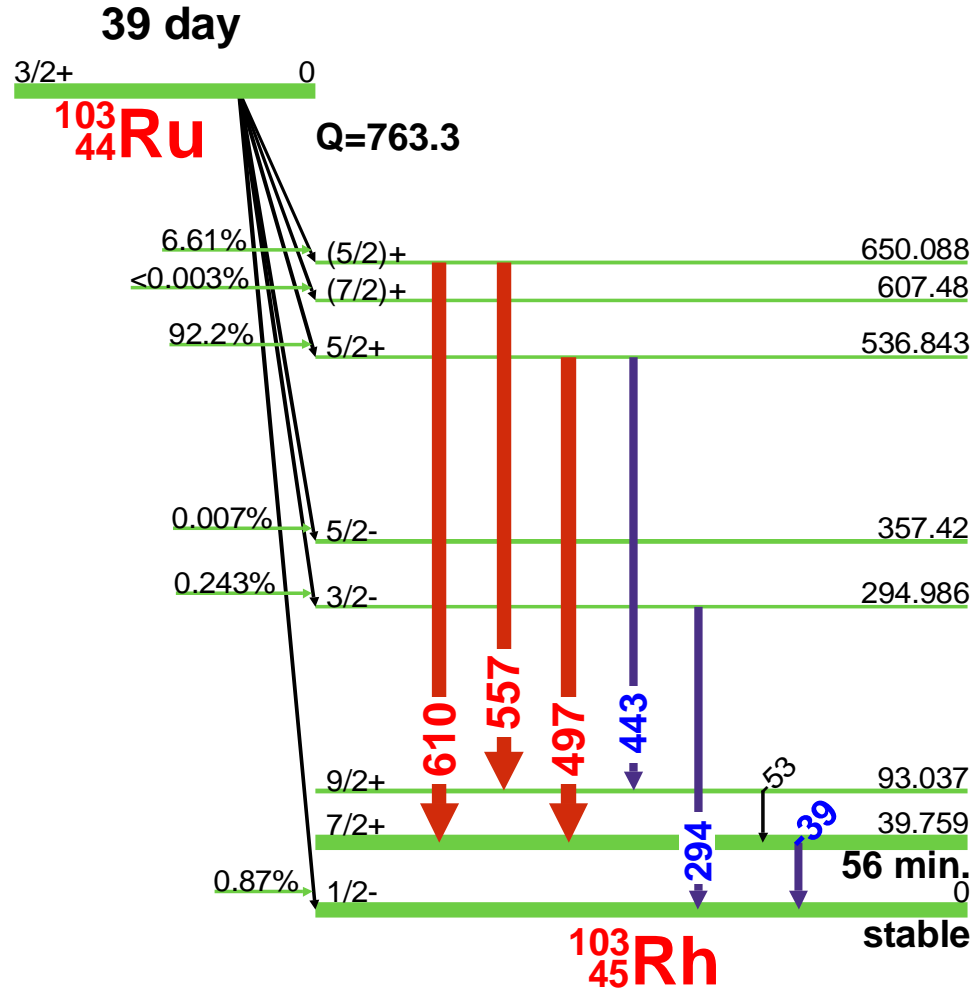
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
3007.0	0.3		0.36	0.05	3
3026.4	0.3		0.222	0.028	4
3056.5	0.3		0.31	0.04	4
3085.4	0.3		0.151	0.027	4
3143.40	0.20	1.0	0.80	0.09	3
3149.20	0.20	1.40	1.16	0.10	3
3187.3	0.3		0.41	0.05	4
3225.6	0.3	0.50	0.31	0.04	4
3260.3	0.3		0.169	0.027	4
3276.8	0.3		0.134	0.027	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
3318.7	0.3		0.29	0.04	4
3370.6	0.3	0.55	0.29	0.04	3
3374.5	0.3	0.2	0.24	0.04	3
3418.2	0.3	0.50	0.36	0.07	4
3517.3	0.4	0.18	0.160	0.027	4
3637.7	0.4	0.30	0.28	0.04	4
3704.3	0.4		0.098	0.018	4
3714.3	0.4	0.50	0.47	0.06	3
3811.9	0.4	0.2	0.12	0.04	4





¹⁰³Ru(39 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁰³Ru

Half Life: 39.26(2) day

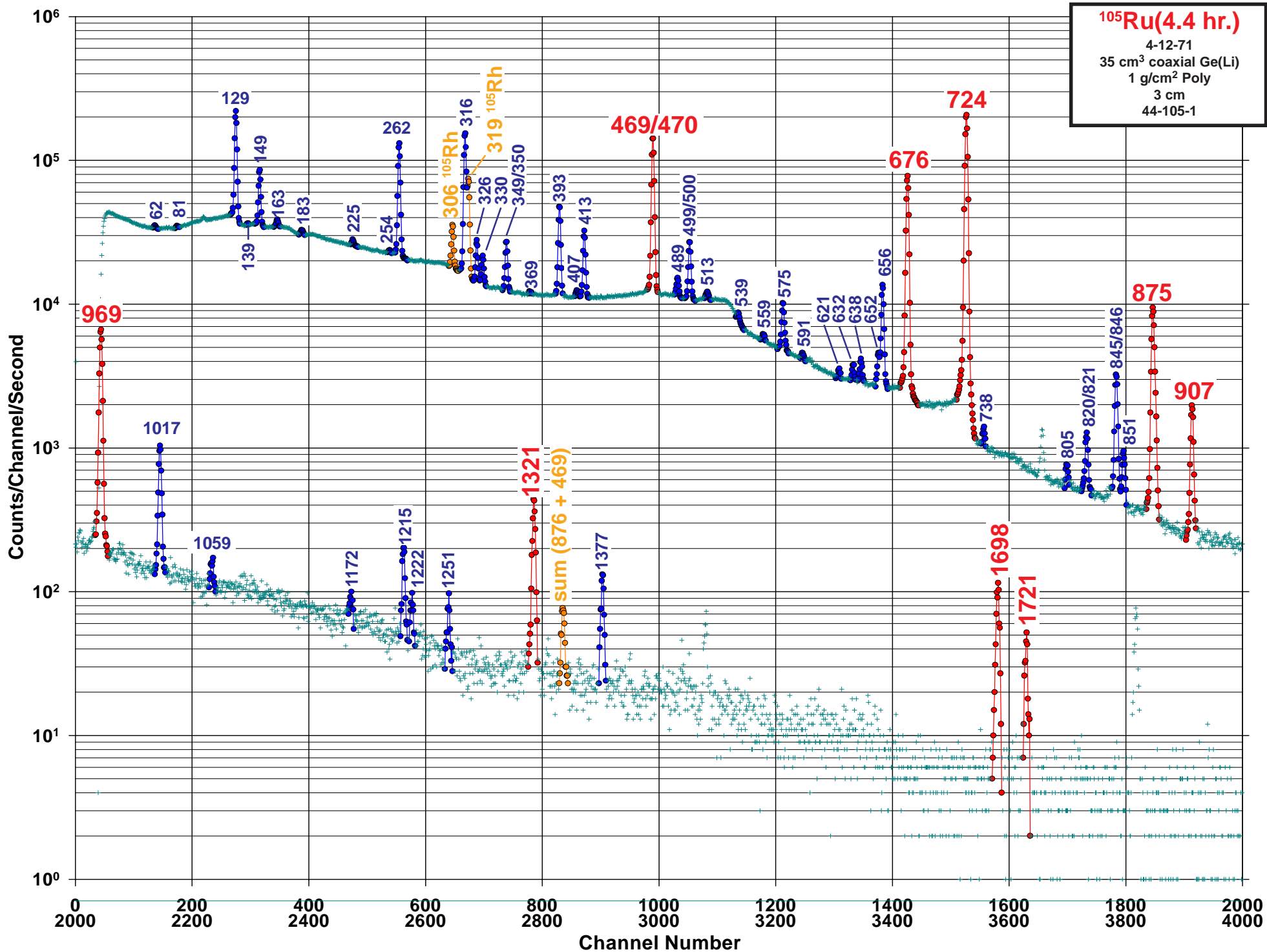
Detector: 65 cm³ coaxial Ge (Li)

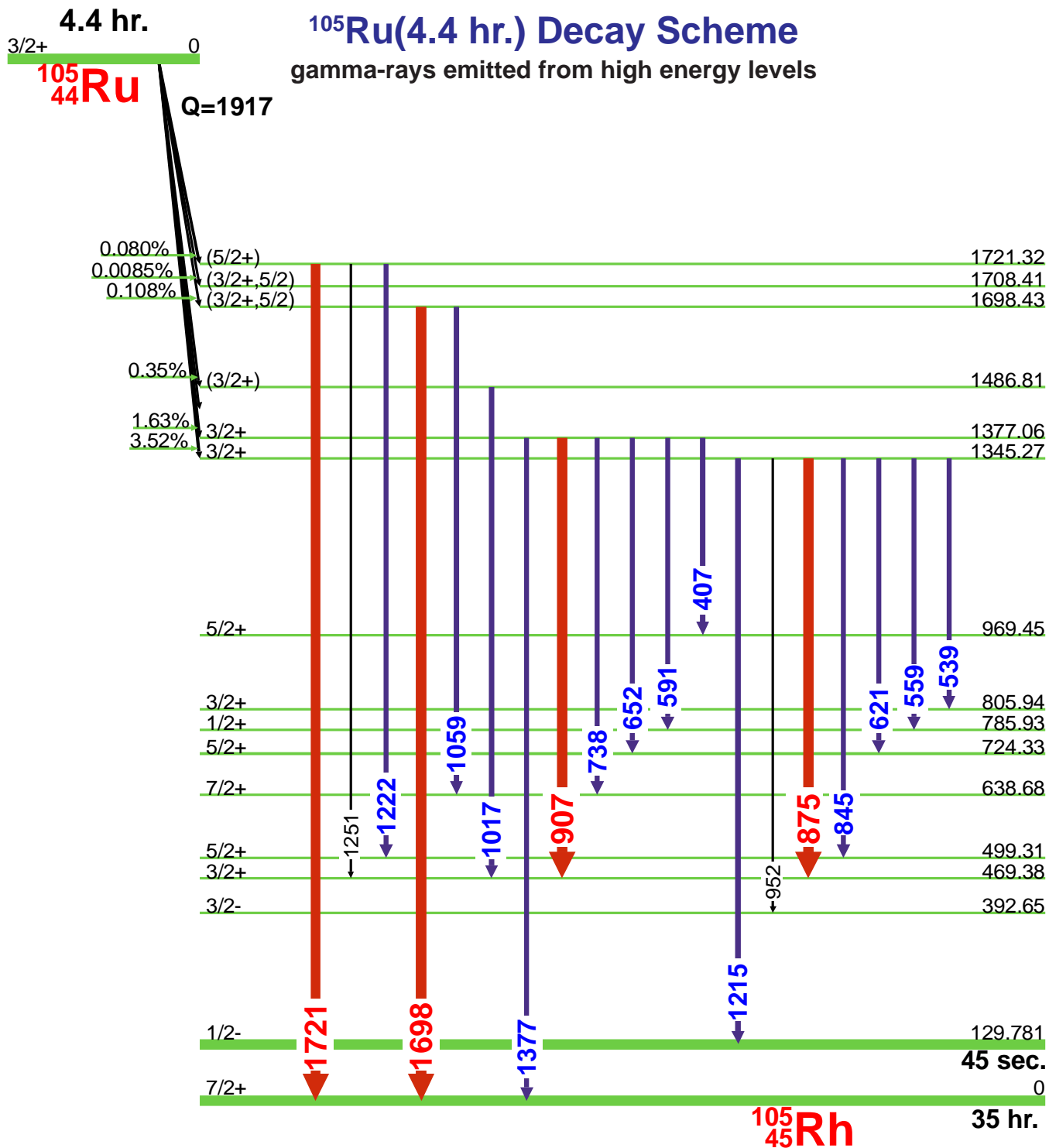
Method of Production: ¹⁰²Ru(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
39.760	0.010	0.060	0.0692	0.0011	4
42.63	0.04		0.0052	0.0005	4
53.275	0.010	0.41	0.443	0.011	4
62.41	0.03		0.0004		4
113.25	0.07		0.0035	0.0007	4
114.970	0.020		0.0074	0.0005	4
241.88	0.05		0.0180	0.0013	4
292.70	0.20		0.0057	0.0003	4
294.980	0.020	0.31	0.3030	0.0051	4
317.72	0.05				4
317.77	0.22		0.019	0.009	4
357.39	0.14		0.0094	0.0006	4
443.800	0.020	0.40	0.345	0.004	3
497.084	0.006	100	91.0	1.2	1
514.60	0.15		0.0114	0.0015	4
557.040	0.020	0.87	0.868	0.012	1
567.87	0.13		0.0028	0.0001	4
610.330	0.020	7.4	5.76	0.06	1
612.02	0.03		0.1074	0.0029	4
651.8	0.4		0.0069	0.0023	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data



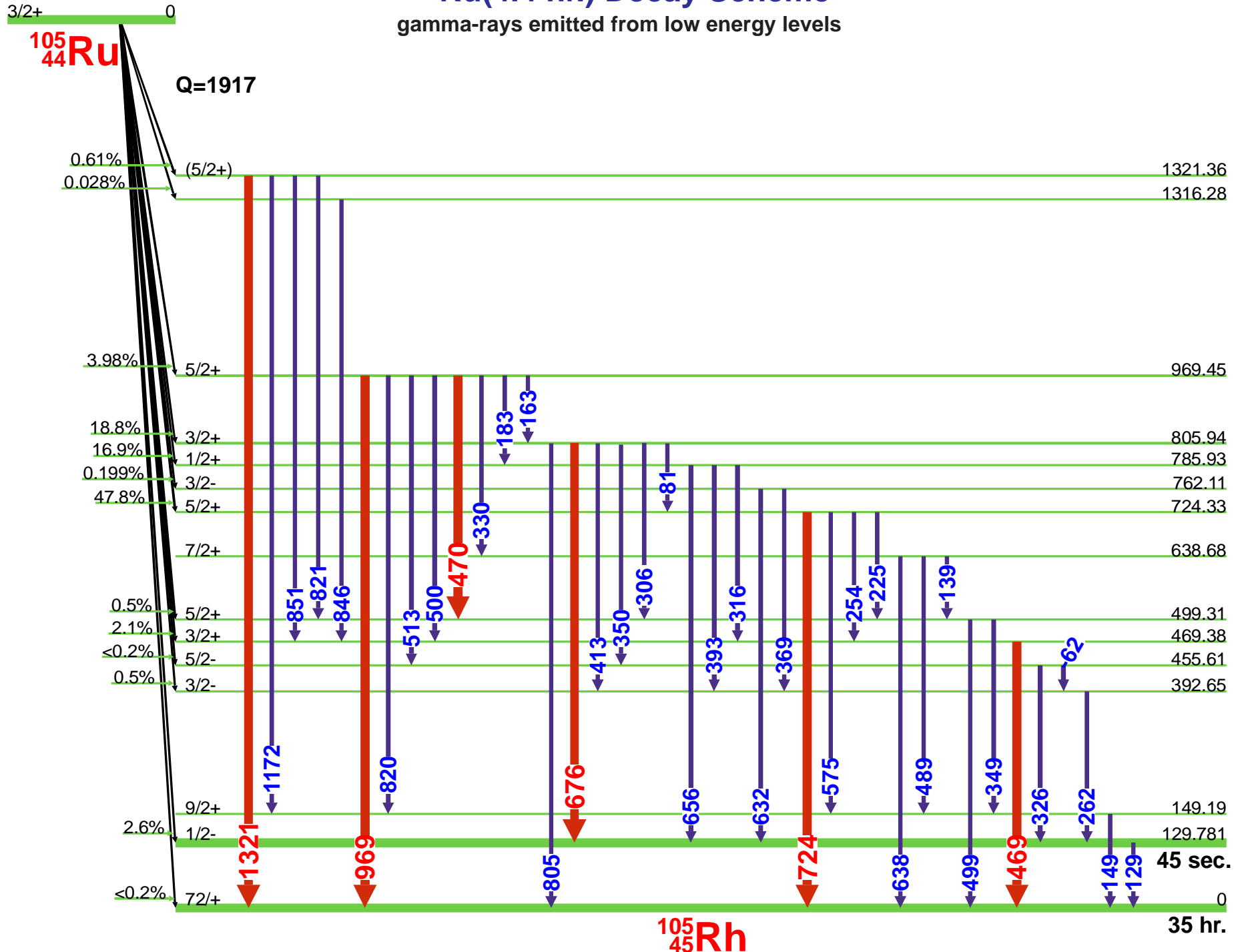




4.4 hr.

¹⁰⁵Ru(4.4 hr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{105}Ru E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.44(2) hr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{104}\text{Ru}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	62.39	0.10		0.066	0.010	4
	81.20	0.10		0.052	0.010	4
	129.782	0.004	11.1	5.68	0.15	2
	139.33	0.10	0.030	0.047	0.010	4
	149.10	0.07	3.4	1.75	0.19	3
	163.46	0.10	0.37	0.156	0.019	4
	183.60	0.12	0.25	0.099	0.010	4
	225.08	0.12	0.41	0.123	0.010	4
	245.21	0.15		0.025	0.005	4
	254.88	0.12	0.17	0.066	0.010	4
	262.83	0.10	14.4	6.57	0.16	2
	286.30	0.20		0.028	0.005	4
	306.66	0.12		0.080	0.010	4
	316.44	0.15	25.0	11.1	0.4	2
	326.14	0.10	2.7	1.06	0.12	3
	330.85	0.10	1.6	0.67	0.08	4
	339.40	0.20		0.014	0.005	4
	343.30	0.20		0.028	0.005	4
D	349.96	0.10	2.9	0.288	0.014	3
	350.18	0.10		1.02	0.12	
	369.45	0.12		0.047	0.010	4
	393.36	0.10	8.1	3.78	0.06	3
	407.60	0.15	0.37	0.090	0.010	4
	413.53	0.10	4.8	2.27	0.24	3
D	469.37	0.10	37.0	17.5	0.6	1
	470.1	0.4		0.184	0.024	
	479.60	0.20		0.0279	0.0010	4
	489.48	0.10	1.3	0.5487	0.0618	4
D	499.3	0.4	5.1	2.03	0.28	3
	500.10	0.20		0.55	0.08	
	513.73	0.10	0.60	0.20	0.05	4
	539.29	0.10	1.5	0.114	0.010	4
	559.24	0.10	0.63	0.109	0.010	4
	572.			0.010	0.005	4
	575.07	0.12	2.40	0.85	0.10	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	577.0	0.4		0.019	0.005	4
	591.20	0.15	0.54	0.080	0.010	4
	597.10	0.15		0.030	0.007	4
	621.04	0.10	0.20	0.071	0.010	4
	632.34	0.10	0.43	0.151	0.014	4
	635.50	0.20		0.014	0.005	4
	638.66	0.10	0.60	0.222	0.024	4
	652.70	0.10	0.7	0.31	0.03	4
	656.21	0.10	4.9	2.08	0.28	2
	676.36	0.08	33.1	15.7	0.5	1
	701.00	0.20		0.019	0.005	4
	707.0	1.0		0.010	0.005	4
	724.30	0.03	100	47.3	0.5	1
	738.27	0.10	0.28	0.076	0.010	4
	805.84	0.15	0.16	0.045	0.010	4
D	820.00	0.20	0.51	0.014	0.005	3
	821.98	0.12		0.21	0.04	
D	845.91	0.12	1.9	0.63	0.07	2
	846.90	0.20		0.028	0.005	
	851.98	0.10	0.39	0.156	0.019	3
	875.85	0.15	6.4	2.50	0.10	1
	878.20	0.20		0.47	0.05	4
	907.64	0.10	1.17	0.53	0.06	1
	952.78	0.10	0.08	0.0151	0.0014	4
	969.44	0.10	4.6	2.10	0.07	1
	977.90	0.20		0.0019	0.0005	4
	984.60	0.20		0.0104	0.0019	4
	987.00	0.20		0.0071	0.0014	4
	1017.47	0.10	0.70	0.32	0.03	2
	1059.60	0.20	0.06	0.027	0.007	4
	1082.70	0.20		0.0080	0.0019	4
	1085.40	0.20		0.0047	0.0014	4
	1094.			0.0033	0.0009	4
	1172.58	0.20		0.0076	0.0019	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{105}Ru E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

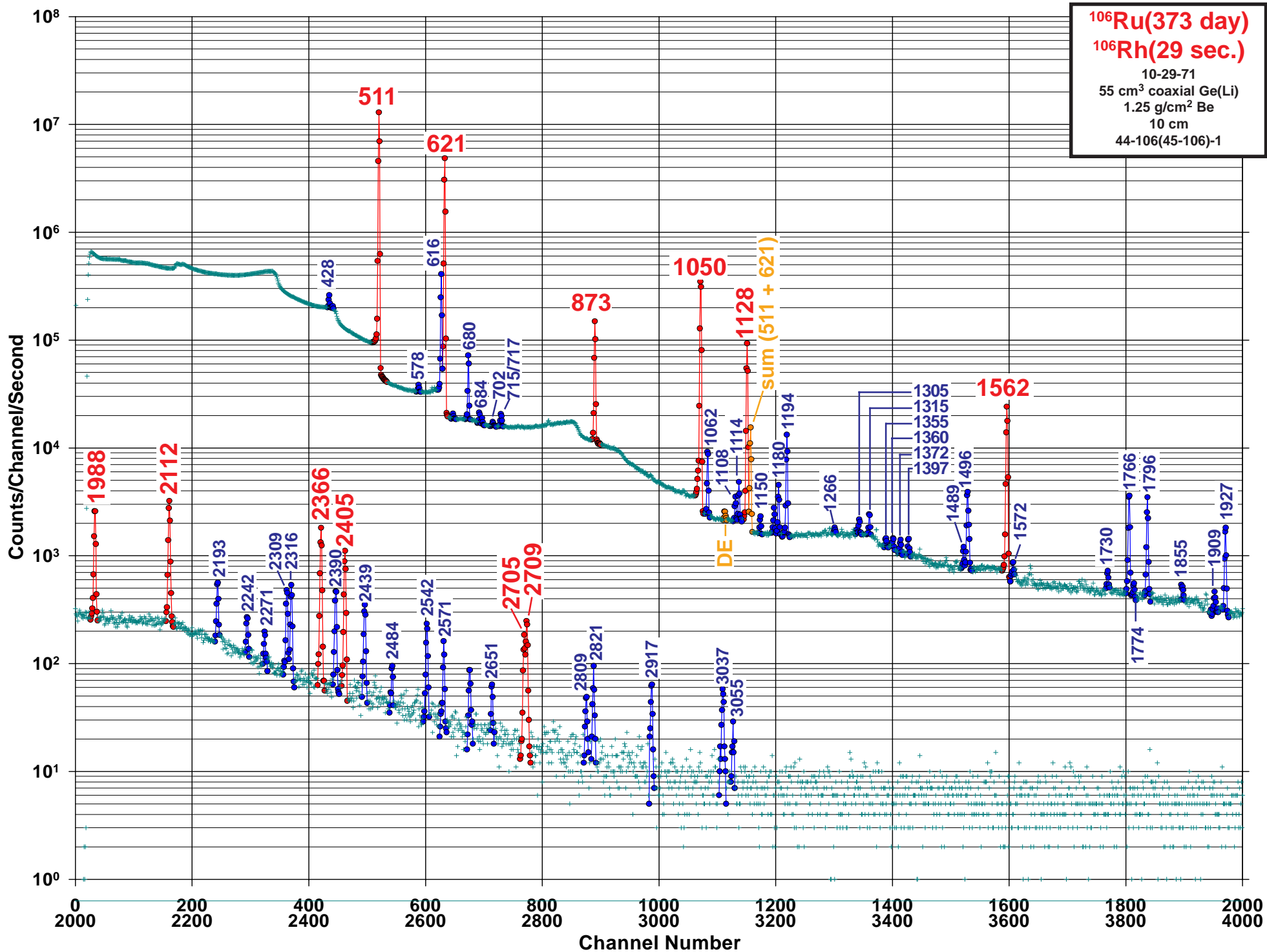
Half Life: 4.44(2) hr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{104}\text{Ru}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1209.00	0.20		0.0061	0.0019	4
1215.38	0.10	0.15	0.071	0.010	3
1222.00	0.20	0.06	0.0184	0.0024	3
1229.50	0.20		0.0057	0.0014	4
1238.80	0.20		0.0019	0.0005	4
1251.89	0.15		0.0194	0.0024	3
1321.26	0.10	0.45	0.203	0.024	1
1340.			0.0005	0.0000	4
1357.20	0.20		0.0024	0.0005	4
1377.06	0.11	0.12	0.057	0.010	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1441.20	0.20		0.0061	0.0019	4
1448.30	0.20		0.0052	0.0014	4
1571.			0.0009	0.0005	4
1698.10	0.20	0.17	0.076	0.014	1
1708.70	0.20		0.0005	0.0002	4
1721.36	0.15	0.07	0.033	0.010	1
1765.4	0.3		0.0002	0.0001	4
1809.			0.0002	0.0002	4
1829.6	0.3		0.0008	0.0006	4





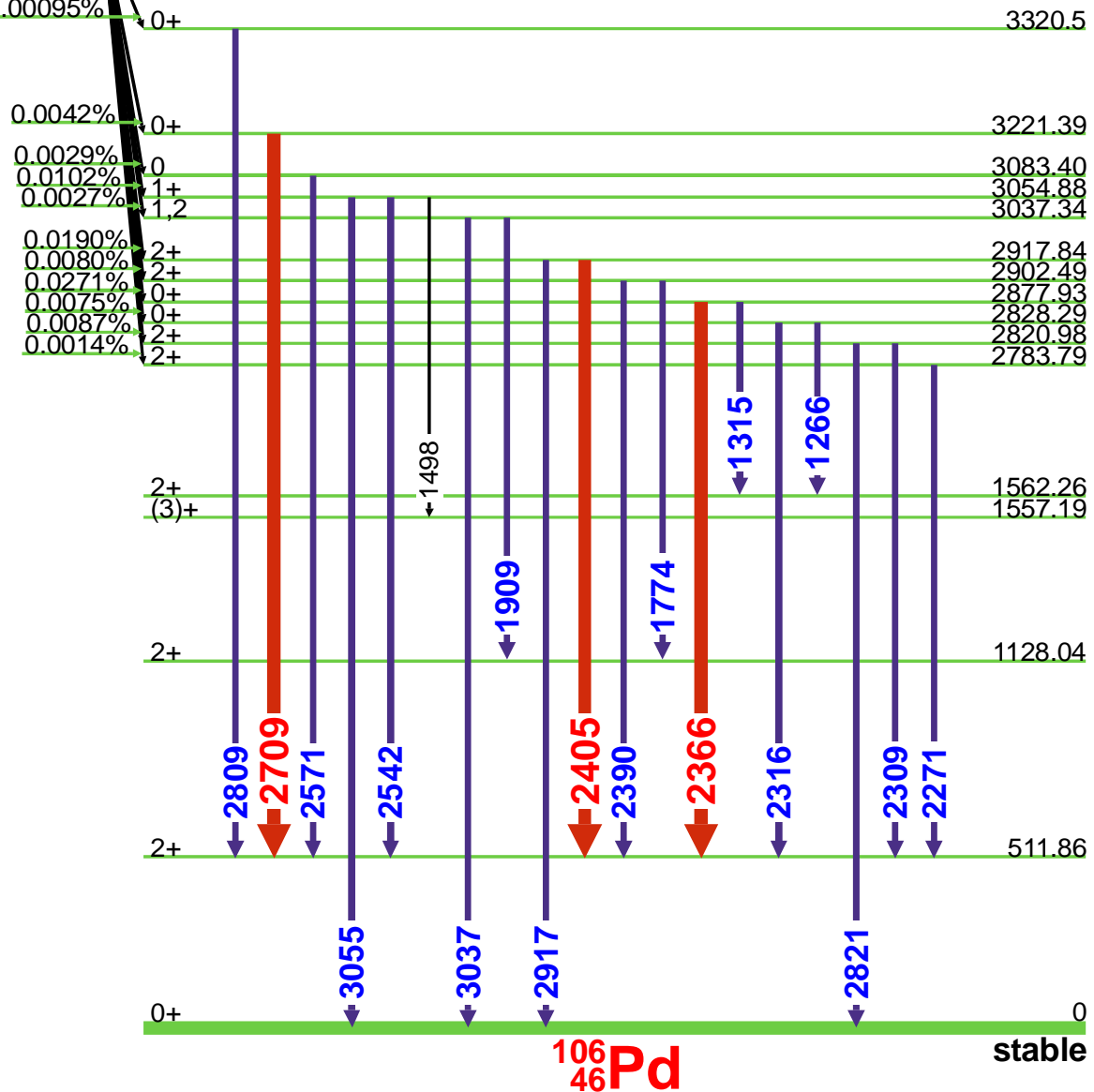
373 day $^{106}_{44}\text{Ru}$ Decay Scheme
 gamma-rays emitted from high energy levels

$^{106}_{44}\text{Ru}$ $Q=39.40$

100% $^{106}_{45}\text{Rh}$ **29 sec.**

$^{106}_{45}\text{Rh}$ $Q=3541$

$^{106}\text{Rh}(29 \text{ sec.})$ Decay Scheme
 gamma-rays emitted from high energy levels



373 day



Q=39.40

gamma-rays emitted from low energy levels

$^{106}\text{Ru}(373 \text{ day})$ Decay Scheme

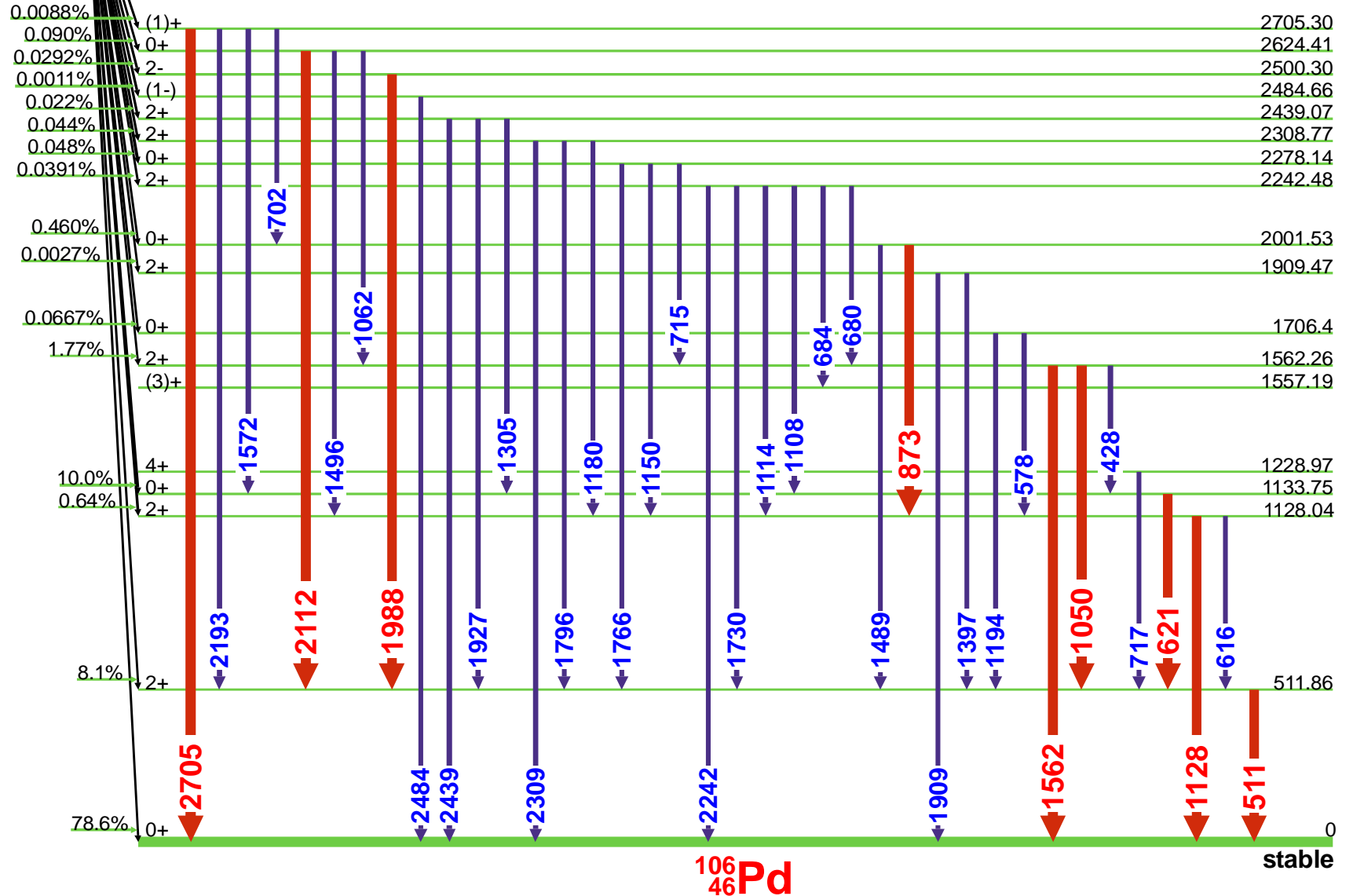
29 sec.



Q=3541

$^{106}\text{Rh}(29 \text{ sec.})$ Decay Scheme

gamma-rays emitted from low energy levels



stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: $^{106}\text{Ru} - ^{106}\text{Rh}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 373.59(15) day – 29.80(8) sec.

Detector: 55 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
428.40	0.20	1.38	0.0706	0.0026	4	1397.60	0.20	0.018	0.0027	0.0002	4
434.25	0.21		0.0202	0.0021	4	1489.6	0.6	0.015	0.0012	0.0006	4
439.17	0.27		0.0126	0.0021	4	1496.33	0.13	0.14	0.0222	0.0008	2
511.8534	0.0023	100	20.4	0.4	1	1498.80	0.20		0.0067	0.0004	4
578.30	0.20	0.54	0.0084	0.0008	4	1562.25	0.06	0.80	0.163	0.004	1
616.22	0.09	4.1	0.7548	0.0829	3	1572.40	0.20	0.016	0.0002		4
621.93	0.06	48.8	9.93	0.23	1	1577.20	0.20		0.0011	0.0002	4
680.25	0.14	0.075	0.0110	0.0006	3	1687.4	0.3		0.0006	0.0001	4
684.80	0.20	0.041	0.0055	0.0002	4	1693.2	0.3		0.0007	0.0001	4
702.8	1.0	0.025	0.0003	0.0002	4	1730.50	0.20	0.013	0.0022	0.0002	4
715.90	0.20	0.089	0.0100	0.0005	4	1766.25	0.05	0.142	0.0343	0.0009	2
717.40	0.20		0.0065	0.0004		1774.5	0.7	0.007	0.0013	0.0002	4
751.30	0.20		0.0011	0.0002	4	1784.1	0.3		0.0004	0.0001	4
873.49	0.05	2.20	0.439	0.011	1	1796.94	0.09	0.126	0.0277	0.0007	2
942.6	0.4		0.0006	0.0001	4	1855.00	0.20	0.017	0.0012	0.0001	4
1045.6	0.6		0.0133	0.0017	4	1909.30	0.20	0.008	0.0014	0.0001	4
1050.41	0.06	7.6	1.56	0.04	1	1927.22	0.09	0.075	0.0153	0.0005	2
1062.14	0.05	0.161	0.0320	0.0007	3	1954.6	0.4		0.0002		4
1108.70	0.10	0.029	0.0059	0.0002	3	1973.5	1.0		0.0002	0.0001	4
1114.48	0.05	0.057	0.0118	0.0019	3	1988.44	0.08	0.126	0.0261	0.0007	1
1128.07	0.05	1.98	0.404	0.010	1	2093.3	0.4		0.0004	0.0001	4
1133.7					4	2112.54	0.06	0.17	0.0345	0.0020	1
1150.20	0.20	0.018	0.0031	0.0002	4	2185.7	0.5		0.0002	0.0001	4
1159.90	0.20		0.0002	0.0001	4	2193.20	0.10	0.028	0.0049	0.0002	2
1180.73	0.08	0.073	0.0145	0.0003	3	2242.40	0.10	0.012	0.0021	0.0001	3
1194.54	0.05	0.28	0.0573	0.0012	2	2271.90	0.20	0.008	0.0014	0.0001	4
1209.80	0.20		0.0004	0.0001	4	2309.00	0.10	0.030	0.0056	0.0002	2
1258.80	0.20		0.0006	0.0001	4	2316.40	0.10	0.031	0.0064	0.0002	2
1266.00	0.20	0.008	0.0010	0.0001	4	2366.04	0.07	0.110	0.0233	0.0008	1
1305.20	0.20		0.0013	0.0001	4	2390.60	0.10	0.031	0.0065	0.0002	2
1315.70	0.20	0.018	0.0035	0.0002	4	2405.96	0.09	0.069	0.0145	0.0005	1
1355.7	0.3		0.0006	0.0001	4	2439.10	0.10	0.023	0.0046	0.0002	2
1360.2	0.3		0.0022	0.0001	4	2456.80	0.20		0.0003		4
1372.3	0.3		0.0021	0.0002	4	2484.60	0.20	0.004	0.0009	0.0001	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: $^{106}\text{Ru} - ^{106}\text{Rh}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 373.59(15) day – 29.80(8) sec.

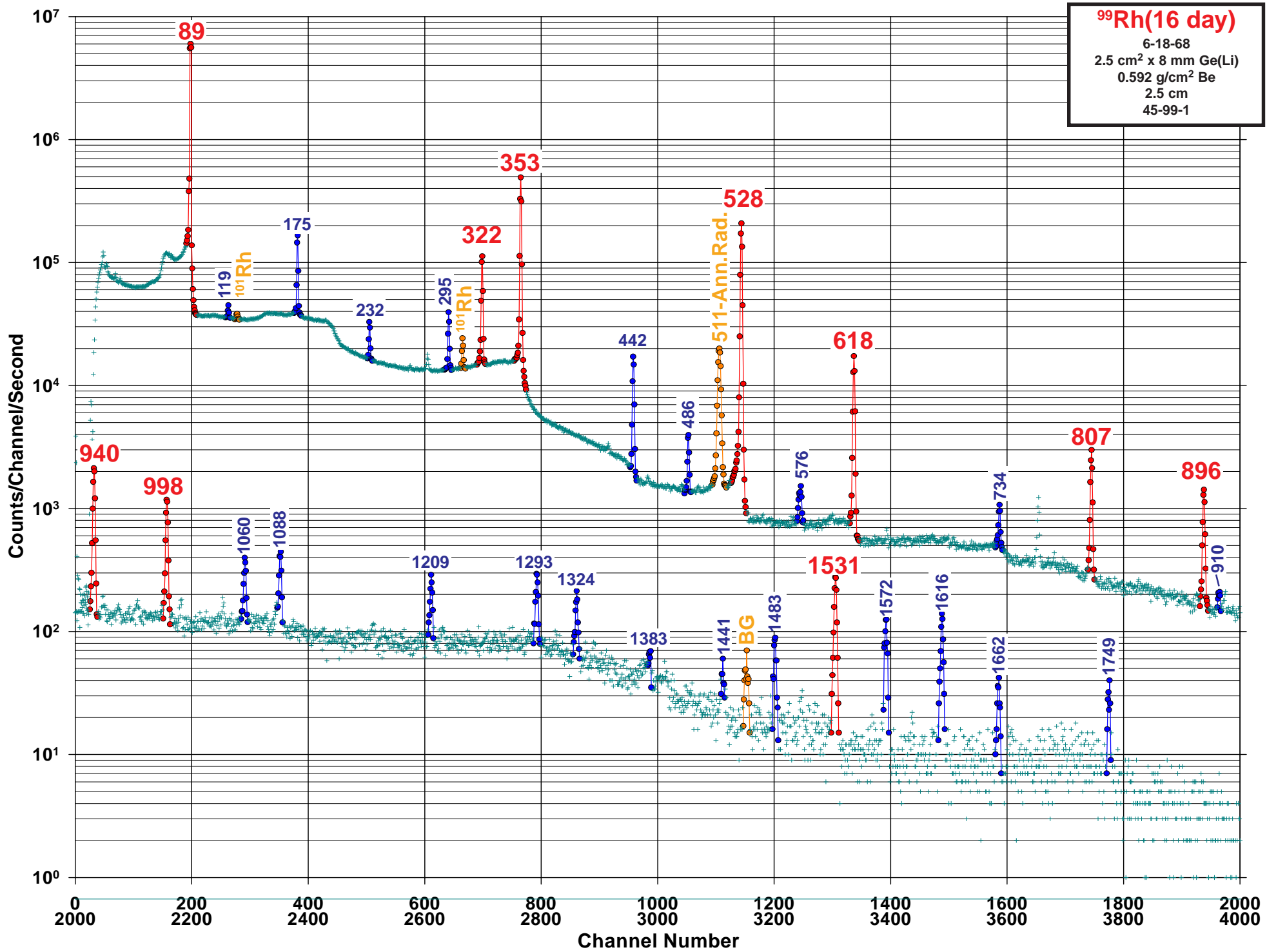
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

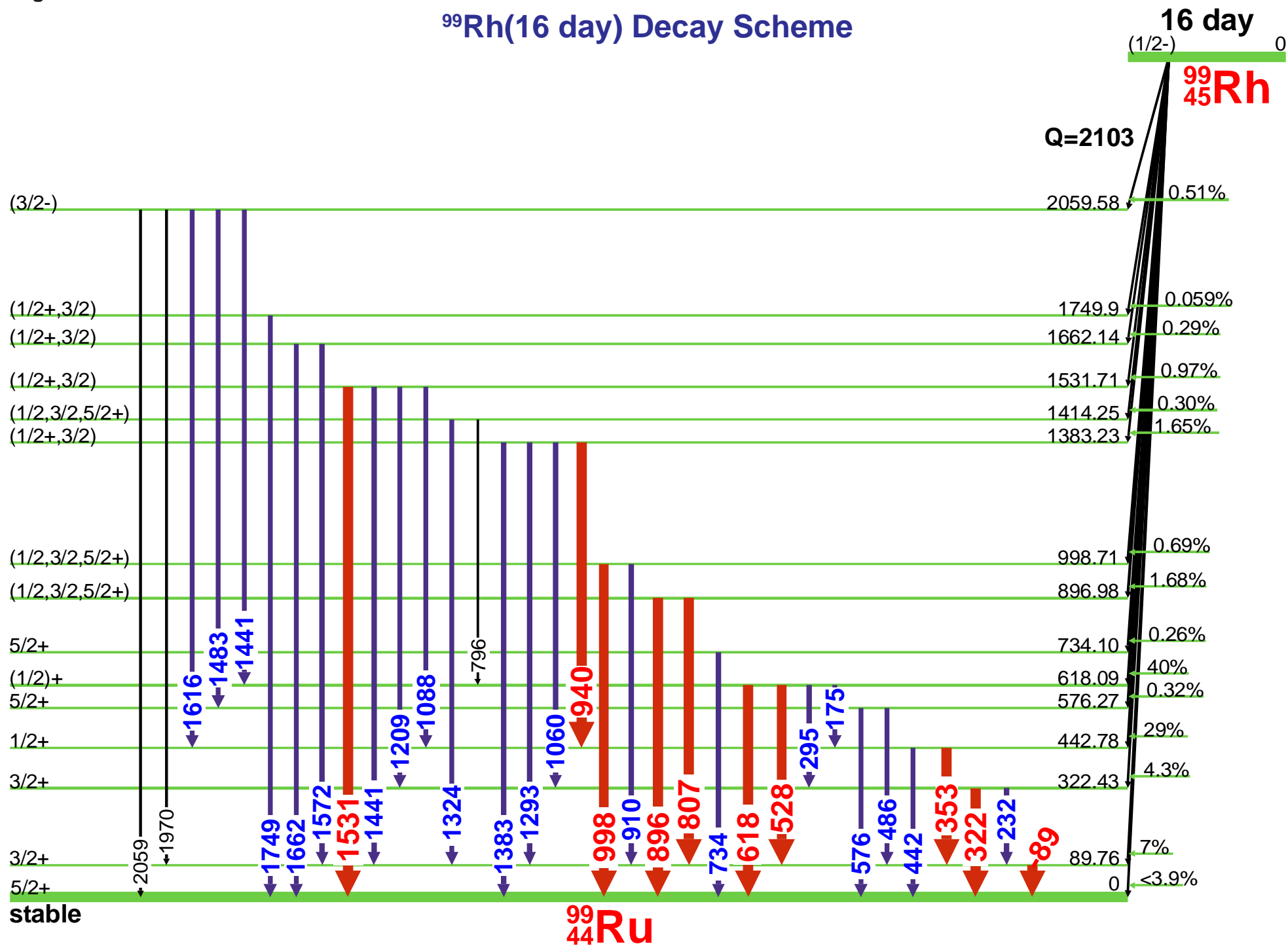
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2525.2	0.6		0.0002		4
2542.70	0.10	0.015	0.0030	0.0001	2
2571.10	0.20	0.008	0.0014	0.0001	2
2651.4	0.3	0.004	0.0007	0.0001	3
2705.3	0.3	0.014	0.0025	0.0001	1
2709.5	0.3	0.020	0.0037	0.0001	1
2740.1	0.4		0.0002		4
2787.3	0.7		0.0001		4
2809.0	0.3	0.003	0.0007		3
2821.1	0.3	0.006	0.0012		2

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2865.0	1.0				4
2902.5	0.8		0.0001		4
2917.9	0.3	0.005	0.0009		2
3037.3	0.3	0.005	0.0010		2
3055.0	0.4		0.0003		4
3164.7	1.0				4
3249.8	0.5		0.0001		4
3273.4	0.7		0.0001		4
3375.9	1.4				4
3401.8	0.9				4





⁹⁹Rh(16 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{99}Rh E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

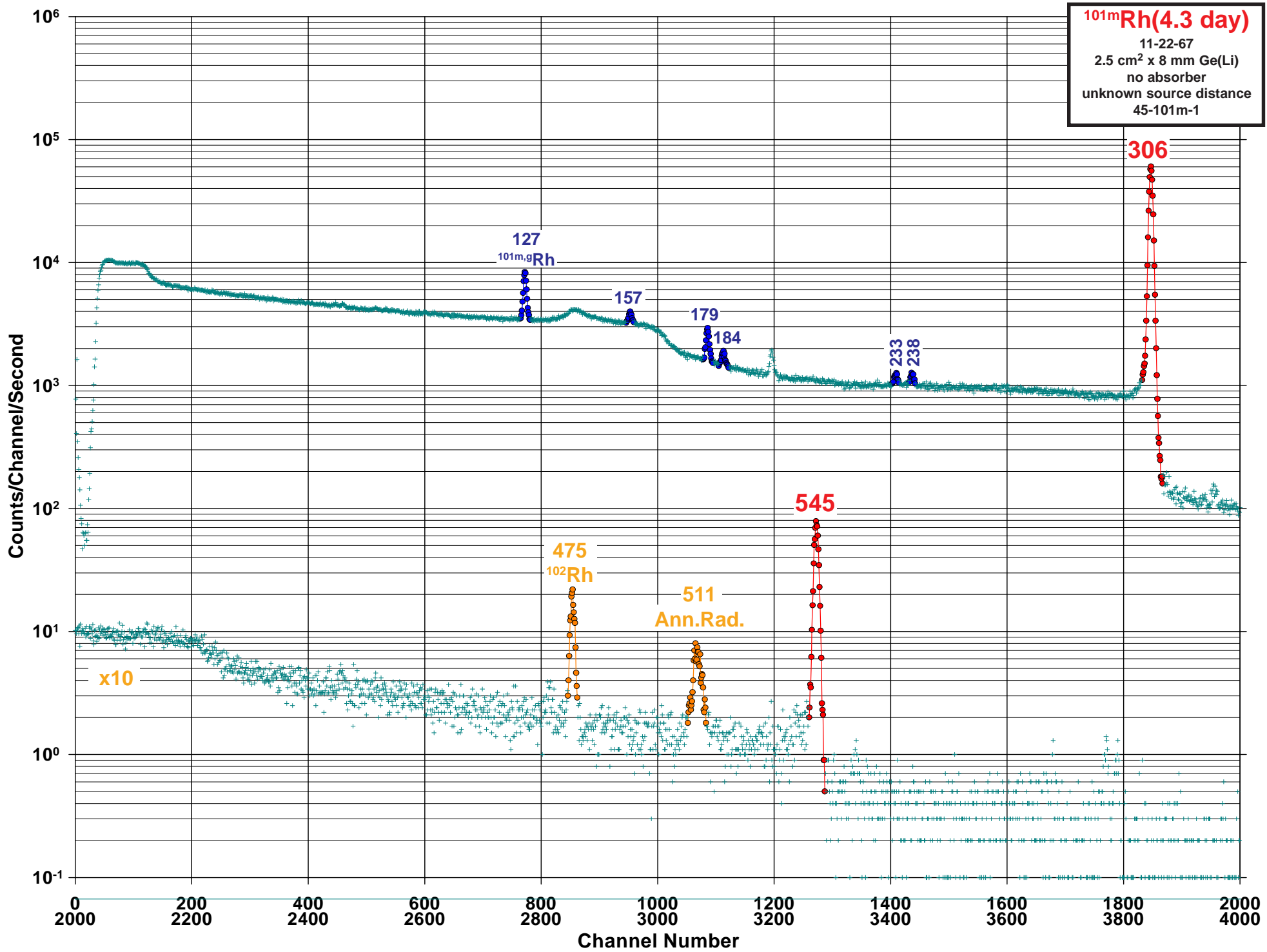
Half Life: 16.1(2) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{99}\text{Ru}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	89.76	0.06	100	33.4	2.3	1
	119.4	0.4	0.22	0.076	0.004	4
	175.43	0.10	5.6	2.01	0.16	3
	232.70	0.15	1.64	0.49	0.06	3
	295.70	0.10	4.04	1.33	0.13	3
	322.45	0.10	20.4	6.2	0.5	1
	353.05	0.06	115	34.6	2.1	1
	442.80	0.20	6.4	2.2	0.4	2
	486.40	0.20	0.40	0.38	0.04	4
Ann.	511.006			7.5	2.2	1
	528.24	0.07	132	38.0	2.0	1
	576.3	0.5	0.65	0.14	0.03	3
	618.13	0.10	14.4	4.2	0.6	1
	734.10	0.20	0.93	0.30	0.08	3
	796.0	0.5		0.08	0.04	3
	807.25	0.10	4.1	1.14	0.10	1
	896.90	0.15	2.7	0.80	0.12	1
	910.80			0.0532	0.0028	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	940.40	0.20	4.9	1.29	0.13	1
	998.70	0.15	2.8	0.80	0.09	1
	1060.75	0.15	0.86	0.23	0.04	2
	1088.80	0.20	1.0	0.34	0.04	3
	1209.32	0.15	0.80	0.190	0.028	3
	1293.50	0.15	0.95	0.30	0.04	2
	1324.50	0.20	0.60	0.27	0.04	3
	1383.5	0.5	0.17	0.08	0.04	4
	1441.8	0.3	0.1	0.053	0.019	4
D	1441.8	0.3	0.1	0.053	0.019	4
	1483.20	0.20	0.42	0.152	0.028	3
	1531.80	0.20	1.62	0.53	0.05	1
	1572.50	0.20	0.74	0.24	0.03	2
	1616.80	0.20	0.77	0.205	0.025	2
	1662.00	0.20	0.20	0.087	0.020	3
	1749.9	0.3	0.2	0.068	0.019	3
	1970.0	0.3	0.34	0.152	0.021	4
	2059.2	0.3		0.023	0.008	4





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{101m}Rh

Half Life: 4.34(1) day

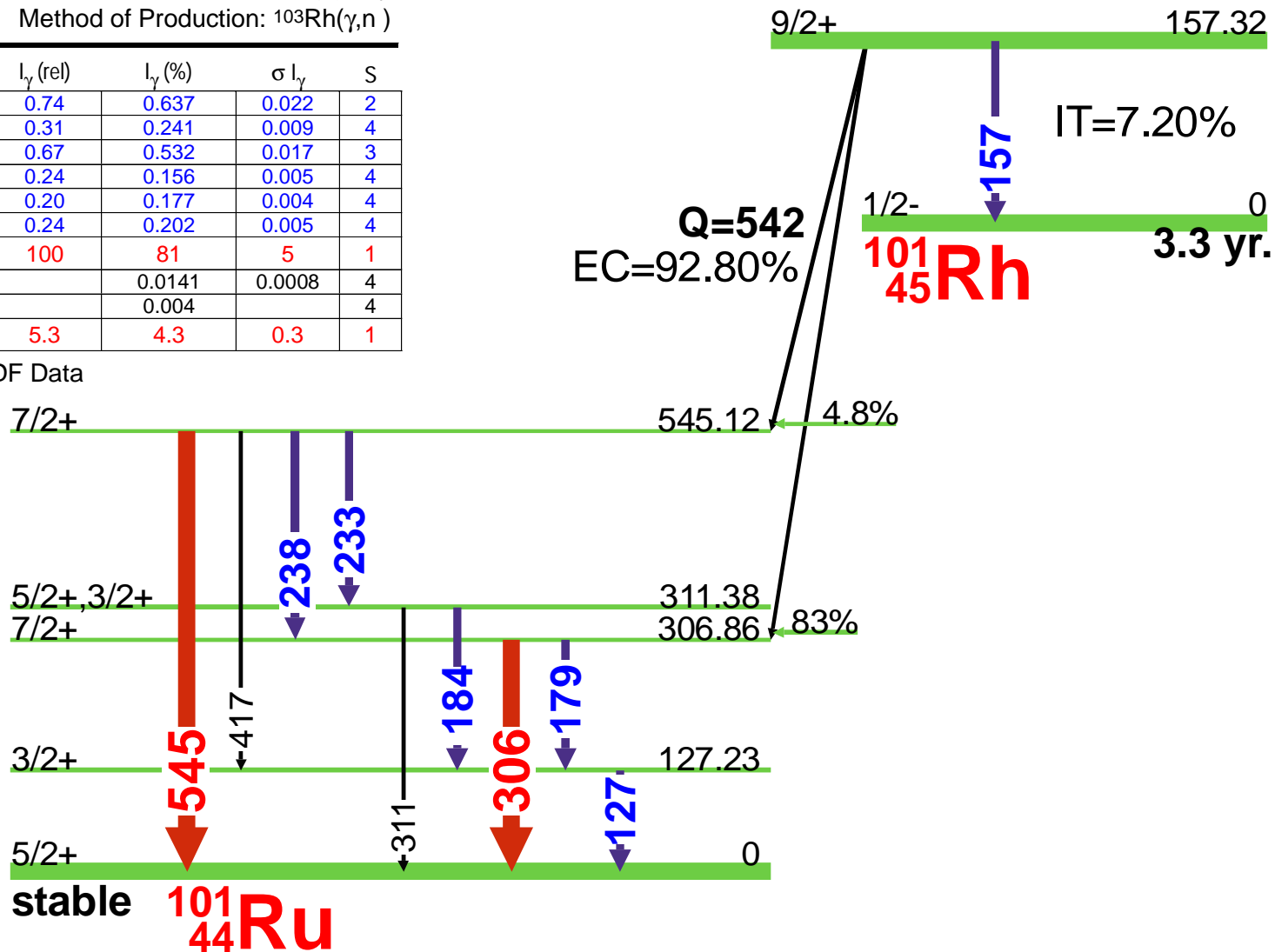
Detector: 2.5 cm² x 8 mm Ge (Li)

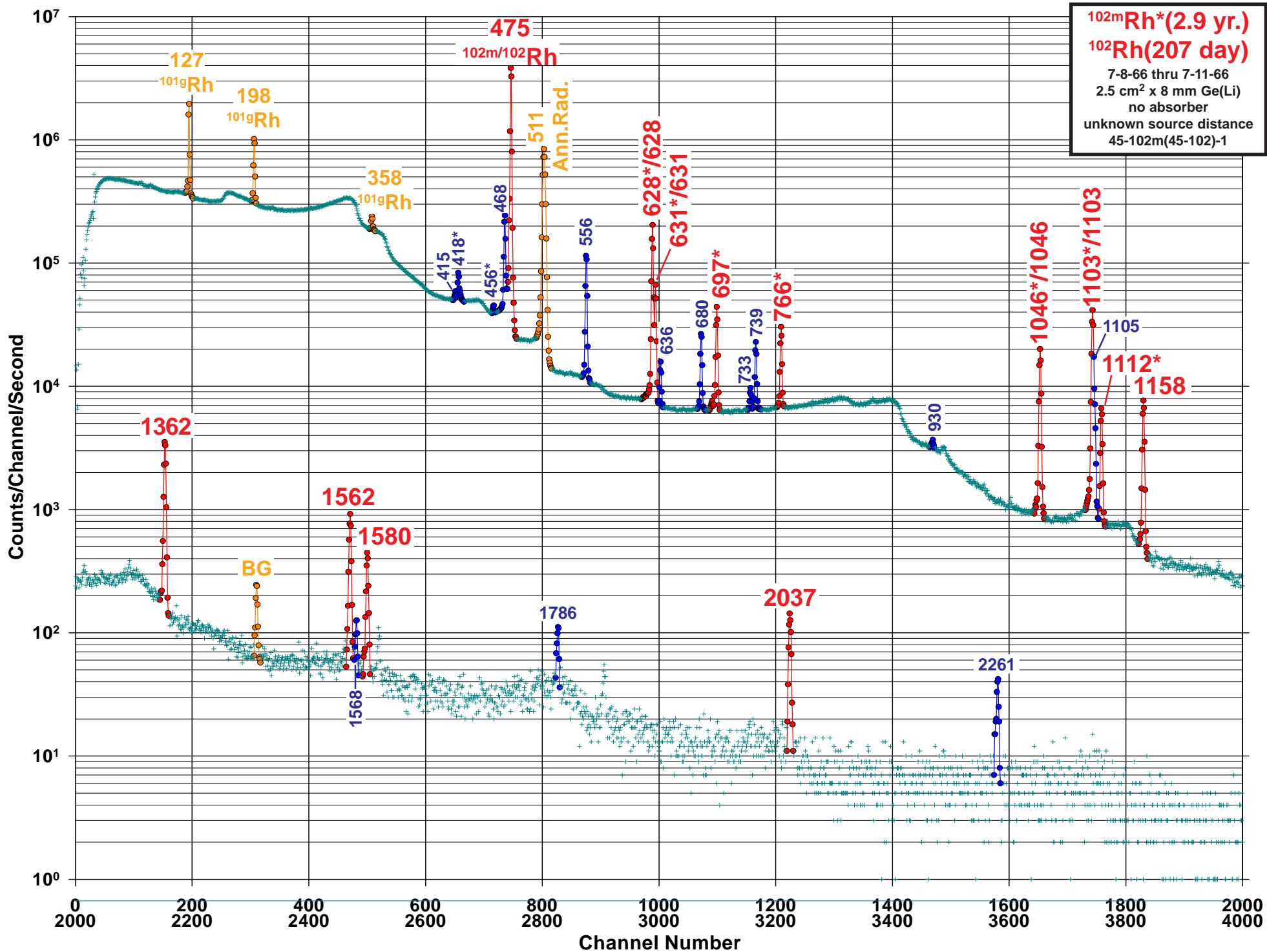
Method of Production: $^{103}\text{Rh}(\gamma, n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
127.226	0.009	0.74	0.637	0.022	2
157.41	0.04	0.31	0.241	0.009	4
179.636	0.015	0.67	0.532	0.017	3
184.11	0.05	0.24	0.156	0.005	4
233.74	0.04	0.20	0.177	0.004	4
238.27	0.04	0.24	0.202	0.005	4
306.857	0.005	100	81	5	1
311.40	0.03		0.0141	0.0008	4
417.86	0.05		0.004		4
545.117	0.007	5.3	4.3	0.3	1

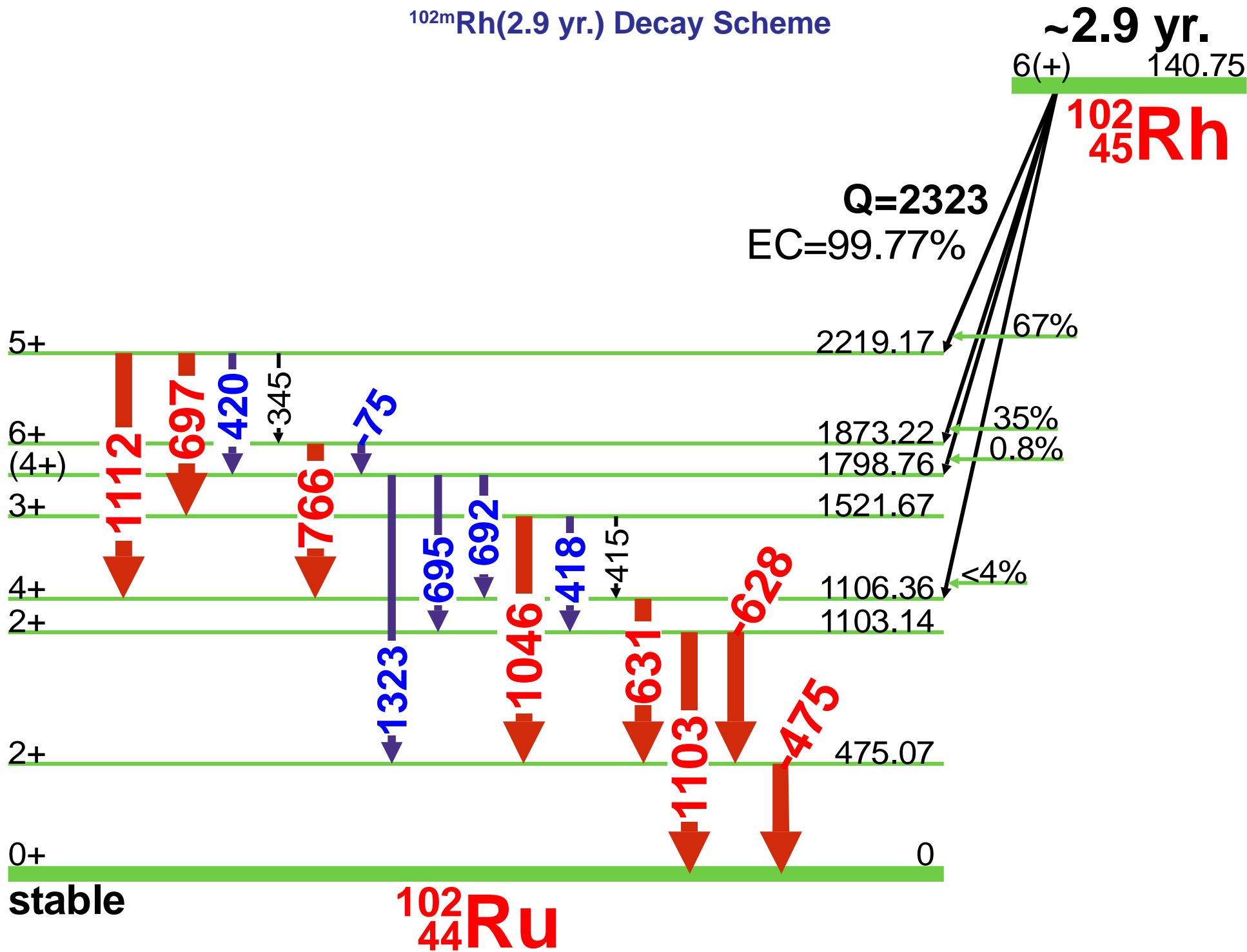
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

^{101m}Rh (4.3 day) Decay Scheme

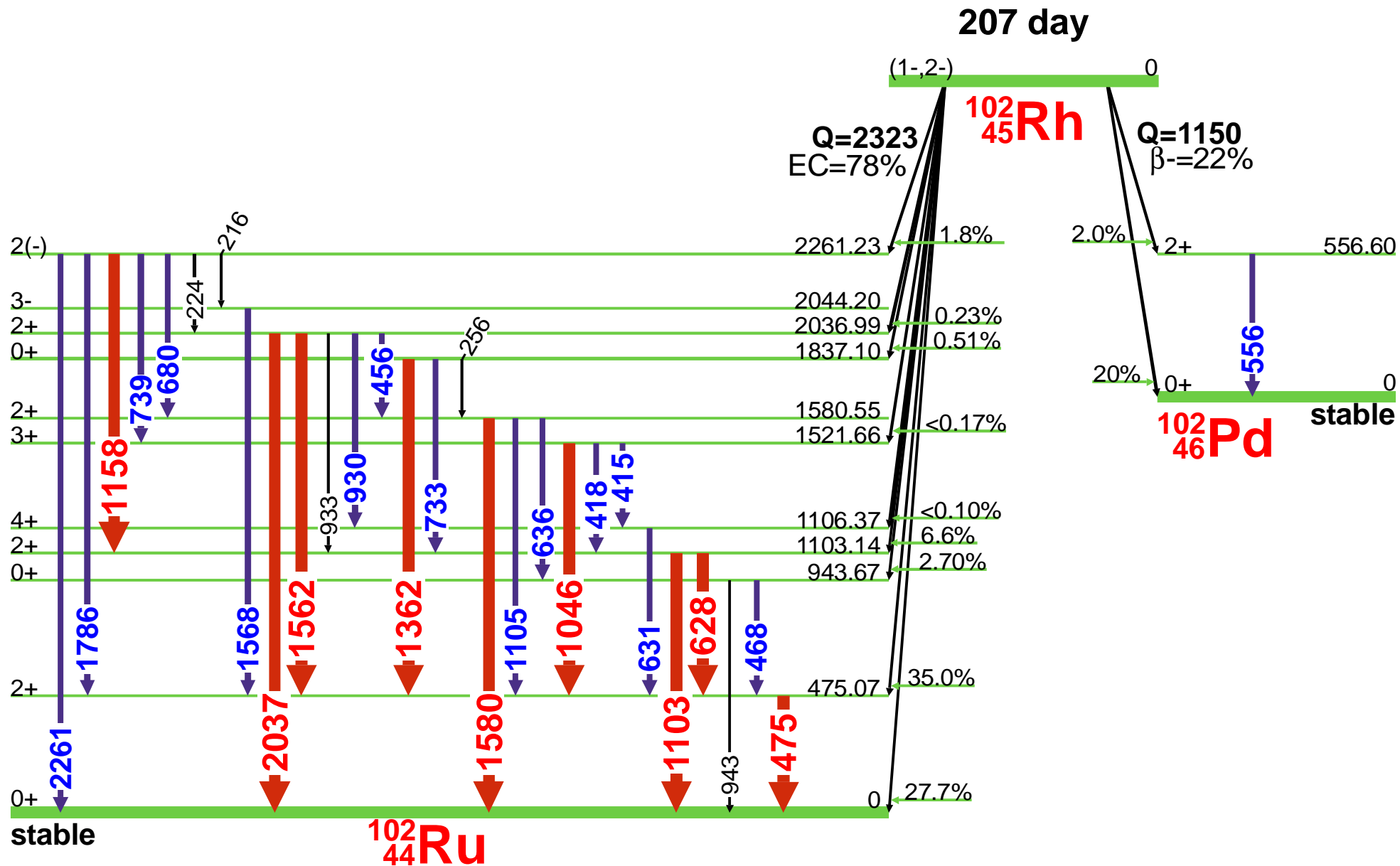




^{102m}Rh (2.9 yr.) Decay Scheme



¹⁰²Rh(207 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

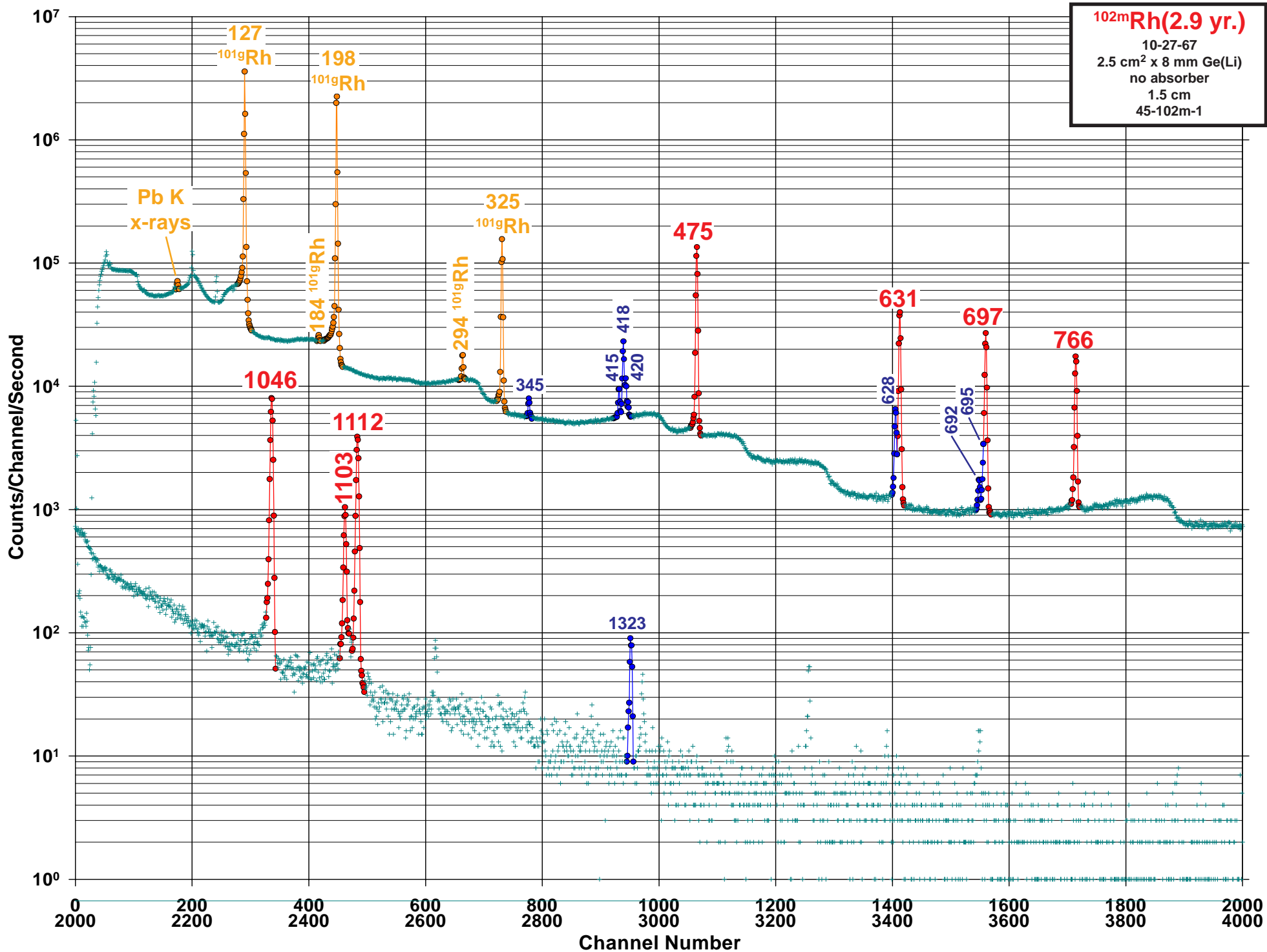
Nuclide: $^{102m}\text{Rh}^* - ^{102}\text{Rh}$ (equilibrium) E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.9 yr.* - 207(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{102}\text{Ru}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	75.6	0.5		0.21	0.09	4		695.6	0.3		2.9	0.4	
	216.9	0.3		0.011	0.011	4		* 697.49	0.08		44.0	2.0	1
	224.9	0.4		0.05	0.03	4		733.93	0.08	0.22	0.107	0.021	4
	256.8	0.4		0.021	0.011	4		739.58	0.07	1.15	0.57	0.09	3
*	345.89	0.12		0.87	0.10	4		* 766.84	0.06		34.0	2.0	1
	415.25	0.15	0.07	0.032	0.021	4		930.5	0.3	0.07	0.032	0.021	4
*	415.25	0.15		2.1	0.3				933.2	0.4		0.021	0.011
	418.52	0.18	0.26	0.128	0.021	3		943.48					4
*	418.52	0.18		9.4	1.0				* 1046.59	0.07	0.93	34.0	2.0
*	420.40	0.20		3.2	0.3	4	1046.59	0.07	0.46	0.03			
	456.42	0.15	0.17	0.086	0.021	4		1103.16	0.06	6.3	3.10	0.11	1
	468.58	0.04	6.3	3.10	0.21	3	* 1103.16	0.06	4.6		0.3		
*	475.06	0.04	100	95.0	4.0	1		1105.7	0.3	0.85	0.42	0.03	3
	475.06	0.04		49.	3.				* 1112.84	0.07		19.0	1.0
Ann.	511.006			29.1	1.4	1		1158.10	0.06	1.26	0.62	0.04	1
	556.60	0.04		2.0	0.2	2		* 1323.6	0.5		0.46	0.08	2
	628.05	0.05	9.8	4.8	0.4	1		1362.10	0.20	0.85	0.42	0.05	1
*	628.05	0.05		8.3	0.4				1562.2	0.4	0.24	0.12	0.03
*	631.29	0.05		56.0	2.0	1		1568.7	0.6	0.02	0.011	0.011	4
	631.29	0.05	0.22	0.11	0.03	2		1580.5	0.3	0.11	0.054	0.011	1
	636.81	0.10	0.50	0.25	0.03	3		1786.4	0.4	0.02	0.011	0.011	2
	680.66	0.05	1.26	0.62	0.04	3		2037.0	0.3	0.07	0.032	0.021	1
*	692.40	0.20		1.6	0.2	4		2044.1	0.4		0.001	0.001	4
								2261.3	0.4	0.04	0.021	0.021	2





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{102m}Rh

Half Life: 2.9 yr.

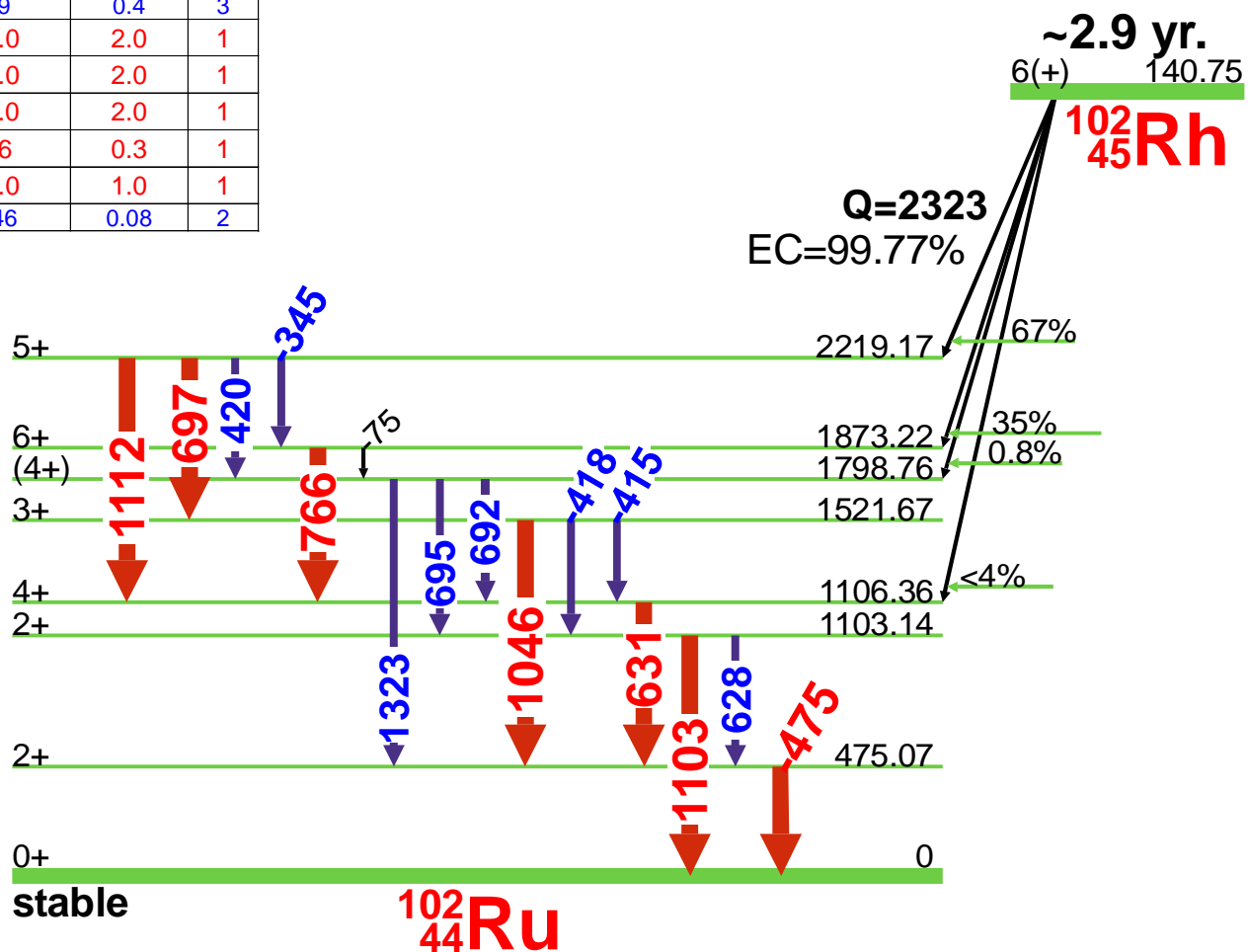
Detector: 2.5 cm² x 8 mm Ge (Li)

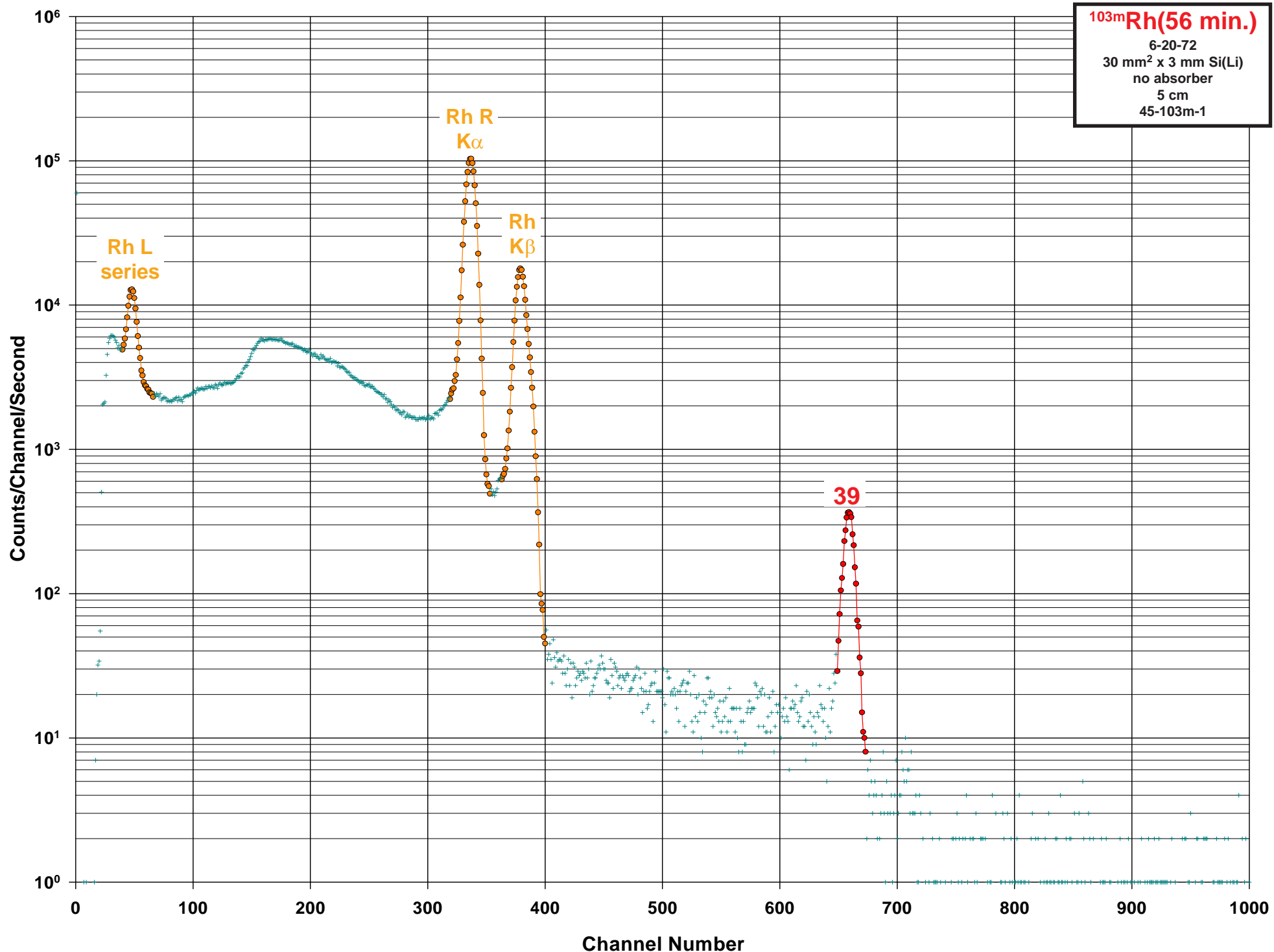
Method of Production: ¹⁰²Ru (p,n)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
75.6	0.5		0.21	0.09	4
345.89	0.12	0.92	0.87	0.10	4
415.25	0.15	2.2	2.1	0.3	4
418.52	0.18	9.9	9.4	1.0	3
420.40	0.20	3.4	3.2	0.3	4
475.06	0.04	100	95.0	4.0	1
628.05	0.05	8.7	8.3	0.4	3
631.29	0.05	59.0	56.0	2.0	1
692.40	0.20	1.7	1.6	0.2	4
695.6	0.3	3.1	2.9	0.4	3
697.49	0.08	46.0	44.0	2.0	1
766.84	0.06	36.0	34.0	2.0	1
1046.59	0.07	36.0	34.0	2.0	1
1103.16	0.06	4.8	4.6	0.3	1
1112.84	0.07	20.0	19.0	1.0	1
1323.6	0.5	0.48	0.46	0.08	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

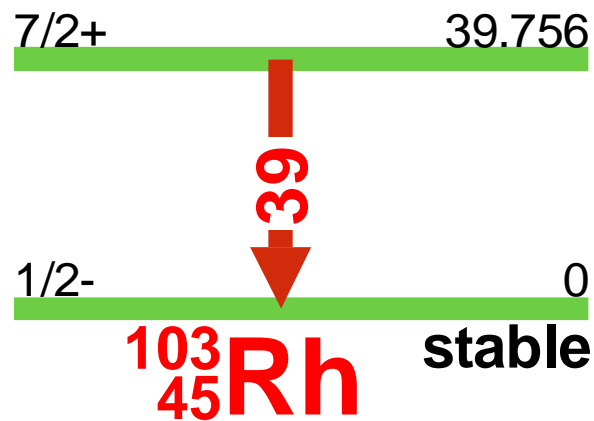
^{102m}Rh(2.9 yr.) Decay Scheme





$^{103\text{m}}\text{Rh}$ (56 min.) Decay Scheme

56 min.



GAMMA-RAY ENERGIES AND INTENSITIES

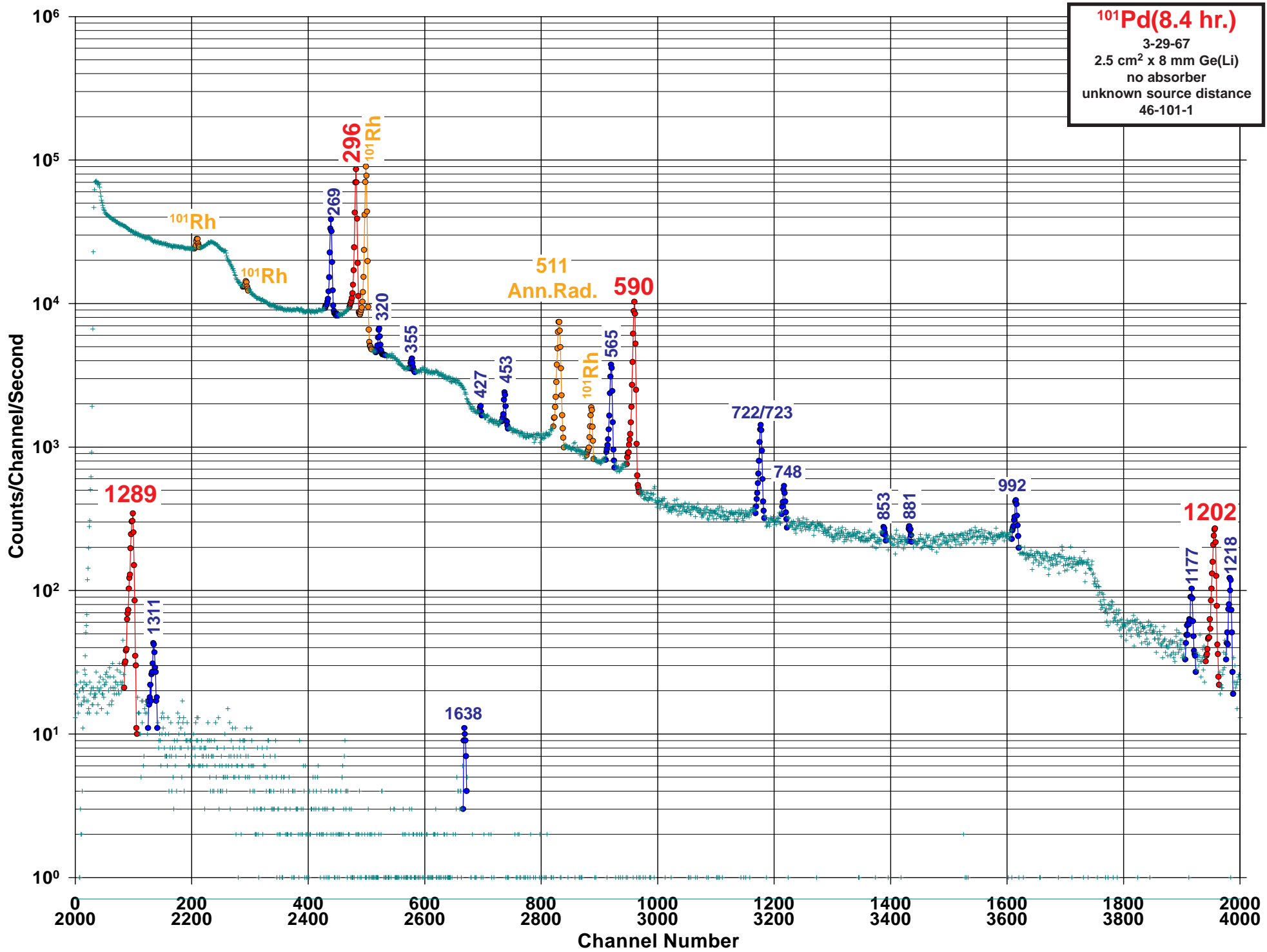
Nuclide: $^{103\text{m}}\text{Rh}$

Half Life: 56.114(9) min.

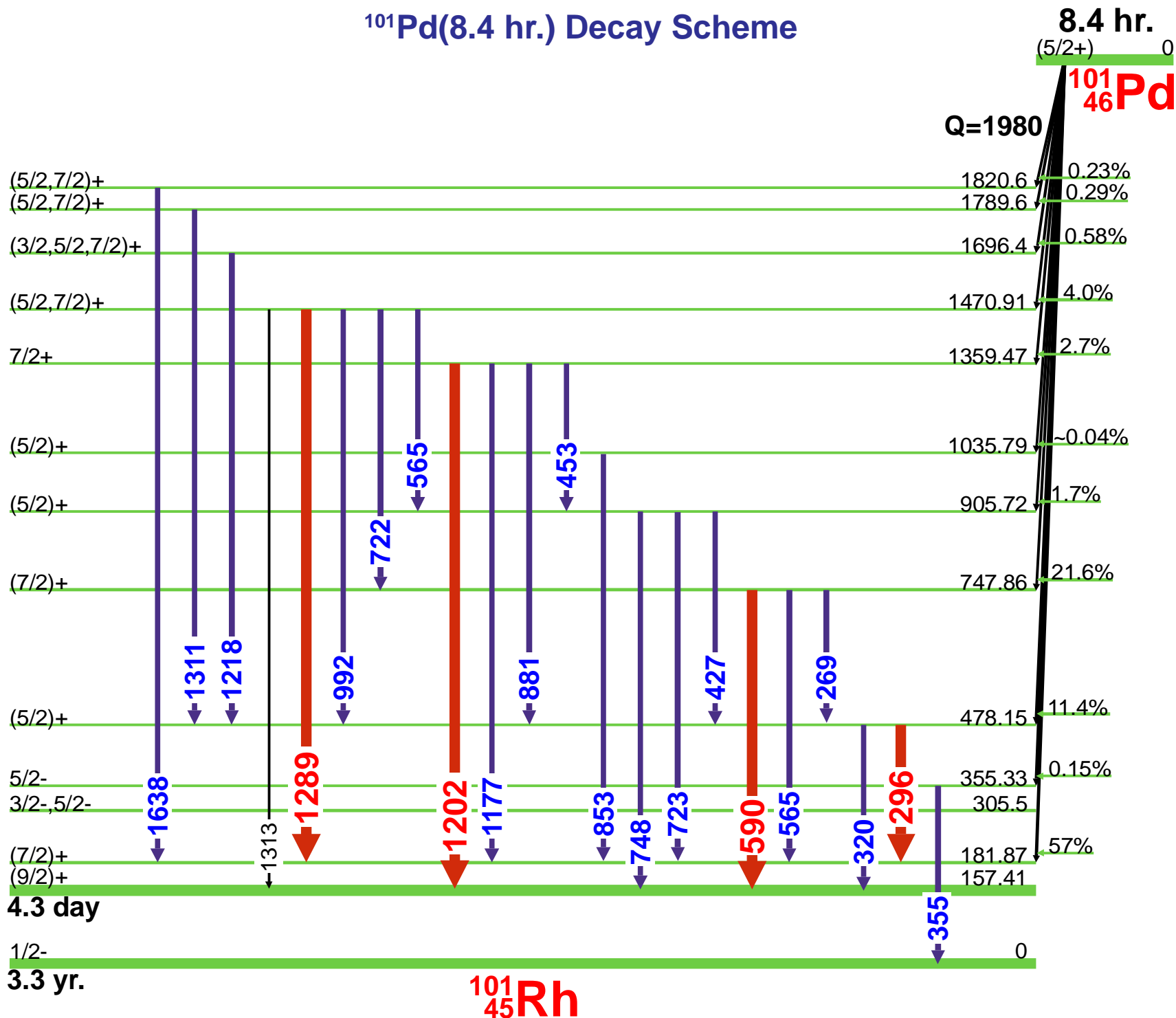
Detector: 30 cm² x 3 mm Si (Li)Method of Production: $^{102}\text{Pd}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
39.755	0.012	100	0.068	0.005	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



¹⁰¹Pd(8.4 hr.) Decay Scheme



¹⁰¹Rh

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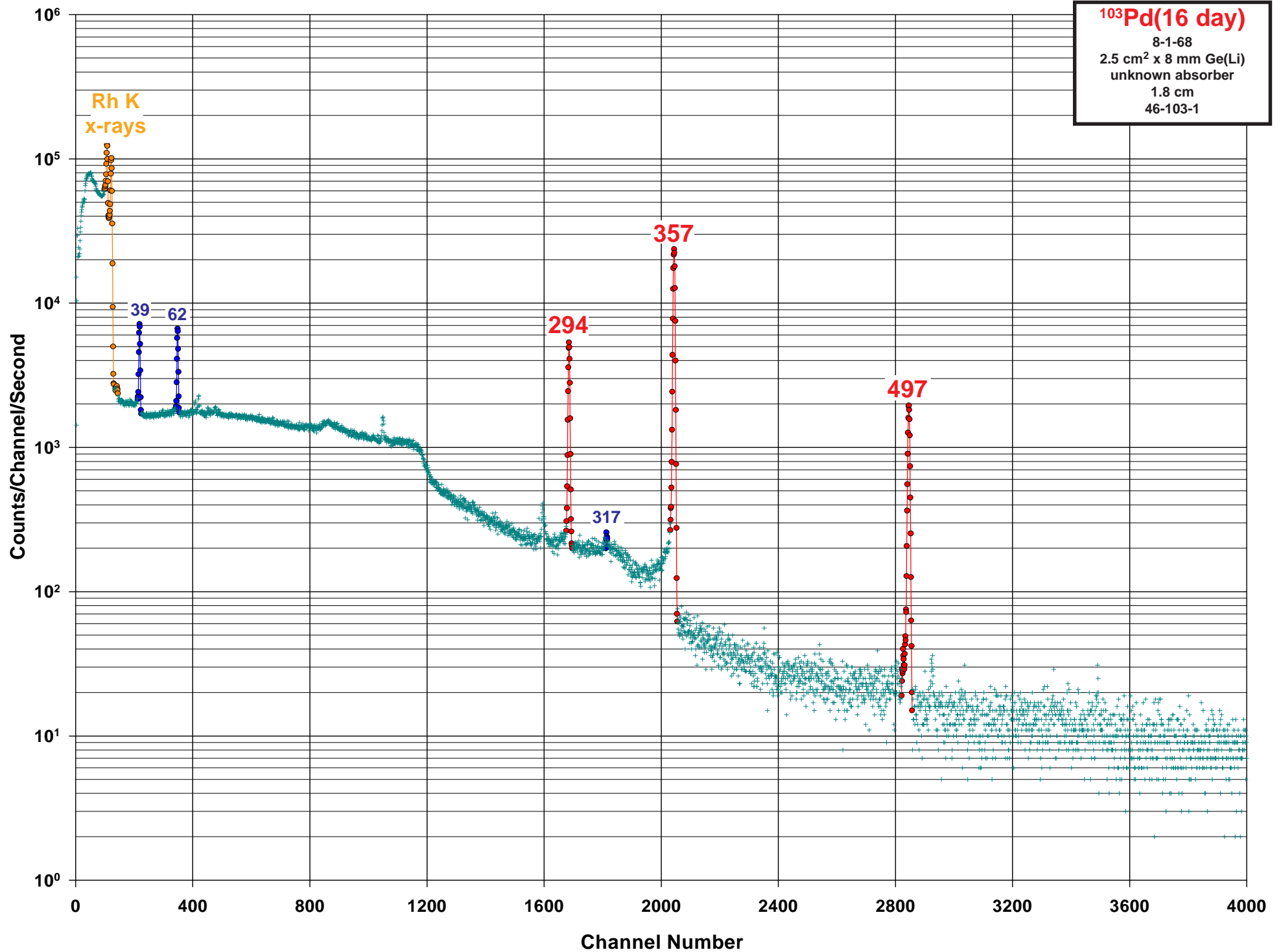
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{101}Pd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 8.47(6) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{102}\text{Pd}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	24.460	0.010		3.90	0.22	4		821.2	0.6		0.019	0.008	4
	111.40	0.08		0.012	0.004	4		853.89	0.07	0.7	0.088	0.008	4
	129.7	1.0		0.015	0.008	4		857.0	0.5		0.008	0.004	4
	132.8	0.5		0.021	0.008	4		870.70	0.20		0.021	0.006	4
	157.41	0.03				4		881.29	0.08	0.8	0.108	0.011	4
	158.0	0.5		0.023	0.010	4		905.8	0.3		0.008	0.004	4
	171.0	0.5		0.017	0.010	4		911.8	0.4		0.021	0.006	4
	173.1	0.5		0.023	0.010	4		914.86	0.12		0.075	0.008	4
	185.0	1.0		0.010	0.004	4		949.0	0.4		0.008	0.004	4
	269.67	0.07	39.0	6.43	0.29	2		965.2	0.5		0.019	0.010	4
	296.29	0.03	100	19.2	0.8	1		992.84	0.06		0.94	0.07	4
	305.3	0.6		0.038	0.010	4		1014.6	0.2		0.023	0.008	4
	320.74	0.04	3.3	0.56	0.04	4		1041.73	0.15		0.056	0.008	4
	355.30	0.10	1.1	0.223	0.016	4		1072.90	0.20		0.029	0.008	4
	374.60	0.20		0.006	0.004	4		1163.6	0.7		0.010	0.006	4
	381.20	0.20		0.038	0.008	4		1165.7	0.7		0.010	0.006	4
	427.65	0.08	1.1	0.098	0.007	4		1177.63	0.08	3.0	0.353	0.024	3
	435.08	0.08		0.063	0.008	4		1202.04	0.06	9.0	1.52	0.09	1
	453.70	0.05	3.2	0.60	0.03	3		1218.28	0.07	3.4	0.520	0.029	2
	492.00	0.20		0.010	0.004	4		1289.05	0.05	13.3	2.28	0.11	1
	496.08	0.15		0.033	0.010	4		1311.5	0.3	1.4	0.16	0.03	3
Ann.	511.006			10.03	0.26	2		1313.5	0.3		0.073	0.019	4
	544.9					4		1342.50	0.20		0.025	0.004	4
D	565.		20.0	0.21	0.08	2		1391.2	0.6		0.0058	0.0019	4
	565.98	0.05		3.44	0.16			1433.4	0.3		0.029	0.006	4
	590.44	0.06	70.0	12.1	0.5	1		1447.0	0.5		0.0038	0.0019	4
	611.44	0.10		0.094	0.010	4		1512.4	0.3		0.025	0.006	4
	619.45	0.12		0.040	0.006	4		1514.6	0.3		0.019	0.006	4
	702.4	0.3		0.017	0.006	4		1607.7	0.3		0.027	0.004	4
D	722.90	0.20	14.4	0.27	0.08	2		1632.5	0.3		0.019	0.004	4
	723.75	0.10		1.96	0.14			1638.6	0.3	0.5	0.100	0.010	2
	748.37	0.05	2.6	0.501	0.028	3		1646.5	1.0		0.0017	0.0010	4
	787.0	0.4		0.0048	0.0023	4		1663.6	0.4		0.0021	0.0012	4
	790.40	0.20		0.023	0.004	4		1729.6	0.3		0.0086	0.0029	4
	796.62	0.15		0.027	0.004	4							



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{103}Pd

Half Life: .16.991(19) day

Detector: 2.5 cm² 8 mm Ge (Li)

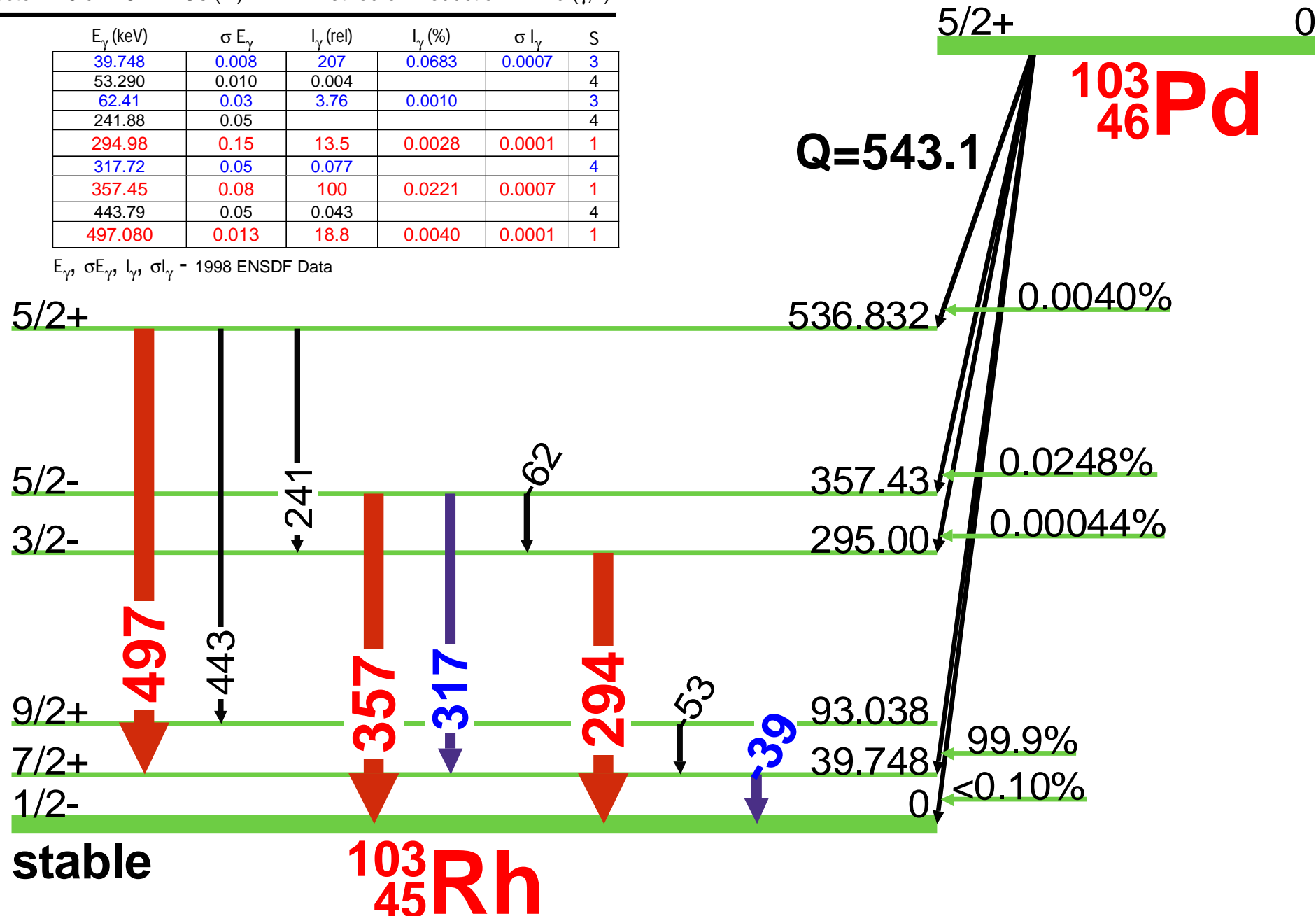
Method of Production: $^{104}\text{Pd}(\gamma, n)$

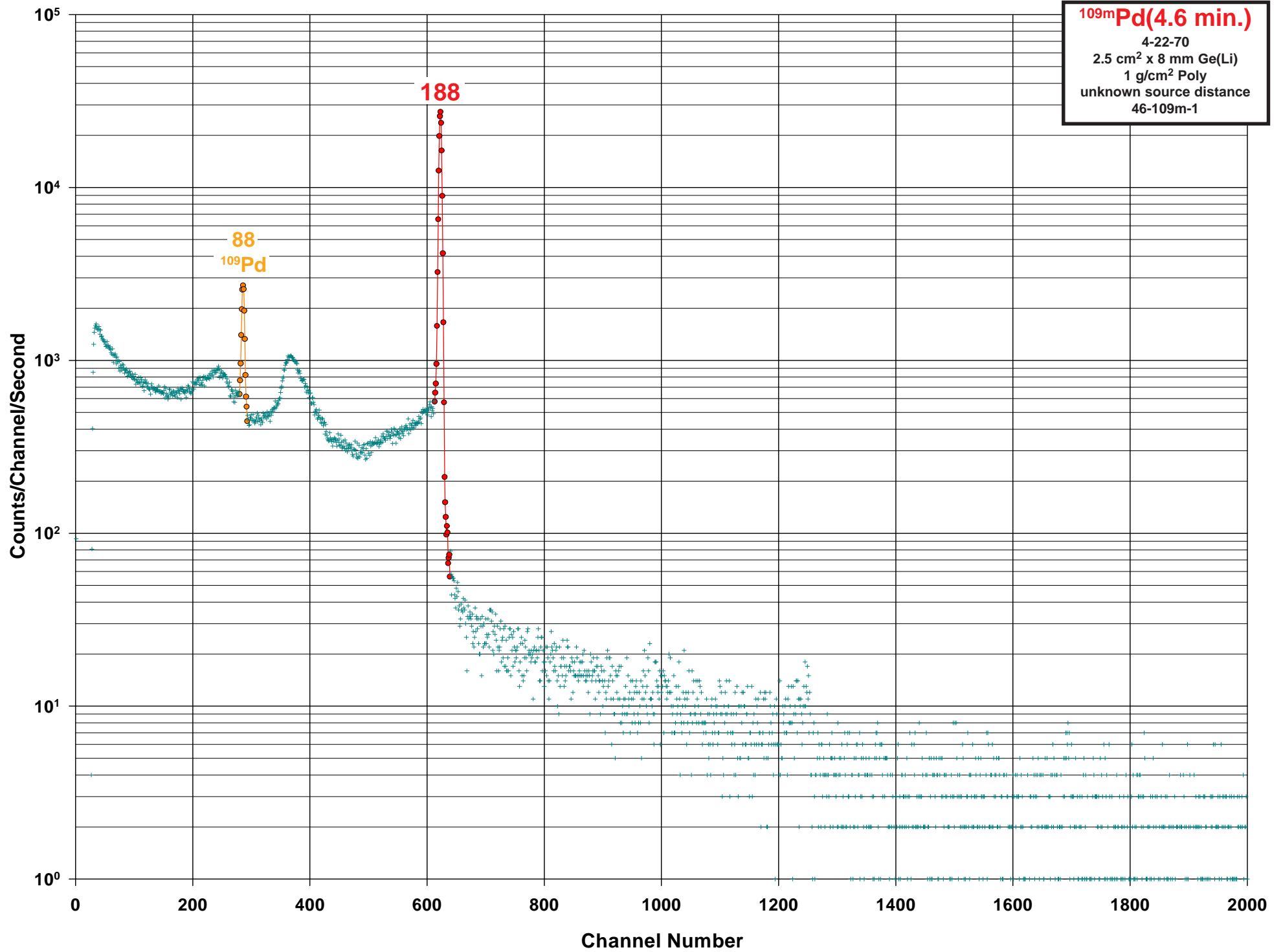
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
39.748	0.008	207	0.0683	0.0007	3
53.290	0.010	0.004			4
62.41	0.03	3.76	0.0010		3
241.88	0.05				4
294.98	0.15	13.5	0.0028	0.0001	1
317.72	0.05	0.077			4
357.45	0.08	100	0.0221	0.0007	1
443.79	0.05	0.043			4
497.080	0.013	18.8	0.0040	0.0001	1

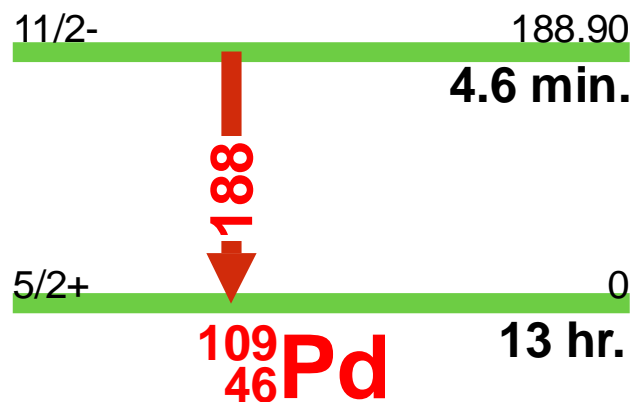
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

^{103}Pd (16 day) Decay Scheme

16 day





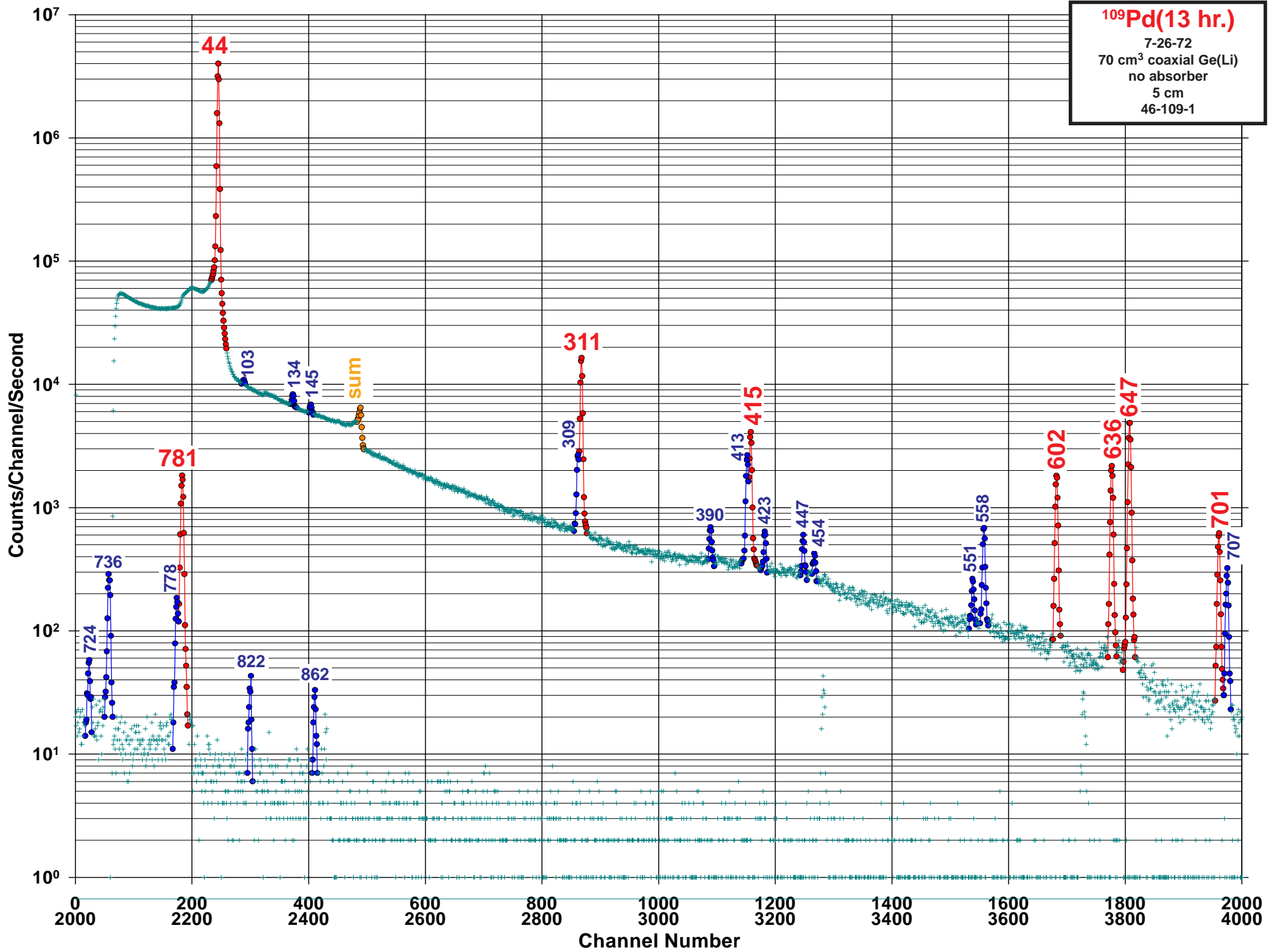
^{109m}Pd (4.6 min.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{109m}Pd

Half Life: 4.696(3) min.

Detector: 2.5 cm² 8 mm Ge (Li)Method of Production: ^{108}Pd (n, γ)

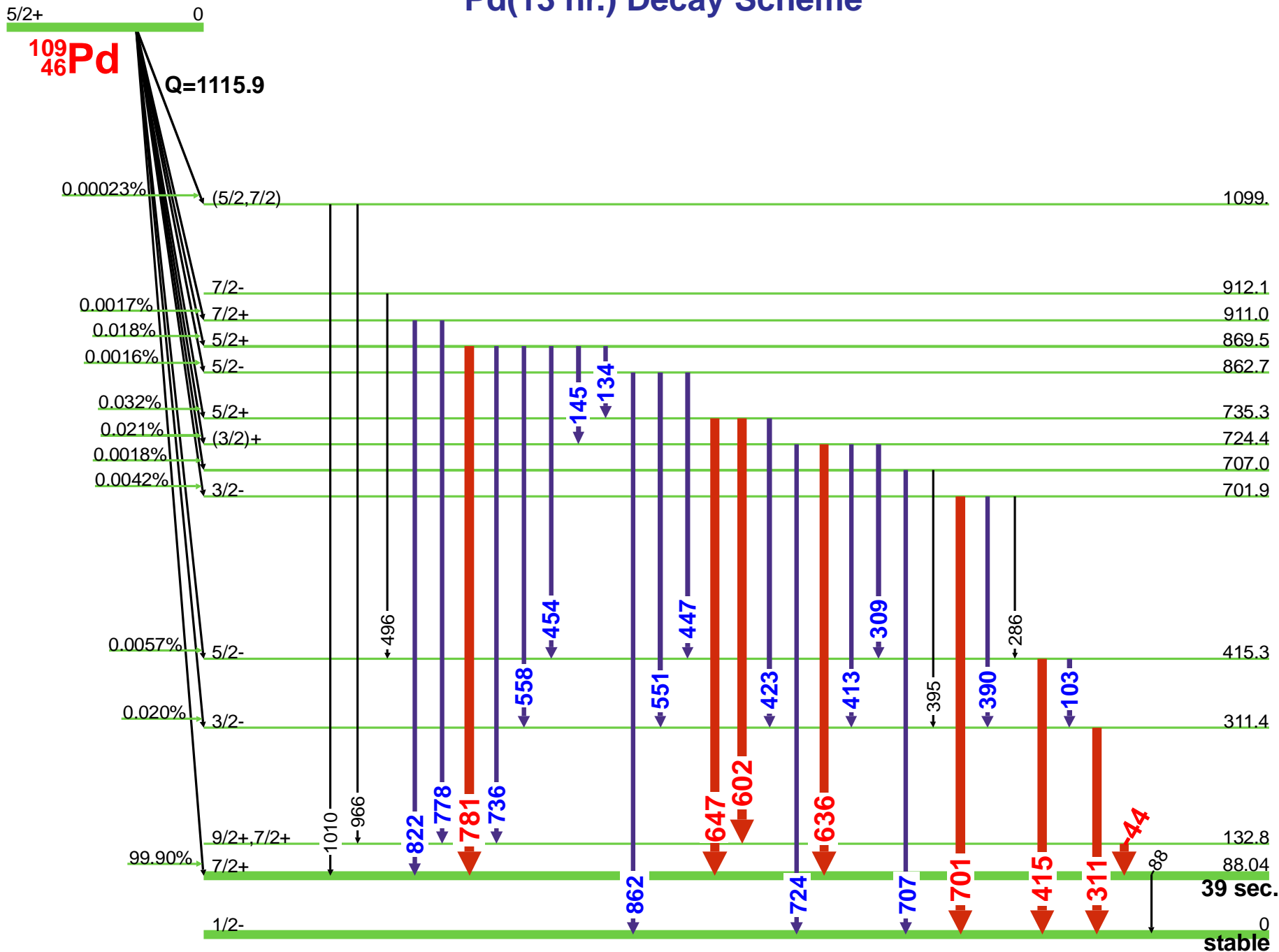
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
188.90	0.10	100	55.9		1

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data



13 hr.

¹⁰⁹Pd(13 hr.) Decay Scheme



¹⁰⁹Ag

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GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{109}Pd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

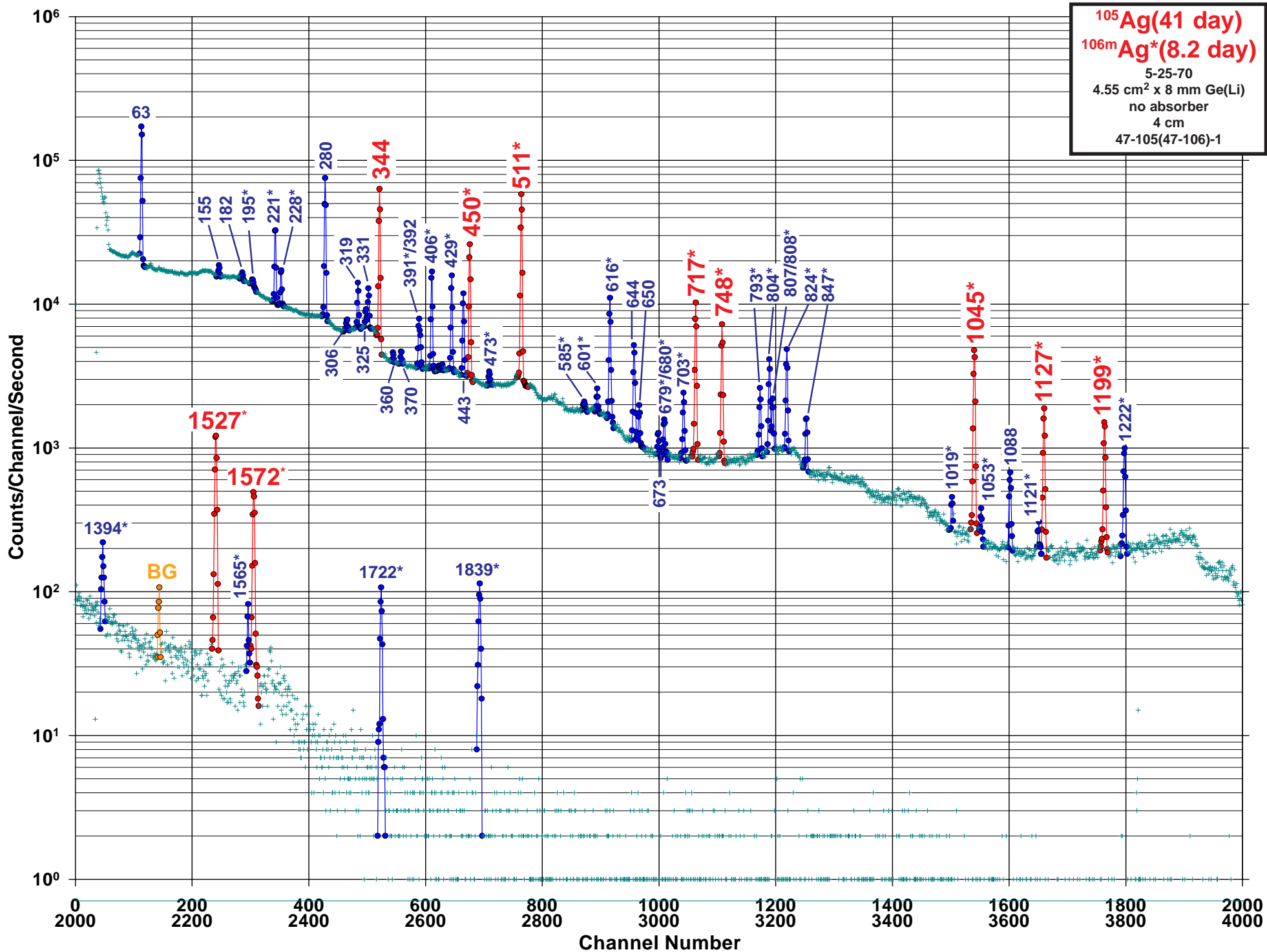
Half Life: 13.7012(24) hr.

Detector: 70 cm³ coaxial Ge (Li)Method of Production: $^{108}\text{Pd}(n,\gamma)$

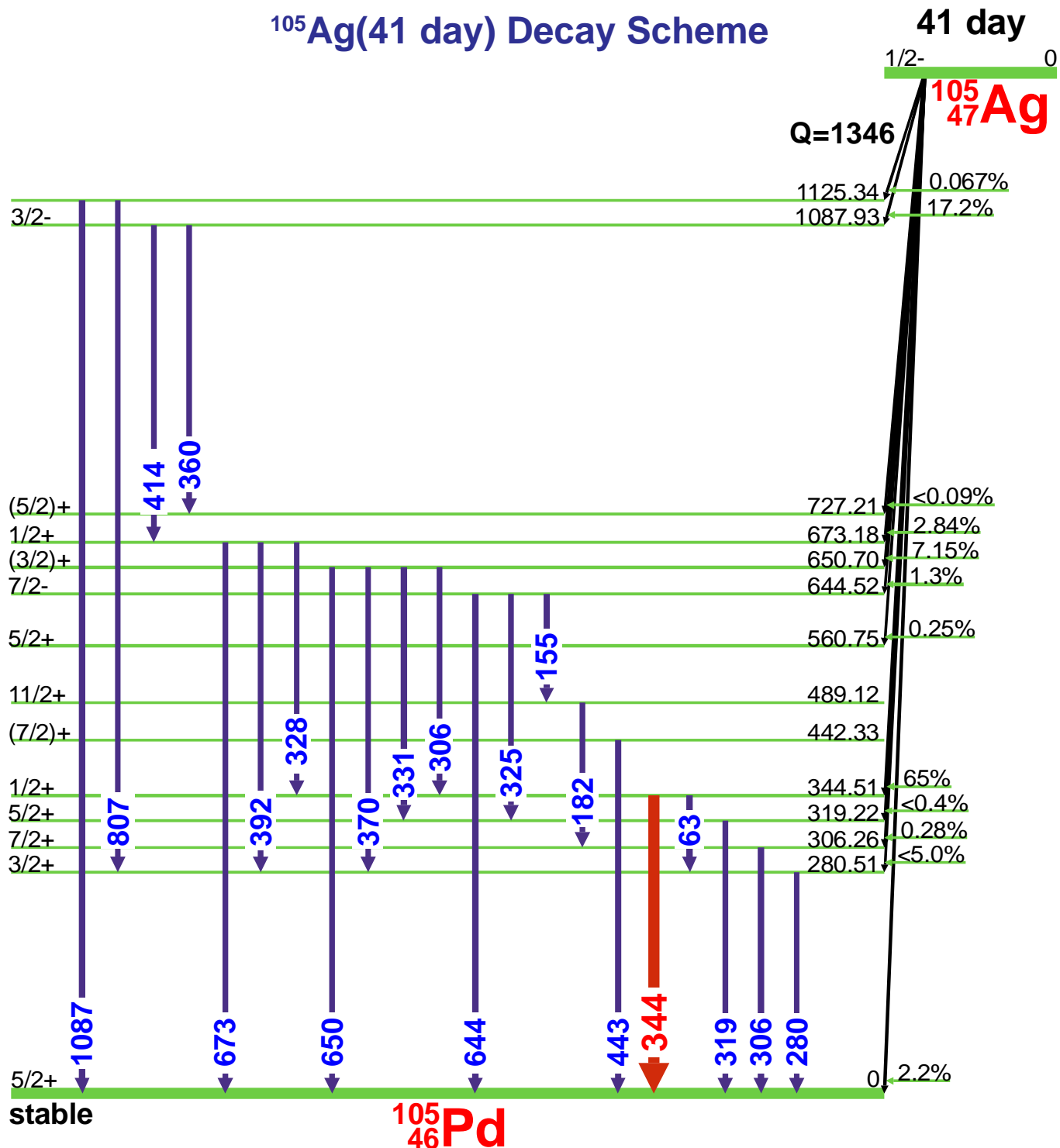
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
44.7	0.6		0.0011	0.0001	1
88.04	0.05	100	3.6	0.4	4
103.9	0.4	0.094	0.0009	0.0002	4
134.20	0.20	0.071	0.0013	0.0003	4
145.10	0.20	0.045	0.0011	0.0002	4
286.3	0.5		0.0001	0.0000	4
309.1	0.5	0.19	0.0049	0.0015	3
311.40	0.10	0.86	0.032	0.003	1
390.60	0.20	0.026	0.0009	0.0002	3
395.6	0.3		0.0002	0.0001	4
413.0	0.4	0.23	0.0066	0.0010	2
415.2	0.3	0.29	0.0107	0.0010	1
423.90	0.20	0.027	0.0010	0.0002	3
447.60	0.20	0.028	0.0008	0.0002	3
454.3	0.3	0.016	0.0005	0.0002	4
496.90	0.20		0.0001		4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
551.4	0.4	0.017	0.0006	0.0001	4
558.10	0.20	0.064	0.0024	0.0003	3
602.50	0.10	0.22	0.0080	0.0005	1
636.30	0.10	0.27	0.0100	0.0005	1
647.30	0.10	0.65	0.0244	0.0007	1
701.90	0.20	0.082	0.0031	0.0003	1
707.00	0.20	0.041	0.0016	0.0002	2
724.4	0.3	0.005	0.0002		3
736.70	0.20	0.056	0.0017	0.0002	2
778.3	0.5	0.023	0.0015	0.0005	2
781.40	0.20	0.30	0.0112	0.0013	1
822.9	0.4	0.005	0.0002		3
862.5	0.4	0.005	0.0001		3
966.2	0.3		0.0001		4
1010.0	0.3		0.0001		4

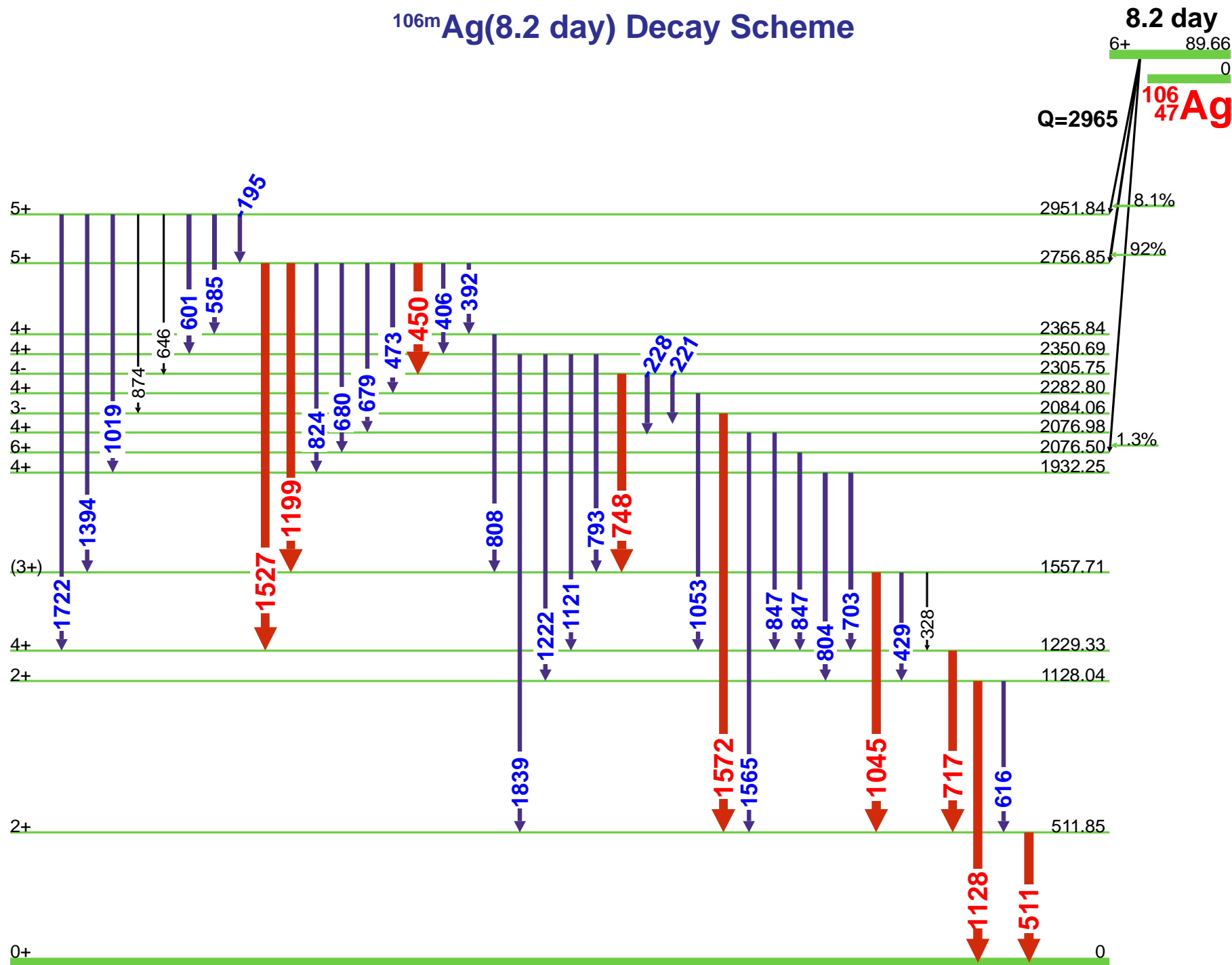




¹⁰⁵Ag(41 day) Decay Scheme



^{106m}Ag(8.2 day) Decay Scheme



stable

¹⁰⁶₄₆Pd

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: **$^{105}\text{Ag} - ^{106\text{m}}\text{Ag}^*$** E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 41.29(7) day - 8.28(2) day*

Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: Pd(p,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	38.72	0.03		0.0054	0.0012	4
	63.98	0.03		10.5	1.0	2
*	69.0	0.4		0.52	0.14	4
*	70.3	0.3		0.91	0.14	4
	73.5	1.0		0.014	0.003	4
*	80.10	0.20		0.34	0.07	4
*	83.2	0.6		0.08	0.04	4
	89.91	0.05		0.014	0.003	4
	112.43	0.05		0.023	0.003	4
	155.39	0.06	1.0	0.44	0.03	4
	158.92	0.08		0.023	0.005	4
	167.50	0.20		0.015	0.008	4
*	178.2	0.5		0.053	0.018	4
	178.34	0.11				4
	182.85	0.07	1.1	0.352	0.025	4
	186.64	0.13				4
	187.37	0.21				4
*	195.05	0.16	0.8	0.31	0.04	4
	202.13	0.16		0.013	0.006	4
	216.17	0.21		0.023	0.005	4
*	221.701	0.015	7.8	6.58	0.27	3
*	228.633	0.021	2.7	2.10	0.10	4
	280.44	0.08	70.0	30.2	1.7	2
	284.83	0.10		0.10	0.05	4
	289.18	0.07		0.13	0.04	4
D	306.25	0.07	2.5	0.88	0.06	4
	306.25	0.07		0.88	0.06	
	311.64	0.07		0.060	0.007	4
	319.16	0.06	10.0	4.35	0.22	3
	325.26	0.07	0.7	0.16	0.05	4
*	328.463	0.023		1.14	0.05	4
	328.61	0.06		0.15	0.07	4
	331.51	0.07	10.0	4.10	0.22	4
	344.52	0.03	100	41.4	0.6	1
	354.			0.0066	0.0001	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	360.66	0.14	1.3	0.50	0.03	4
	370.17	0.06	2.2	0.73	0.05	4
*	374.46	0.13		0.26	0.04	4
	382.60	0.20		0.0046	0.0021	4
*	391.035	0.026	4.8	3.68	0.18	3
	392.64	0.06	3.6	1.98	0.10	4
	401.65	0.07		0.174	0.013	4
	402.75	0.25				4
*	406.182	0.020	16.0	13.4	0.4	2
	408.00	0.08		0.040	0.006	4
	414.66	0.19	0.7	0.286	0.025	4
*	418.55	0.23		0.33	0.06	4
	420.94	0.09		0.105	0.010	4
*	429.646	0.022	15.0	13.2	0.4	2
*	433.9	0.5		0.09	0.04	4
	437.12	0.19		0.25	0.03	4
	437.12	0.19		0.25	0.03	4
D	442.25	0.11	25.0			3
	443.37	0.07		10.5	0.5	
	446.74	0.19		0.12	0.06	4
*	450.976	0.022	32.0	28.2	0.7	1
*	474.06	0.03	1.0	0.93	0.05	4
	486.8	0.4		0.006	0.004	4
*	511.85	0.03	100	87.7	2.7	1
*	522.3	0.3		0.088	0.018	4
	527.20	0.07		0.100	0.010	4
	560.72	0.06		0.58	0.04	4
	564.39	0.20		0.007	0.006	4
	576.62	0.10		0.014	0.003	4
	580.1	0.4		0.008	0.003	4
	582.93	0.15		0.018	0.004	4
*	585.97	0.10	1.0	0.44	0.10	4
	598.60	0.20		0.014	0.003	4
*	601.17	0.07	2.0	1.614	0.088	4
	610.			0.0037	0.0029	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: $^{105}\text{Ag} - ^{106\text{m}}\text{Ag}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 41.29(7) day - 8.28(2) day*

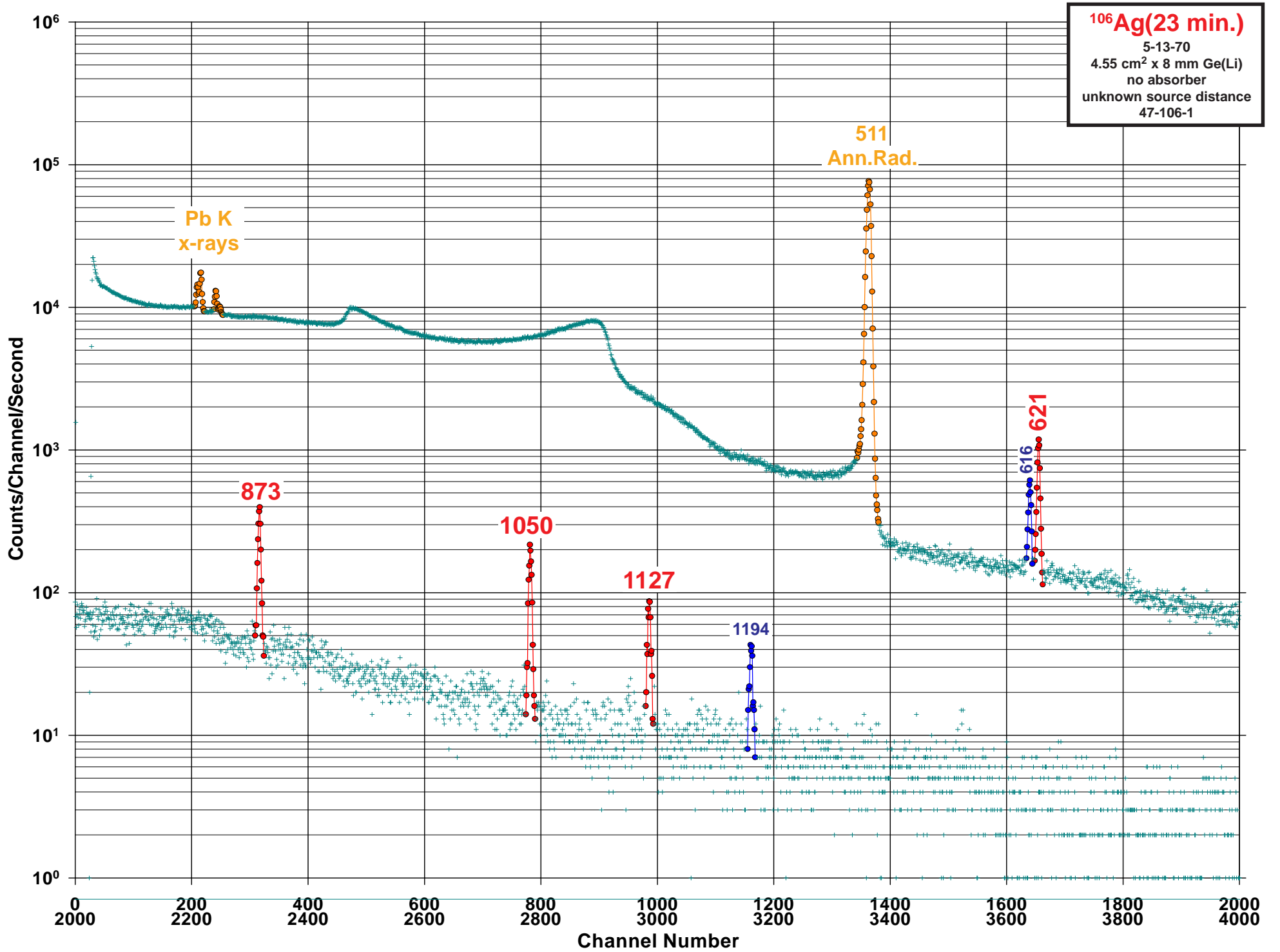
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: Pd(p,xn)

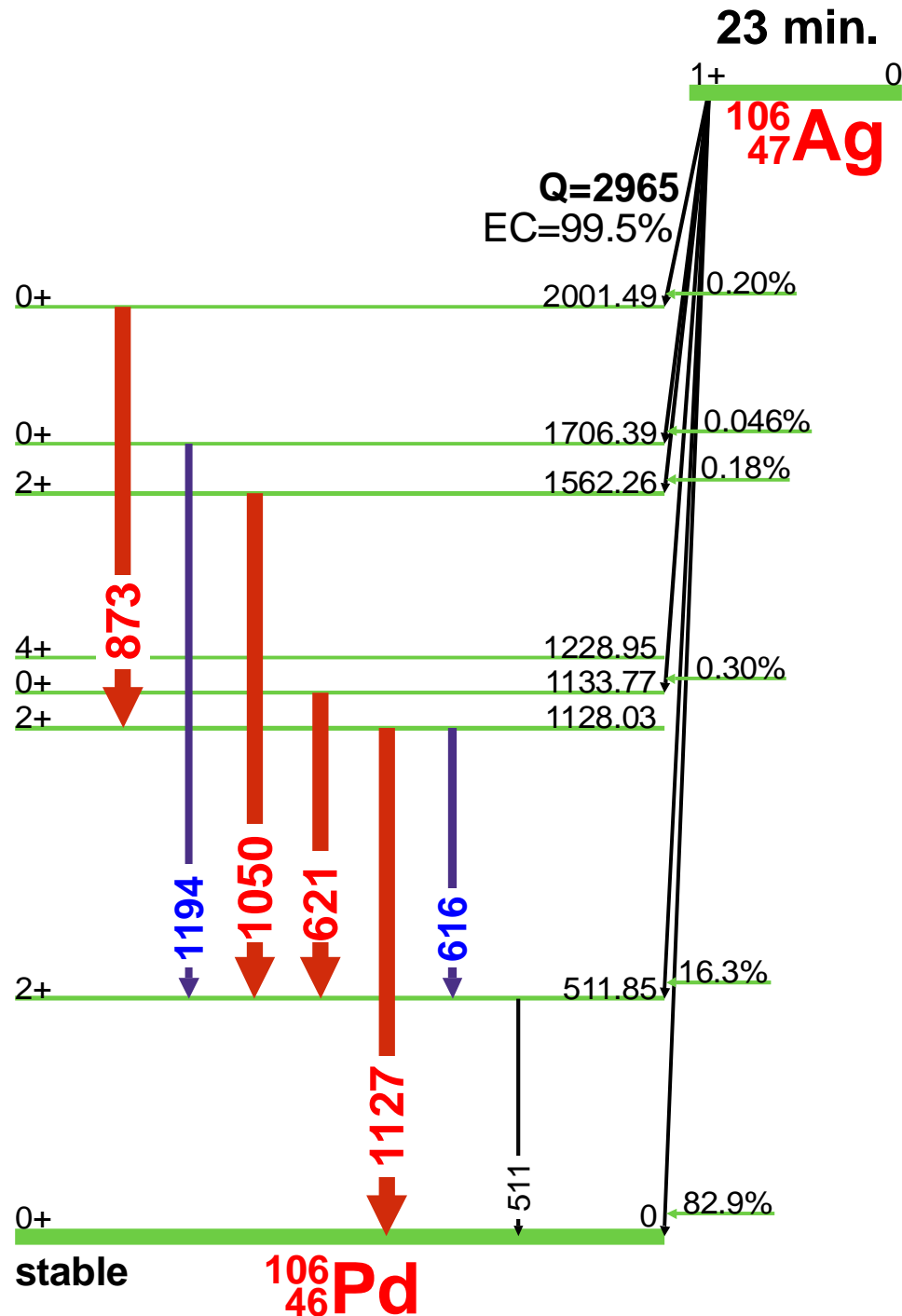
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	616.17	0.03	26.0	21.6	0.6	2
	617.85	0.07		1.16	0.06	4
	636.6	0.3				4
	644.55	0.07	26.0	11.1	0.6	2
	646.0	0.4				4
*	646.03	0.05		1.46	0.10	4
D	649.2		6.2	0.0037	0.0001	4
	650.72	0.06		2.54	0.04	4
	673.21	0.06	2.8	1.06	0.06	4
*D	679.640	0.020	2.5	0.64	0.04	4
	680.420	0.010		1.54	0.08	4
	681.90	0.07		0.045	0.007	4
*	703.11	0.08	5.4	4.47	0.18	3
*	717.34	0.09	33.0	28.9	0.8	1
	727.22	0.07		0.124	0.010	4
	743.31	0.21		0.57	0.04	4
*	748.36	0.11	24.0	20.6	0.6	1
*	793.17	0.10	7.0	5.88	0.27	3
	796.25	0.24		0.0029	0.0012	4
*	804.28	0.10	13.0	12.4	0.5	3
	807.46	0.07		1.16	0.07	4
*	808.36	0.11		4.0	0.4	4
*	824.69	0.07	17.0	15.3	0.4	2
	844.89	0.13		0.046	0.005	4
*D	847.03	0.04	5.2	2.8	0.6	3
	847.270	0.020		1.6	0.5	4
	860.33	0.18		0.0029	0.0012	4
*	874.81	0.18		0.33	0.04	4
	921.04	0.22		0.023	0.005	4
	928.89	0.23		0.016	0.004	4
*	949.52	0.25		0.19	0.04	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	956.22	0.23		0.47	0.08	4
	962.43	0.07		0.124	0.010	4
*	986.8	0.4		0.0035		4
*	1019.72	0.15	1.2	1.04	0.16	4
*	1045.83	0.08	32.0	29.6	1.0	1
*	1050.6	0.5		0.26	0.13	4
*	1053.77	0.21	1.4	0.96	0.14	4
*	1077.2	0.5		0.053	0.018	4
	1087.94	0.06	8.4	3.85	0.17	3
*	1121.59	0.18	0.75	0.57	0.06	4
	1125.7	0.6		0.014	0.004	4
*	1128.02	0.07	13.0	11.8	0.5	1
*	1136.85	0.19		0.228	0.026	4
*	1168.25	0.25		0.096	0.026	4
*	1178.07	0.21		0.114	0.026	4
*	1199.39	0.10	12.0	11.2	0.5	1
*	1222.88	0.12	7.4	7.0	0.4	2
*	1349.5	0.6		0.12	0.04	4
*	1394.35	0.14	1.9	1.49	0.18	3
*	1419.4	0.8		0.035	0.018	4
*	1527.65	0.19	17.0	16.3	1.3	1
*	1565.4	0.3	0.7	0.48	0.04	4
*	1572.35	0.15	7.3	6.6	0.5	1
*	1690.2	0.4		0.036	0.006	4
*	1722.76	0.18	1.5	1.40	0.18	2
*	1771.1	0.3		0.040	0.007	4
*	1794.0	0.3		0.038	0.015	4
*	1839.05	0.10	2.3	2.02	0.26	2
*	1909.1	0.6		0.013	0.004	4
*	2077.3	0.8		0.0022	0.0013	4
*	2084.0	0.4		0.023	0.004	4





¹⁰⁶Ag(23 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁰⁶Ag

Half Life: 23.96(4) min.

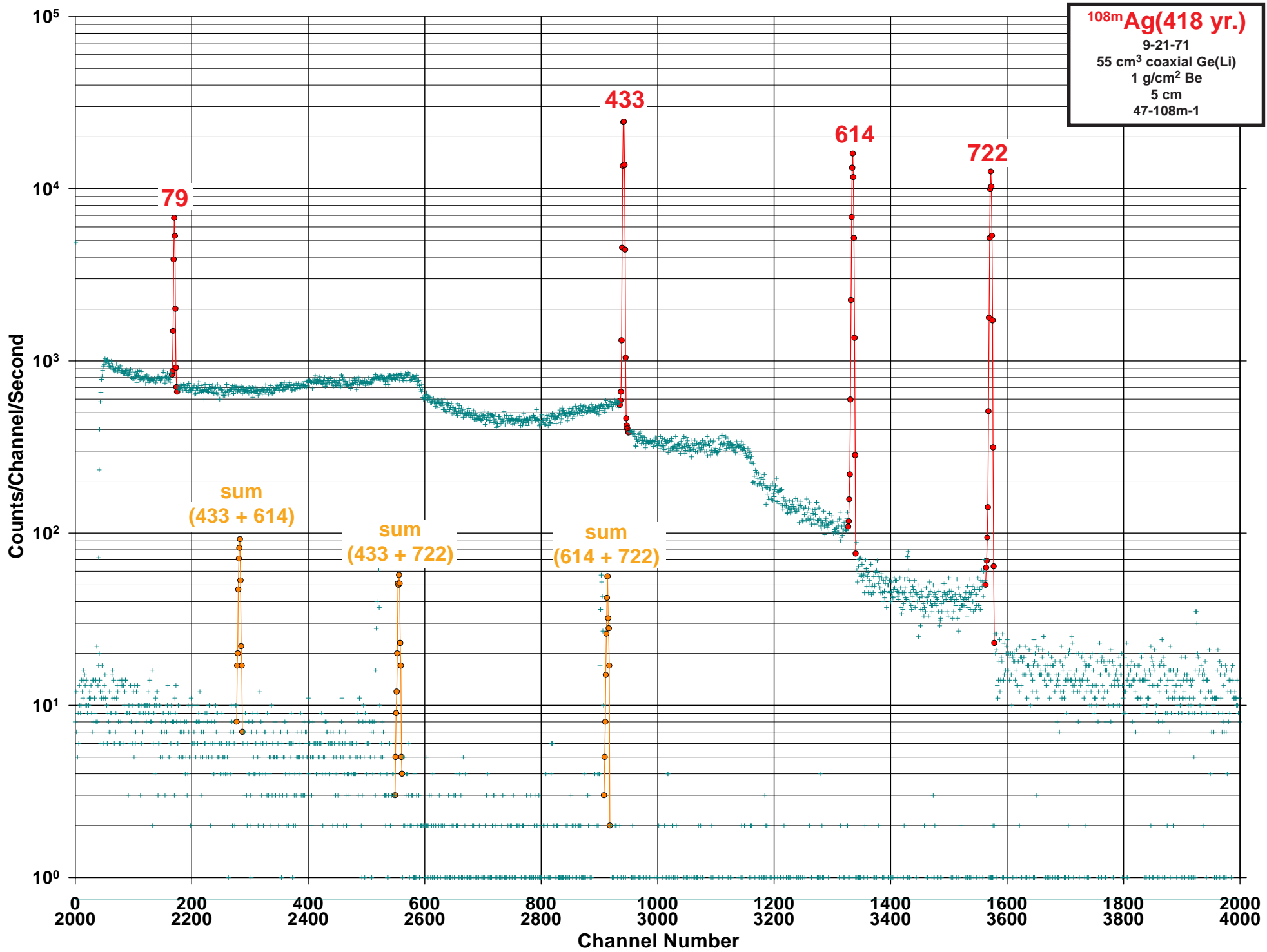
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ¹⁰⁷Ag(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	428.60	0.10		0.0077	0.0010	4
	434.28			0.0022	0.0003	4
	439.23			0.0057	0.0009	4
Ann. D	511.006			117.	3.	
D	511.90	0.10		17.0	1.5	1
	578.40	0.10		0.0065	0.0009	4
	616.19	0.05	47.0	0.142	0.013	2
	621.95	0.04	100	0.316	0.028	1
	680.20	0.10		0.0032	0.0006	4
	715.60	0.00		0.0007	0.0001	4
	717.10	0.10		0.0012	0.0002	4
	873.46	0.07	61.0	0.199	0.018	1
	1050.31	0.10	47.0	0.167	0.015	1
	1109.00	0.20		0.0042	0.0006	4
	1114.50	0.10		0.0062	0.0007	4
	1127.98	0.07	23.0	0.072	0.007	1
	1133.70					4
	1180.70	0.10		0.0055	0.0007	4
	1194.50	0.10	11.0	0.040	0.004	2
	1397.60	0.10		0.0030	0.0004	4
	1489.60	0.20		0.0015	0.0003	4
	1498.80	0.20		0.0007	0.0002	4
	1562.20	0.10		0.0172	0.0015	4
	1572.30			0.0001		4
	1730.0	0.3		0.0012	0.0002	4
	1766.00	0.10		0.0025	0.0003	4
	1797.00	0.10		0.0082	0.0009	4
	1909.50	0.20		0.0012	0.0002	4
	1927.50	0.20		0.0008	0.0001	4
	1988.6	0.6		0.0003	0.0001	4
	2113.8	0.6		0.0004	0.0002	4
	2193.40	0.10		0.0025	0.0005	4
	2242.70	0.20		0.0008	0.0001	4
	2309.30	0.20		0.0007	0.0001	4
	2316.6	0.3		0.0002	0.0001	4
	2365.9	0.4		0.0003	0.0001	4
	2438.6	0.4		0.0005	0.0001	4
	2626.9					4
	2704.9	0.2		0.0008	0.0001	4

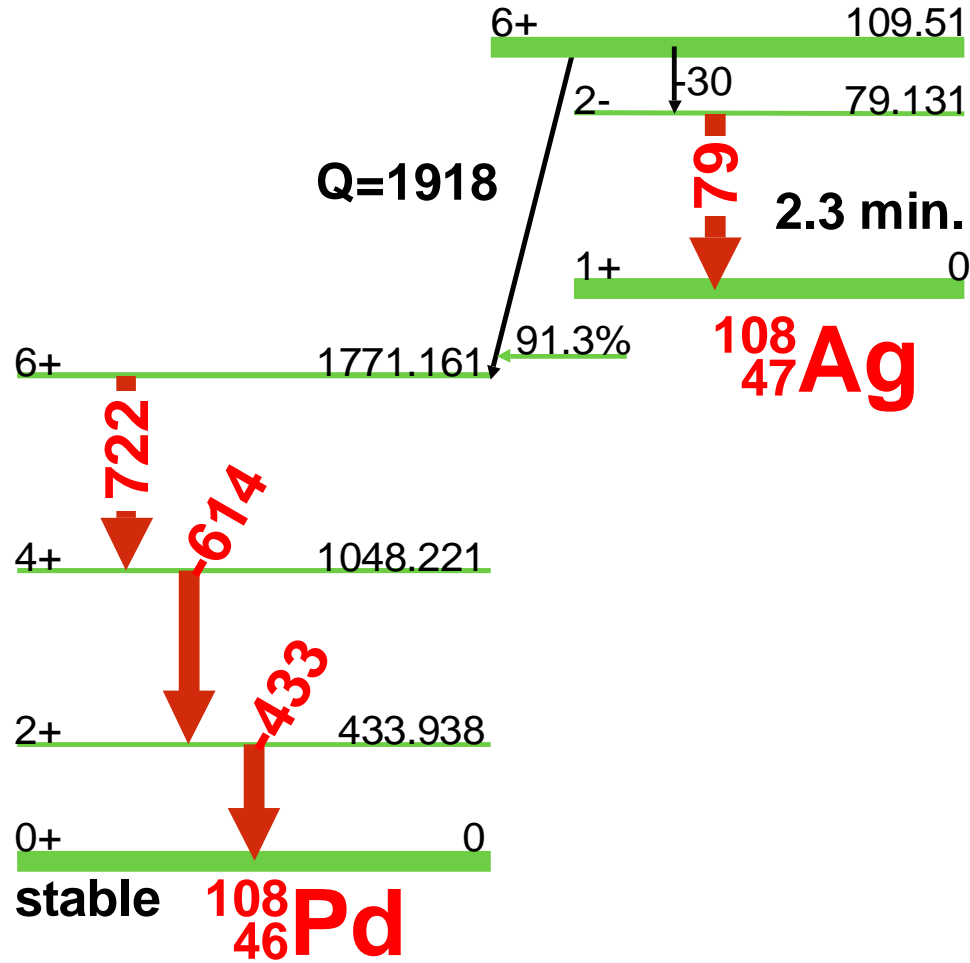
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{108m}Ag(418 yr.) Decay Scheme

418 yr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{108m}Ag

Half Life: 418(21) yr.

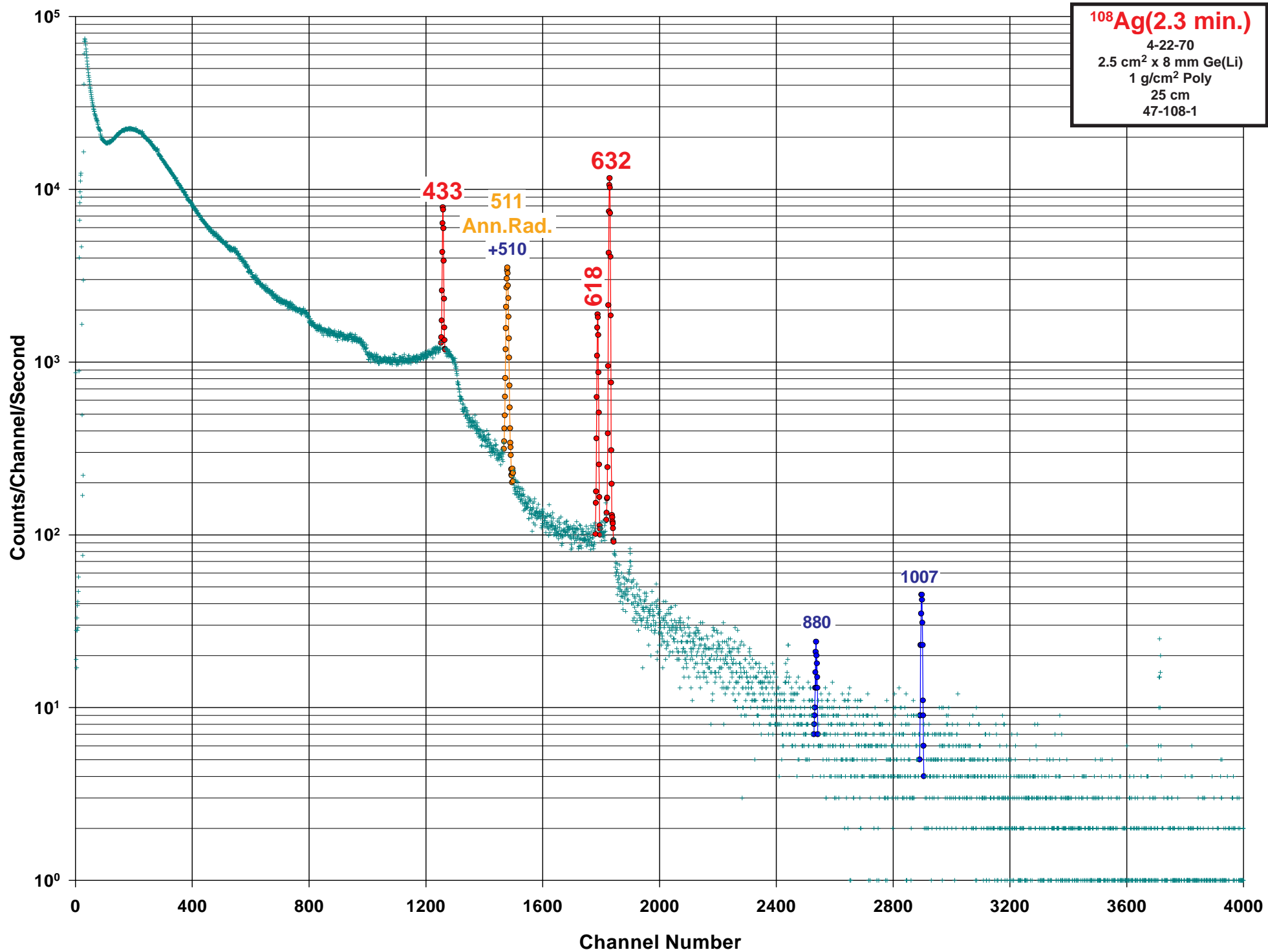
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ¹⁰⁷Ag(n,γ)

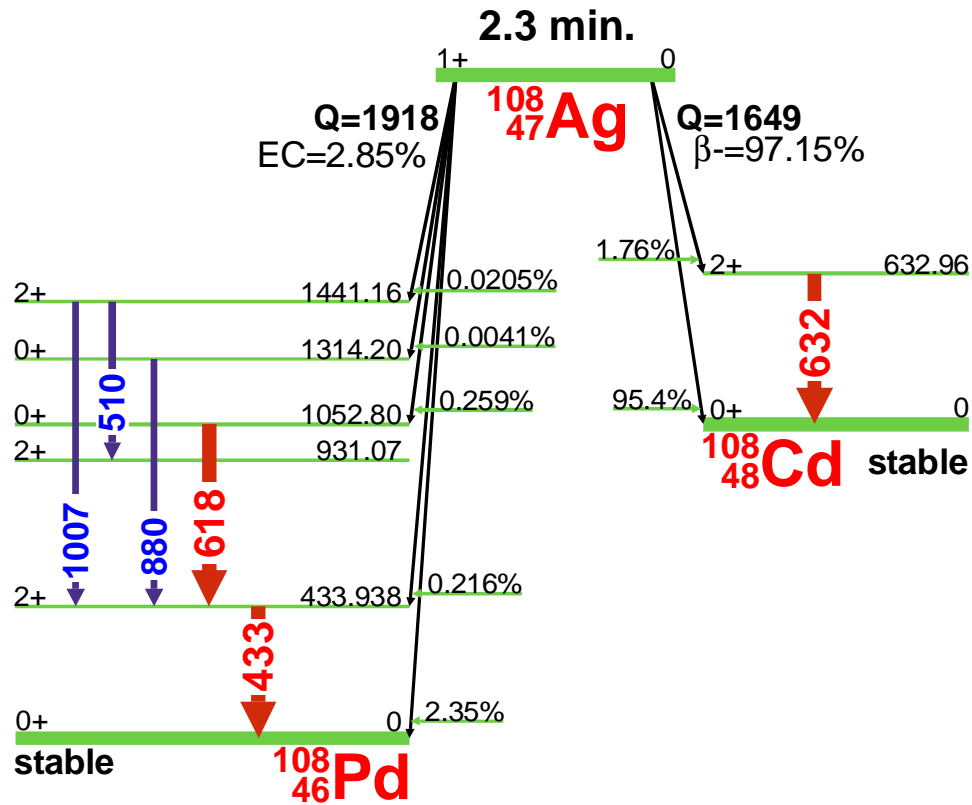
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
30.38	0.06				4
79.131	0.003		6.6	0.5	1
433.937	0.004	100	90.5		1
614.276	0.004	100	89.8	2.0	1
722.907	0.010	100	90.8	2.0	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁰⁸Ag(2.3 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁰⁸Ag

Half Life: 2.37(1) min.

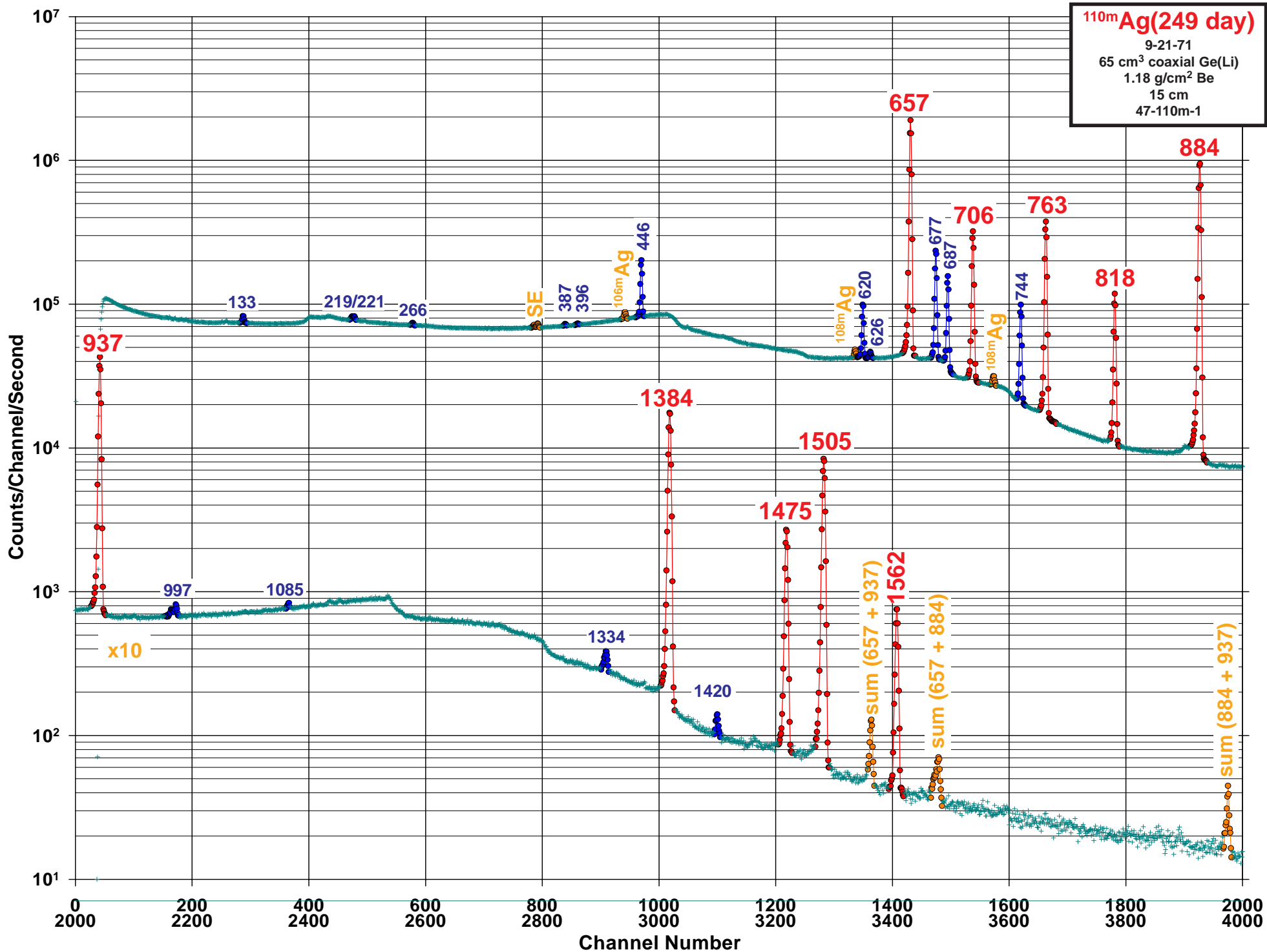
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁰⁷Ag(n,γ)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	383.2	1.0		0.0009	0.0003	4
	388.6	0.4		0.0019	0.0006	4
	433.937	0.004	28.3	0.50		1
	497.10	0.20		0.0023	0.0005	4
	510.10	0.20		0.0035		1
Ann.	511.006			0.0160	0.0011	
	618.86	0.05	52.5	0.262	0.014	1
	632.98	0.05	100	1.71	0.10	1
	880.26	0.10	0.17	0.0032	0.0003	3
	931.12	0.20		0.00055	0.00005	4
	1007.22	0.06	0.81	0.0139	0.0007	2
	1106.00	0.07		0.00165	0.00014	4
	1441.14	0.10		0.00305	0.00020	4
	1540.00	0.20		0.00105	0.00011	4

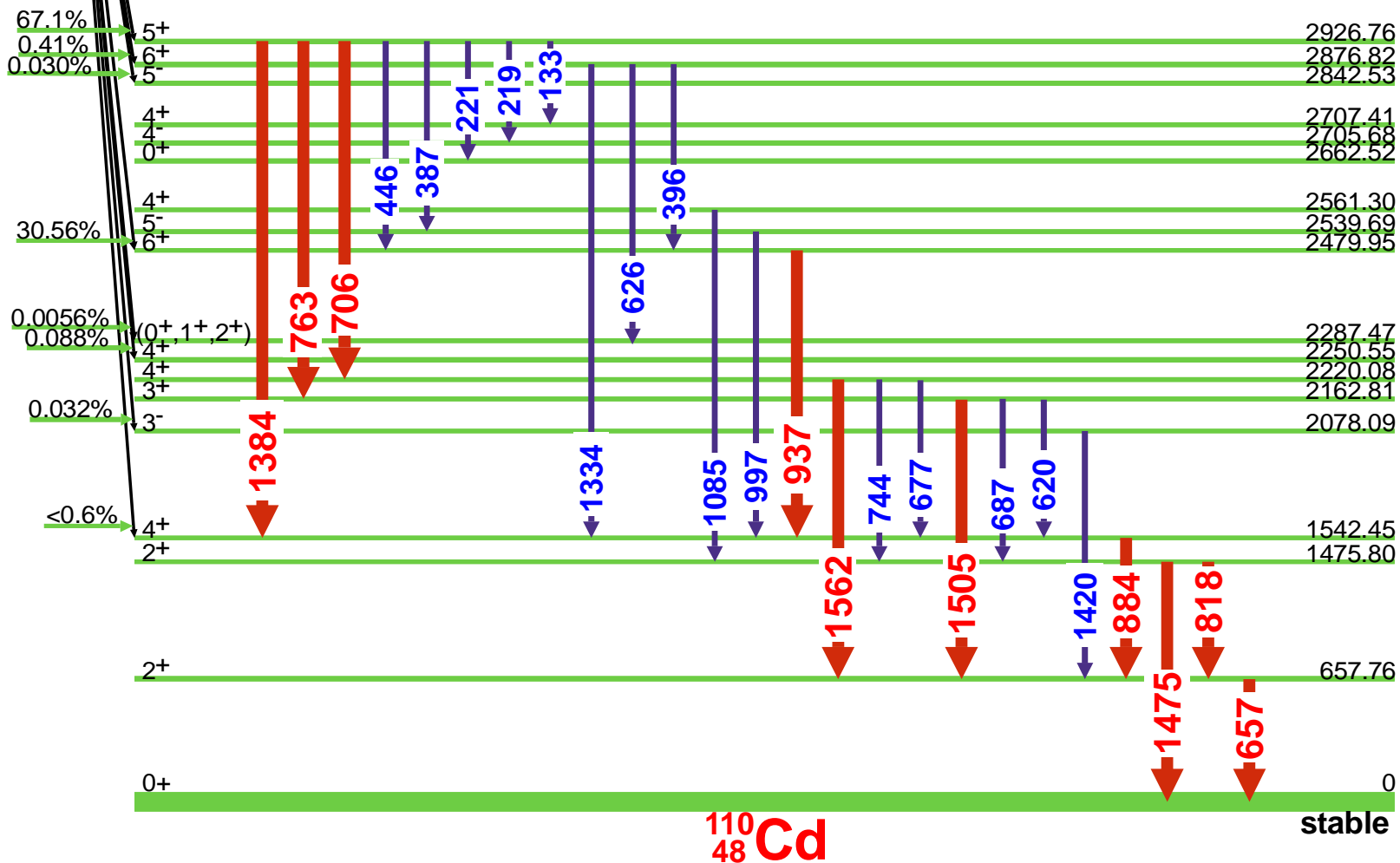
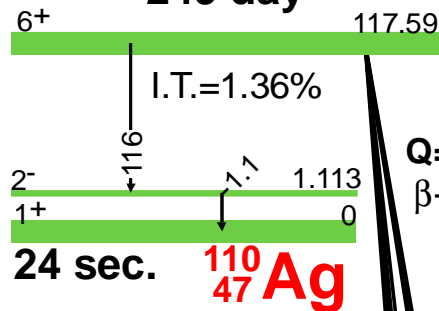
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





249 day

^{110m}Ag(249 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

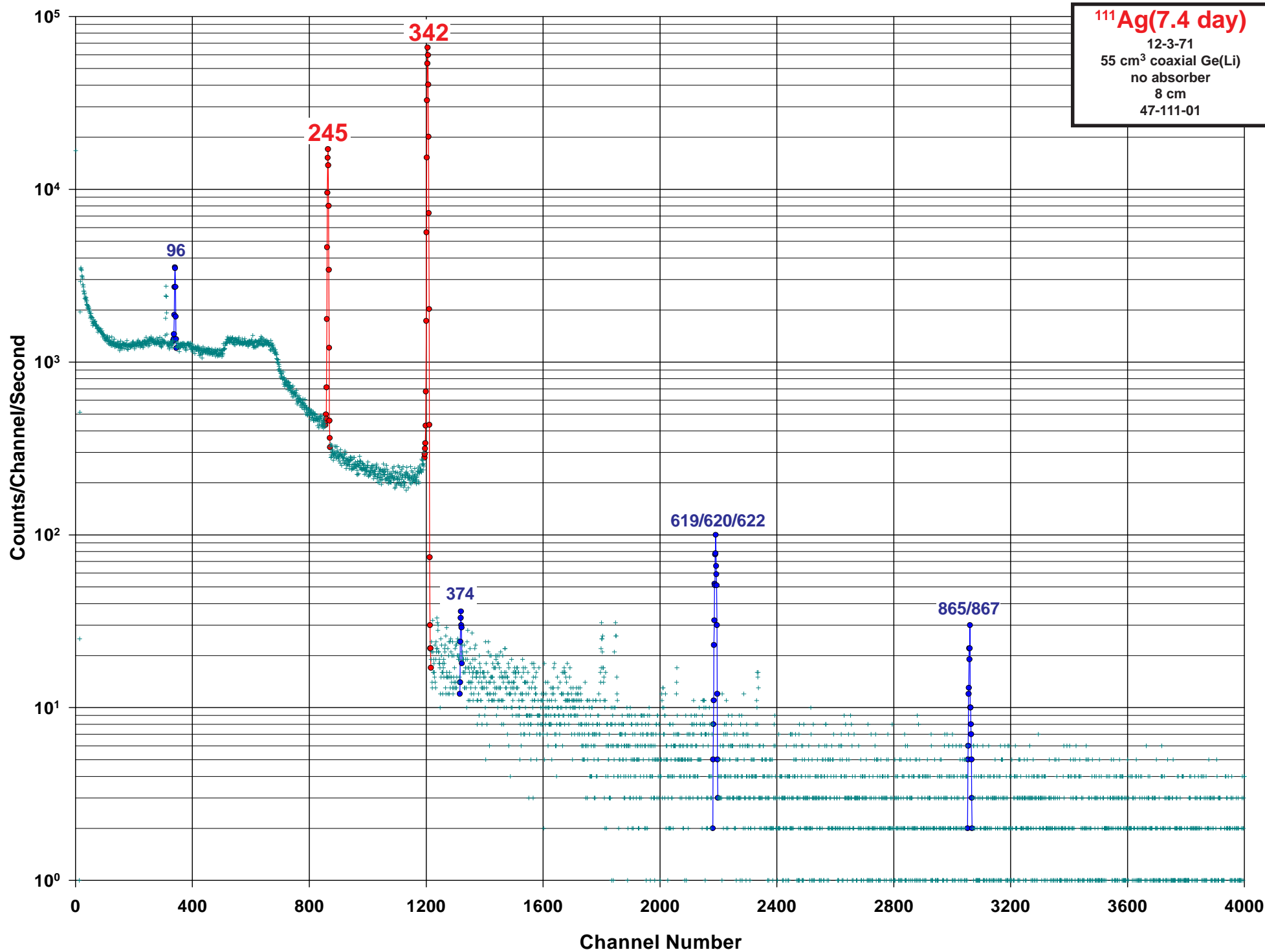
Nuclide: ^{110m}Ag E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 249.79(20) day

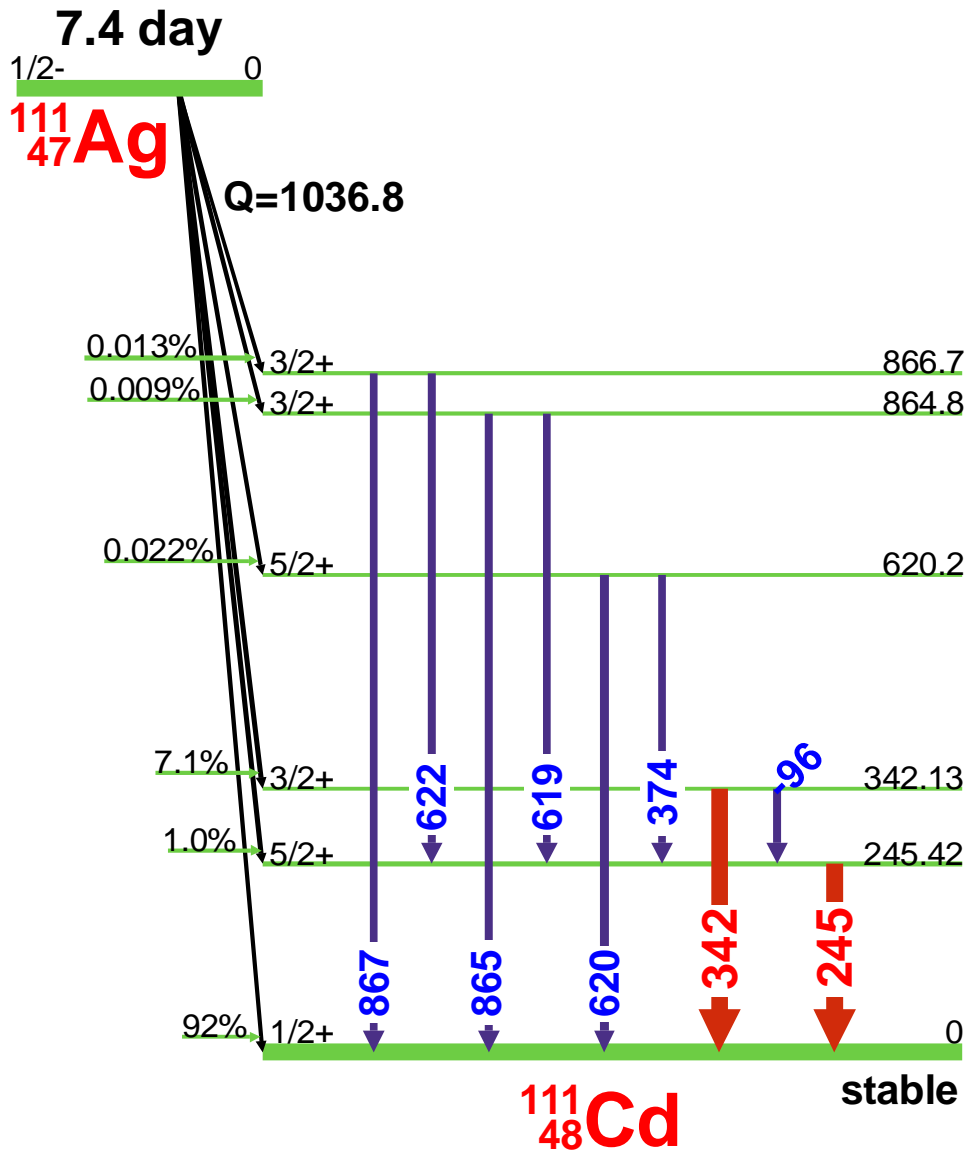
Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{109}\text{Ag}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1.113					4
116.48	0.05		0.0080	0.0005	4
120.23	0.03		0.0181	0.0010	4
133.333	0.007	0.08	0.0734	0.0029	4
219.348	0.008	0.27	0.0667	0.0019	4
221.079	0.010		0.0686	0.0010	
229.423	0.023		0.0122	0.0008	4
266.913	0.012	0.08	0.0410	0.0010	4
341.20	0.20		0.0021	0.0004	4
360.23	0.08		0.0033	0.0007	4
365.450	0.011		0.087	0.018	4
387.075	0.009	0.06	0.08	0.04	4
396.897	0.023	0.06	0.057	0.029	4
409.33	0.05		0.0065	0.0007	4
409.33	0.05		0.0065	0.0007	4
446.812	0.003	3.81	3.77	0.03	3
467.03	0.04		0.025	0.005	4
493.43	0.09		0.0105	0.0010	4
544.55	0.05		0.0210	0.0010	4
573.0	0.4		0.0124	0.0029	4
603.07	0.09		0.0040	0.0009	4
620.3553	0.0017	2.93	2.826	0.020	3
626.262	0.010	0.225	0.217	0.013	4
630.63	0.06		0.0381	0.0019	4
649.6					4
657.7600	0.0011	100	95.3	0.5	1
677.6217	0.0012	11.26	10.43	0.08	2
687.0091	0.0018	7.33	6.48	0.06	2
706.6760	0.0015	17.57	16.55	0.11	1
708.133	0.020		0.276	0.019	4
714.90	0.10		0.0086	0.0019	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
744.2755	0.0018	5.18	4.76	0.03	2
763.9424	0.0017	23.99	22.44	0.11	1
774.80	0.20		0.0019	0.0010	4
818.0244	0.0013	7.94	7.40	0.04	1
884.68 5	0.003	77.87	73.19	0.37	1
937.485	0.003	37.40	34.60	0.16	1
997.37	0.09	0.122	0.0076	0.0010	4
997.25 8	0.015		0.135	0.005	
1018.89	0.05		0.0143	0.0010	4
1085.462	0.014	0.067	0.063	0.011	4
1117.47	0.03		0.039	0.006	4
1125.714	0.020		0.036	0.008	4
1163.16	0.08		0.046	0.008	4
1164.96	0.09		0.030	0.005	4
1251.06	0.05		0.023	0.007	4
1300.03	0.12		0.024	0.008	4
1334.341	0.017	0.21	0.142	0.005	4
1384.2931	0.0020	26.79	24.45	0.11	1
1420.08	0.05	0.074	0.0372	0.0029	4
1475.7792	0.0023	4.37	4.024	0.021	1
1505.0280	0.0020	14.32	13.13	0.06	1
1562.2940	0.0018	1.33	1.036	0.007	1
1592.67	0.10		0.0215	0.0012	4
1629.69	0.07		0.0058	0.0010	4
1698.50	0.20		0.0018	0.0002	4
1775.42	0.04		0.0064	0.0010	4
1783.48	0.03		0.0098	0.0010	4
1903.53	0.04		0.0151	0.0014	4
2004.74	0.10		0.0010	0.0002	4



¹¹¹Ag(7.4 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹¹¹Ag

Half Life: 7.45(1) day.

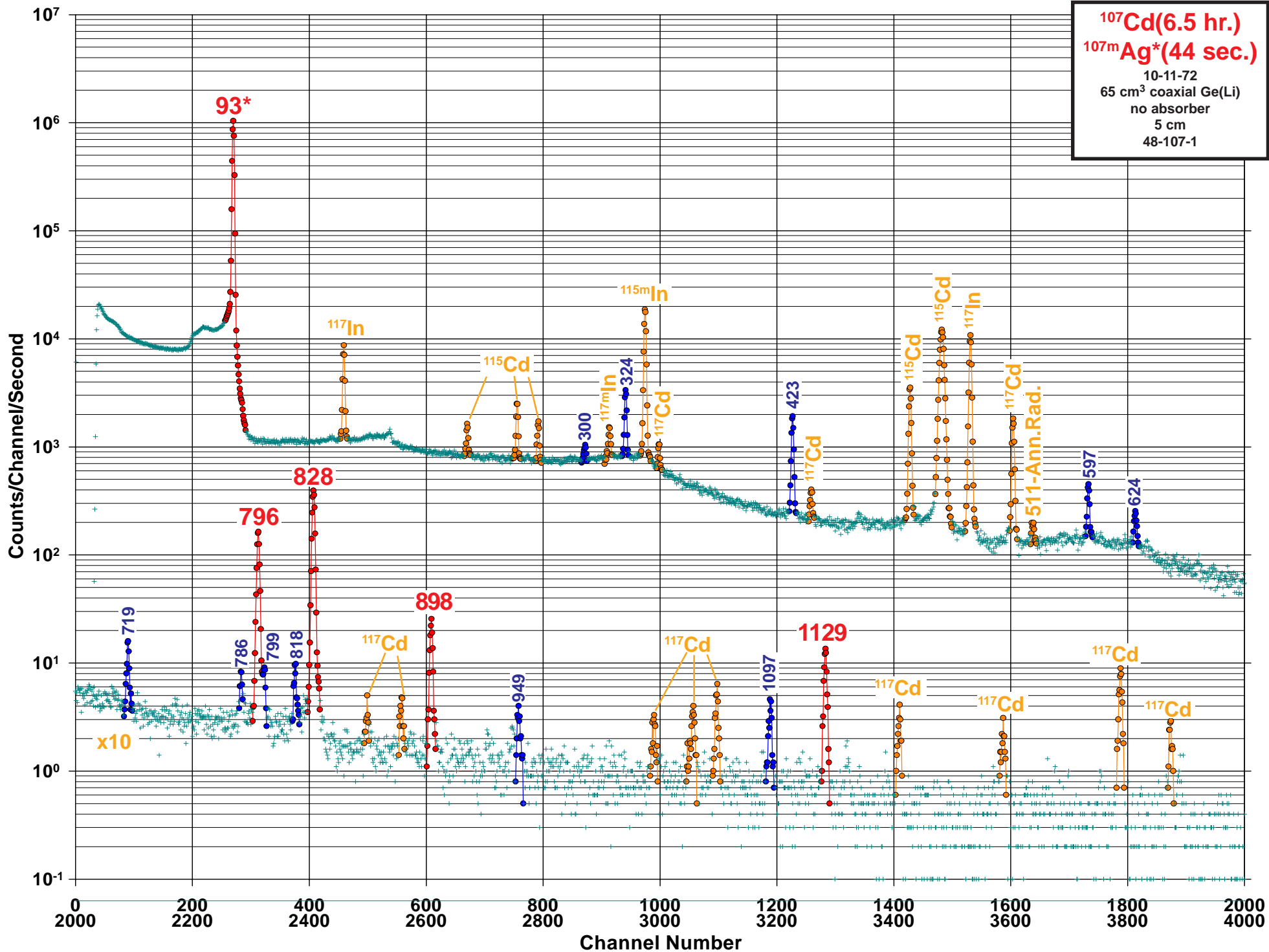
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁰Pd(n, γ) β

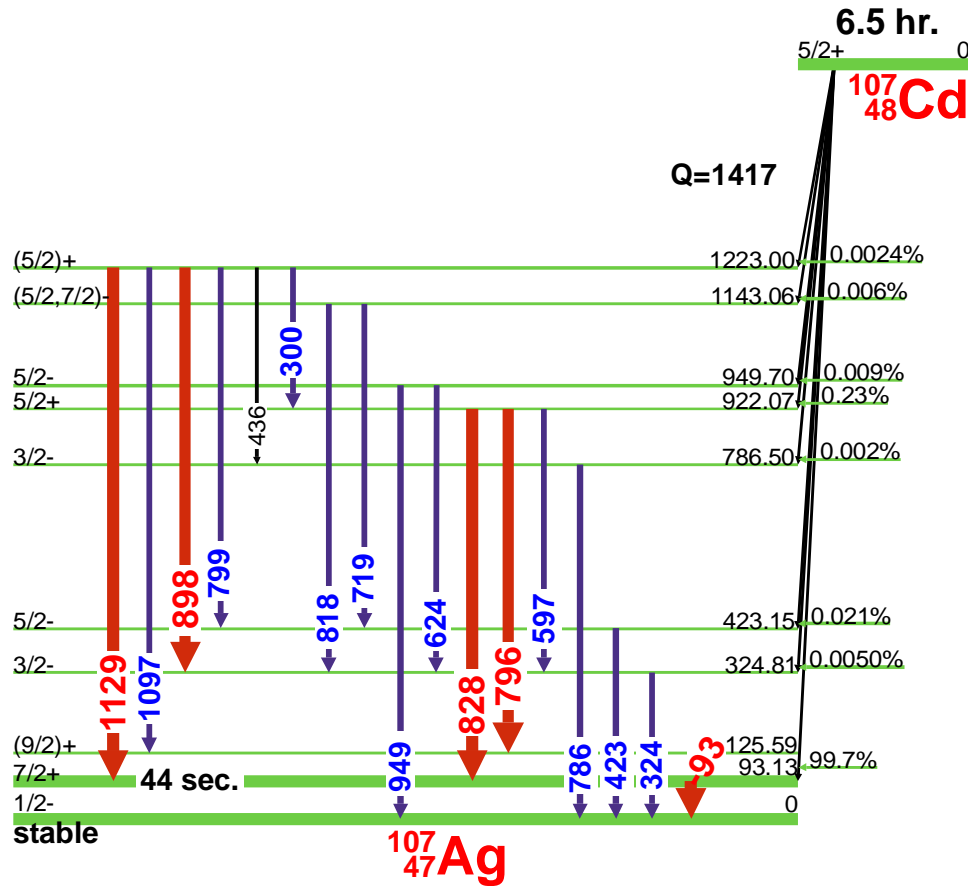
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
96.750	0.020	1.6	0.116	0.008	3
245.400	0.020	16.9	1.33	0.08	1
278.3	0.4		0.0005	0.0001	4
342.130	0.020	100	6.7	0.3	1
374.60	0.20		0.0031	0.0002	4
509.4			0.0013	0.0001	4
522.4	0.4		0.0009	0.0001	4
524.3	0.4		0.0021	0.0002	4
619.3	0.4		0.0005	0.0003	
D 620.3	0.4	0.35	0.0110	0.0010	2
622.0	0.4		0.0060	0.0020	
754.6			0.0027	0.0001	4
D 865.1	0.4		0.0015	0.0003	
D 867.0	0.4		0.0036	0.0003	2

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

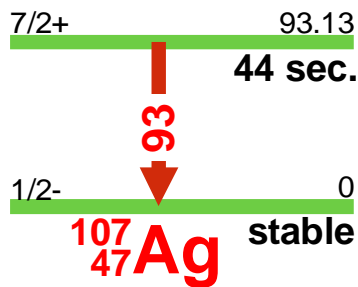




¹⁰⁷Cd(6.5 hr.) Decay Scheme



^{107m}Ag(44 sec.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁰⁷Cd - ^{107m}Ag

Half Life: 6.50(2) hr. - 44.3(2) sec.

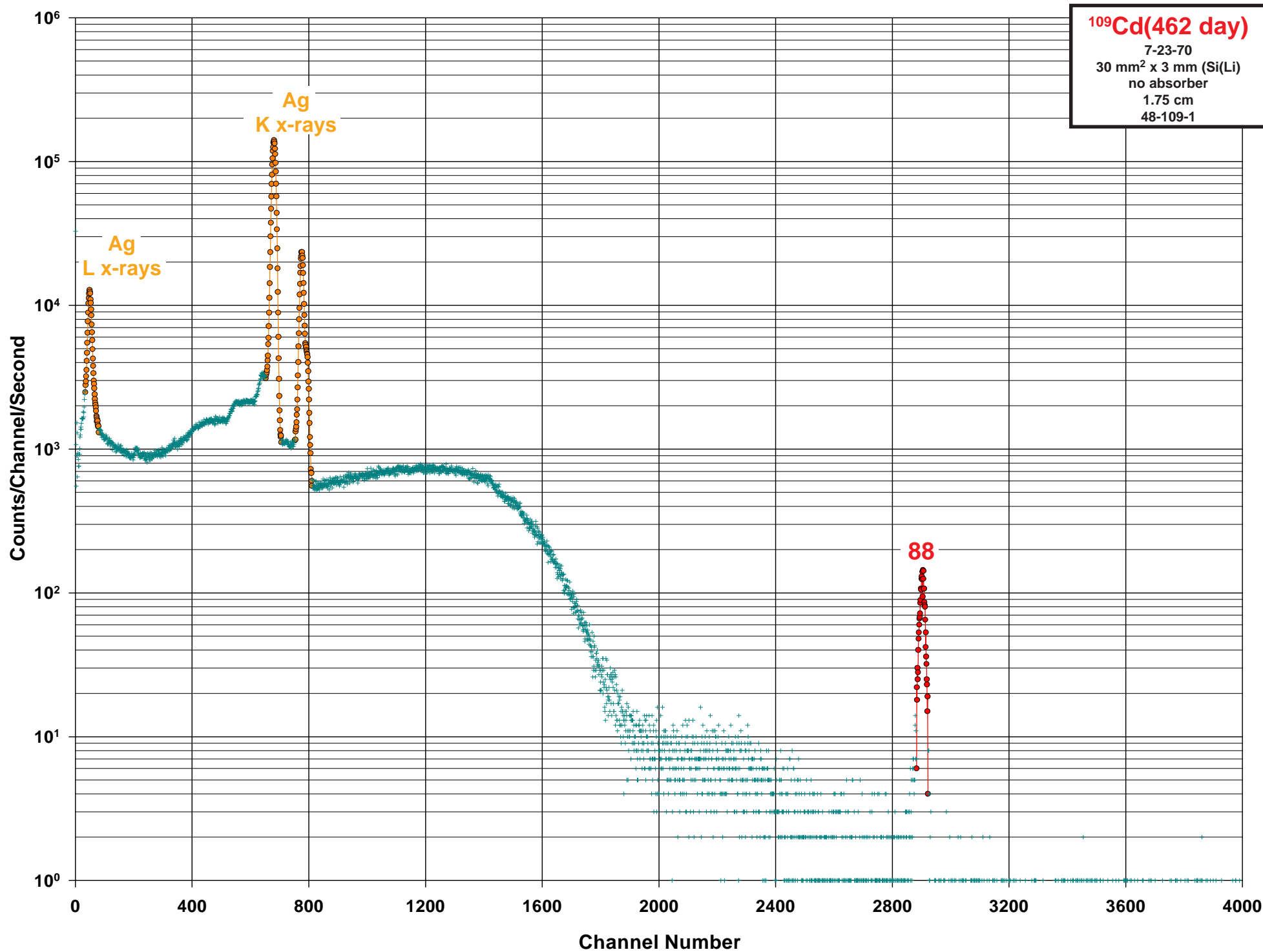
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ¹⁰⁷Ag(p,n)

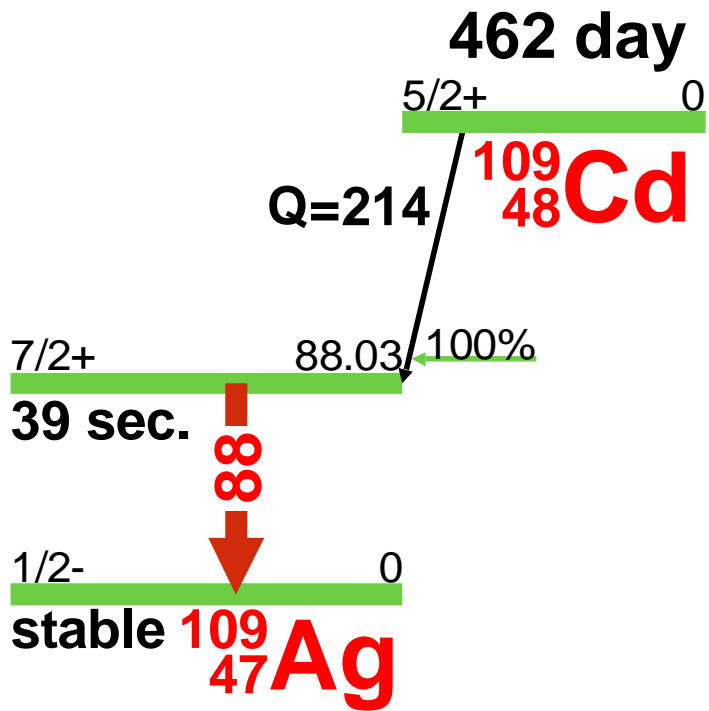
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	32.460	0.020		0.0048	0.0005	4
^{107m} Ag	93.124	0.020	100	4.8	0.3	1
	98.2	0.5		0.0014	0.0002	4
	300.90	0.10	0.055	0.0027	0.0002	4
	324.81	0.03	0.57	0.0314	0.0015	3
	356.4	0.4		0.0004	0.0001	4
	364.			0.0003		4
	423.150	0.025	0.53	0.0301	0.0015	2
	436.6	0.4		0.0003		4
	461.7	0.4		0.0007	0.0001	4
Ann.	511.006			0.40		4
	526.50	0.10		0.0046	0.0003	4
	549.9	0.4		0.0009	0.0001	4
	597.27	0.06	0.152	0.0078	0.0004	3
	624.91	0.10	0.087	0.0036	0.0002	3
	648.4	0.4		0.0002		4
	719.93	0.10	0.070	0.0037	0.0003	3
	786.45	0.15	0.035	0.0017	0.0002	3
	796.462	0.025	1.13	0.0665	0.0020	1
	799.92	0.15	0.056	0.0020	0.0002	4
	818.23	0.10	0.042	0.0021	0.0003	3
	828.93	0.03	2.85	0.167		1
	856.5	0.4		0.0001		4
	898.17	0.06	0.185	0.0099	0.0004	1
	934.0	0.4		0.0001		4
	949.80	0.20	0.025	0.0013	0.0001	3
	1050.0	0.4		0.0002		4
	1097.50	0.20	0.036	0.0020	0.0002	3
	1129.90	0.10	0.134	0.0073	0.0003	1
	1143.0	0.4				4
	1165.7	0.4		0.0004	0.0001	4
	1223.0	0.4				4
	1232.6	0.4		0.0005	0.0001	4
	1259.0	0.4		0.0001		4
	1264.5	0.8		0.0001		4
	1294.0	0.8				4
	1297.0	0.4		0.0001		4
	1325.8	0.4		0.0001		4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁰⁹Cd(462 day) Decay Scheme



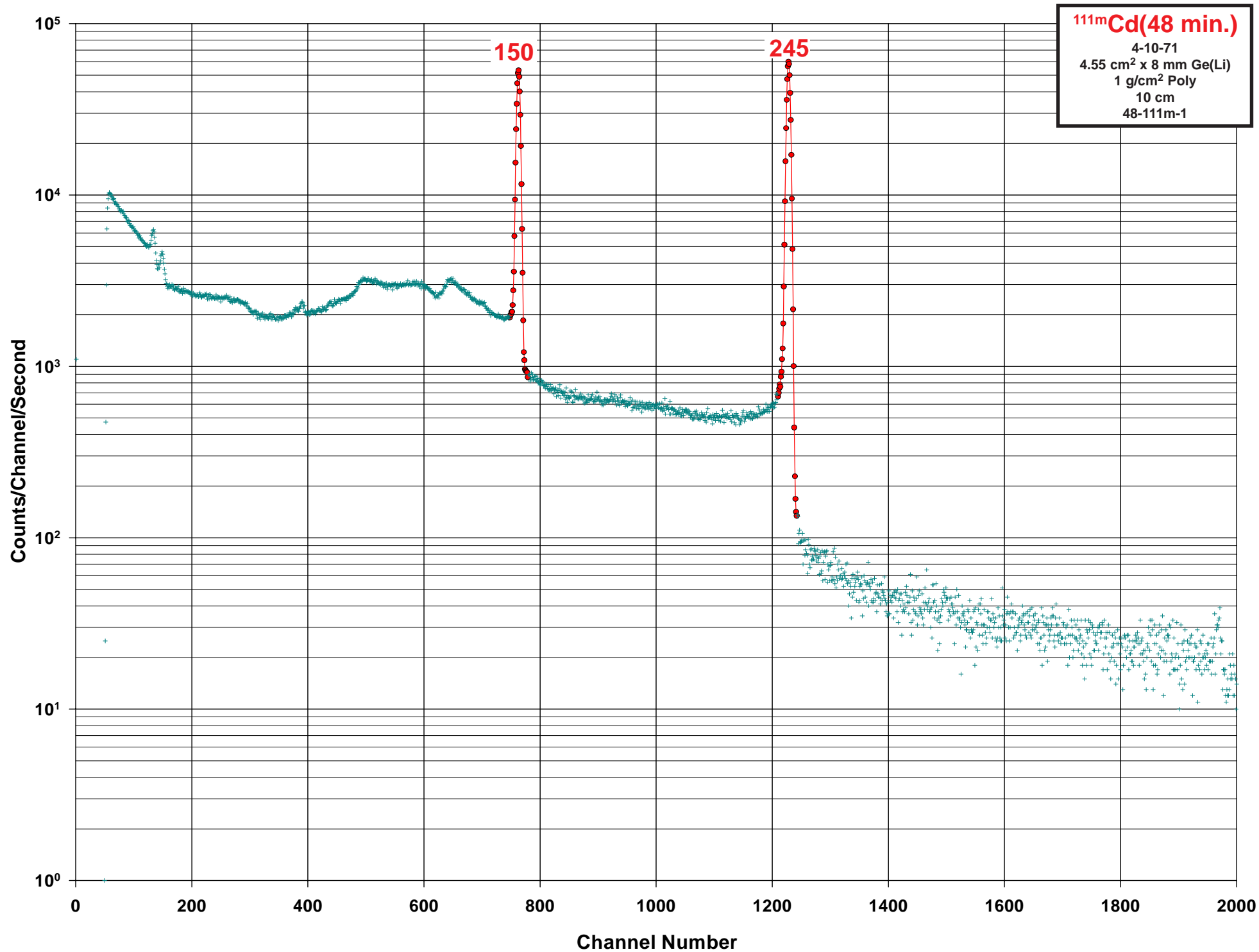
GAMMA-RAY ENERGIES AND INTENSITIES

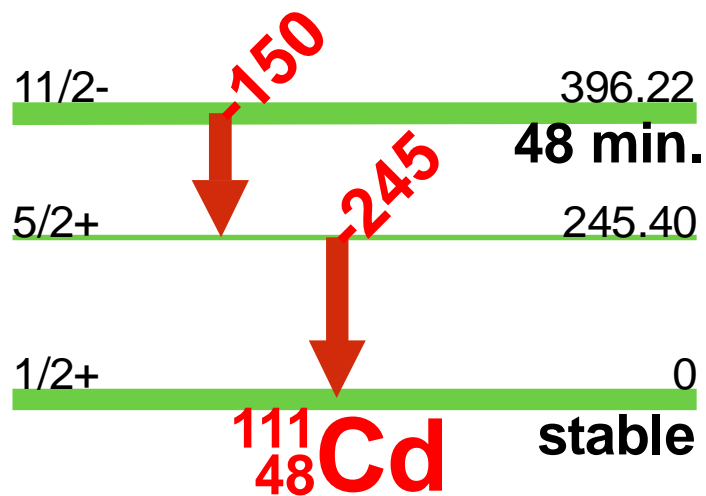
Nuclide: ¹⁰⁹Cd Half Life: 462.6(4) day
 Detector: 30 mm² x 3 mm Si (Li) Method of Production: ¹⁰⁹Ag(p,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
88.034	0.001	100	3.61	0.10	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





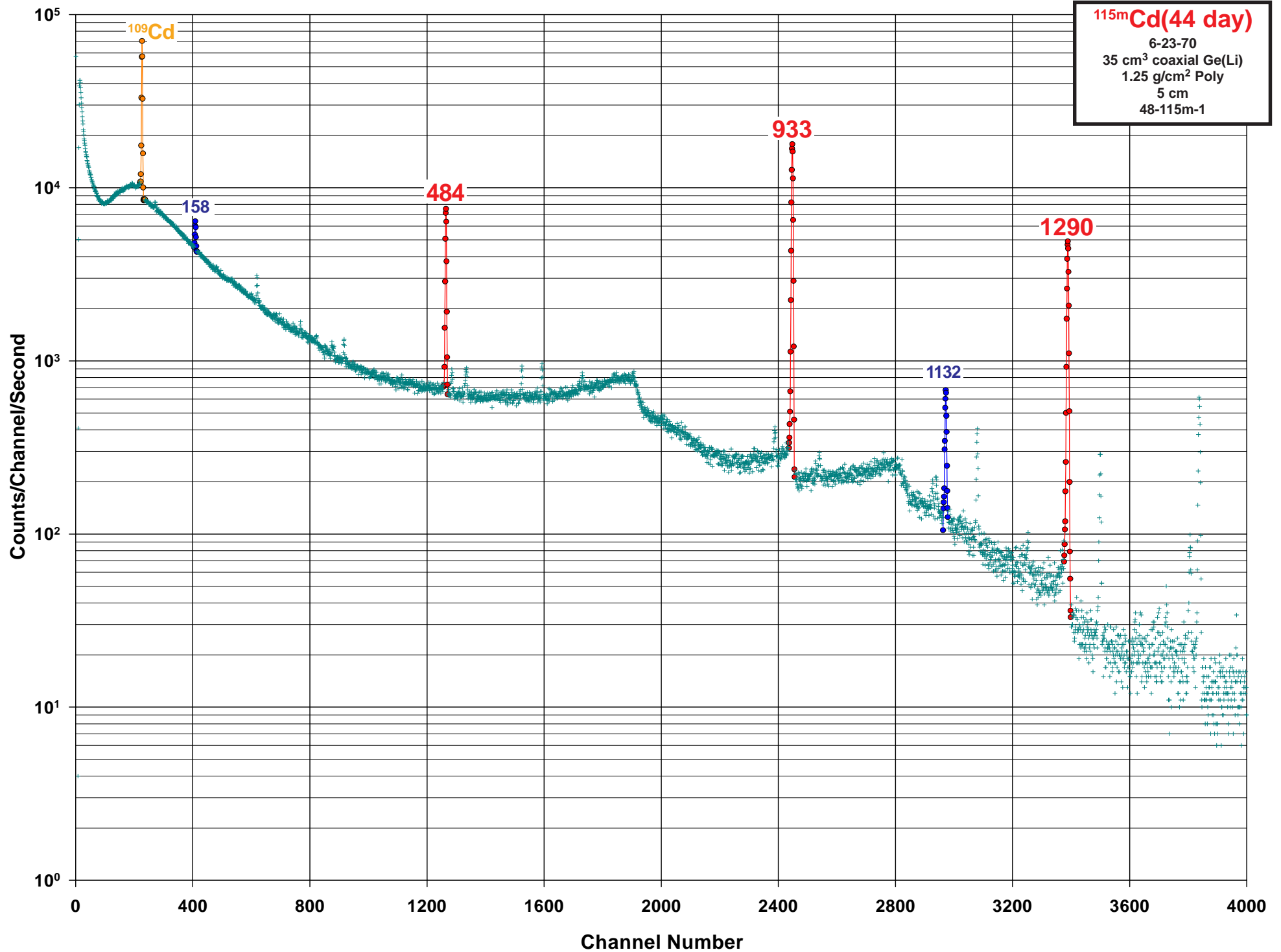
^{111m}Cd (48 min.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{111m}Cd

Half Life: 48.54(5) min.

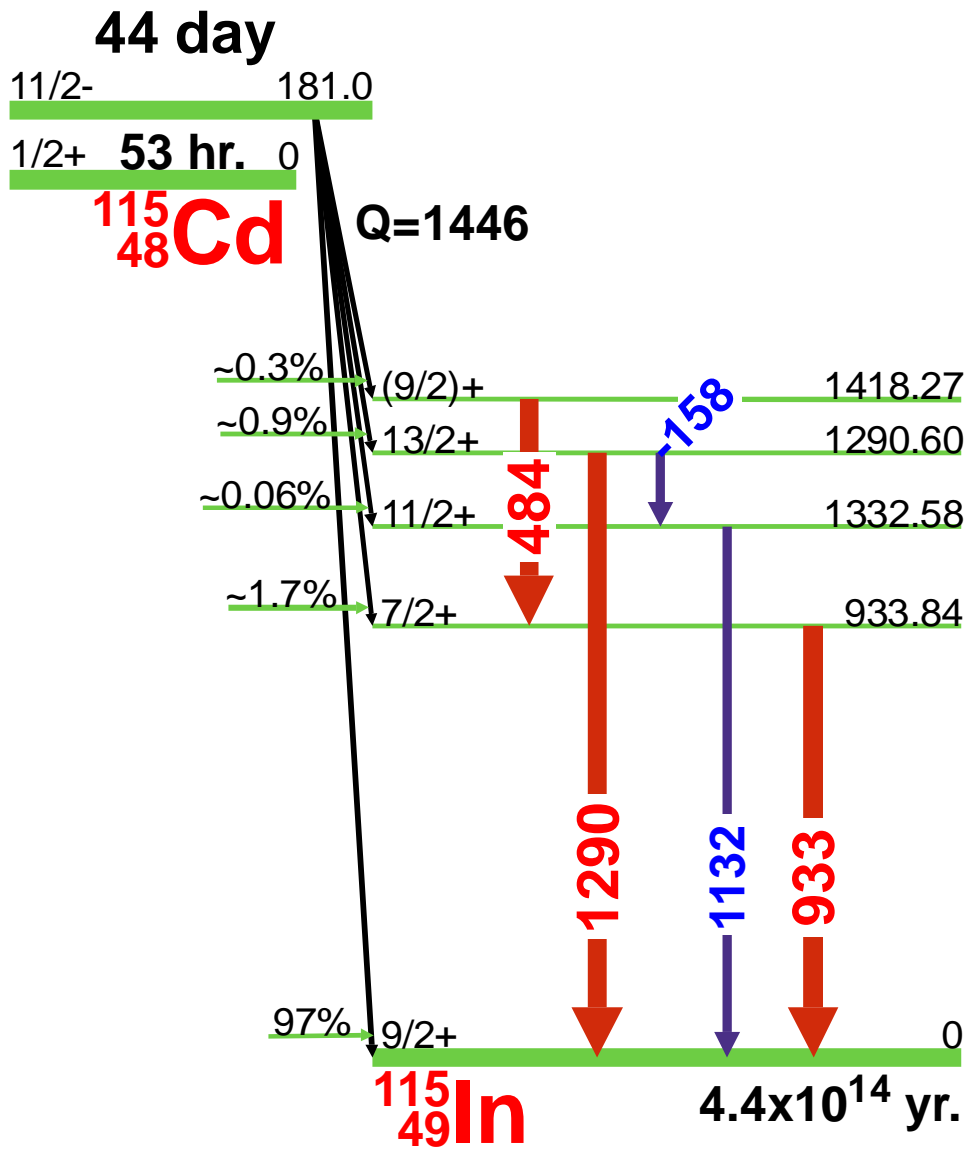
Detector: 4.55 cm² x 8mm Ge (Li)Method of Production: $^{110}\text{Cd}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
150.825	0.015	31	29.1	1.8	1
245.395	0.020	100	94.	7.	1

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data



^{115m}Cd(44 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{115m}Cd

Half Life: 44.6(3) day

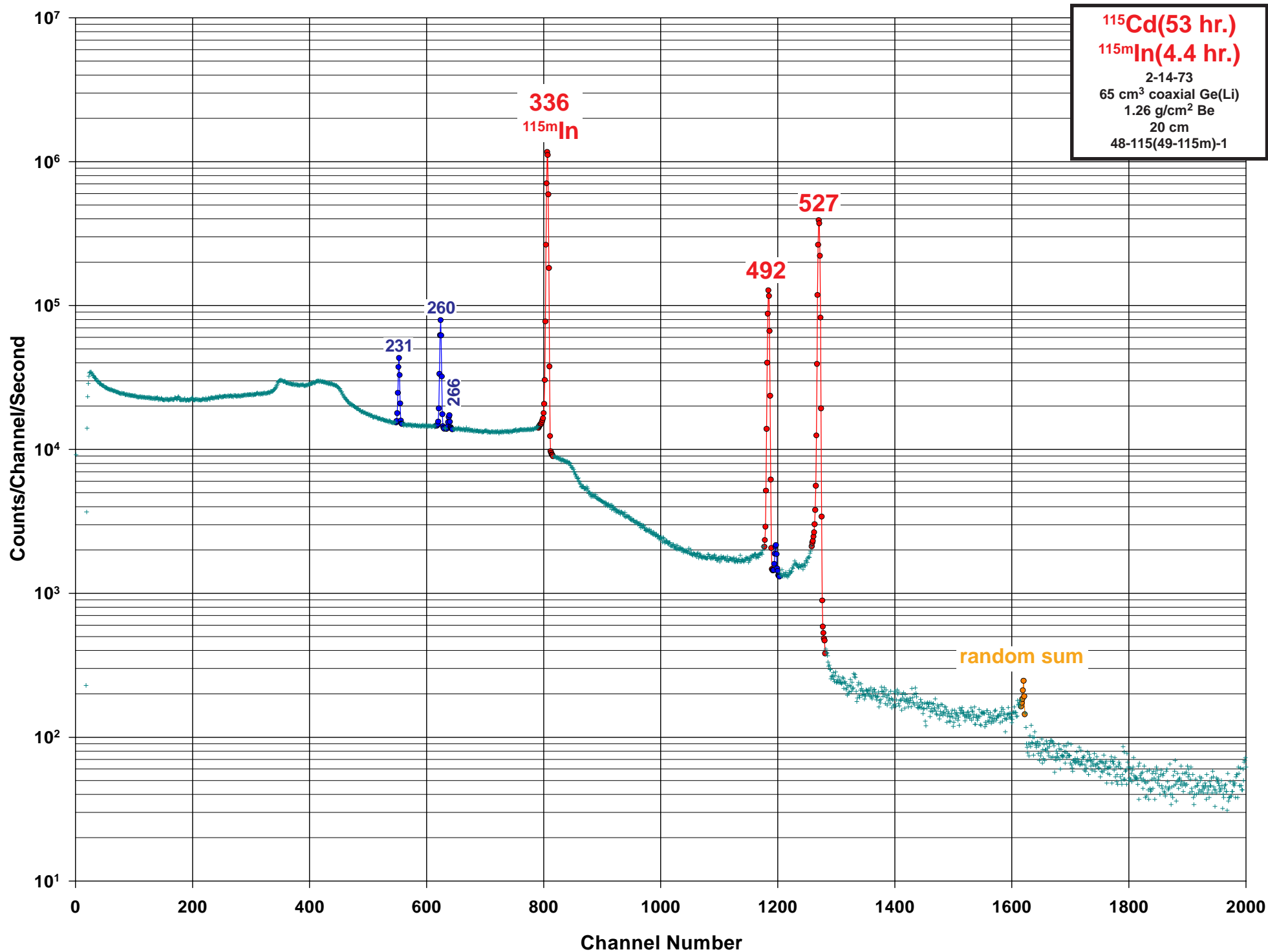
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁴Cd(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
105.200	0.025		0.0044	0.0016	4
136.3					4
158.027	0.020	1.44	0.017	0.006	4
231.440	0.020		0.0009	0.0003	4
260.89	0.03		0.0009	0.0003	4
316.201	0.017		0.0025	0.0009	4
336.241	0.025		0.0049	0.0017	4
344.60	0.10				4
353.6			0.0001		4
370.61	0.07				4
476.67	0.15		0.0001		4
480.5					4
484.471	0.015	16.4	0.29	0.10	1
492.351	0.005		0.010	0.003	4
507.36	0.06		0.0003	0.0001	4
515.05	0.07		0.0001	0.0001	4
544.70	0.20		0.0001		4
544.70	0.20				4
933.838	0.004	100	2.0	0.7	1
941.420	0.011		0.0002	0.0001	4
1078.2	0.5				4
1132.573	0.011	4.79	0.09	0.03	3
1290.585	0.011	42.9	0.9	0.3	1
1418.243	0.011		0.0018	0.0006	4
1448.776	0.006		0.017	0.006	4
1478.5	0.3				4
1486.099	0.011		0.0006	0.0002	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

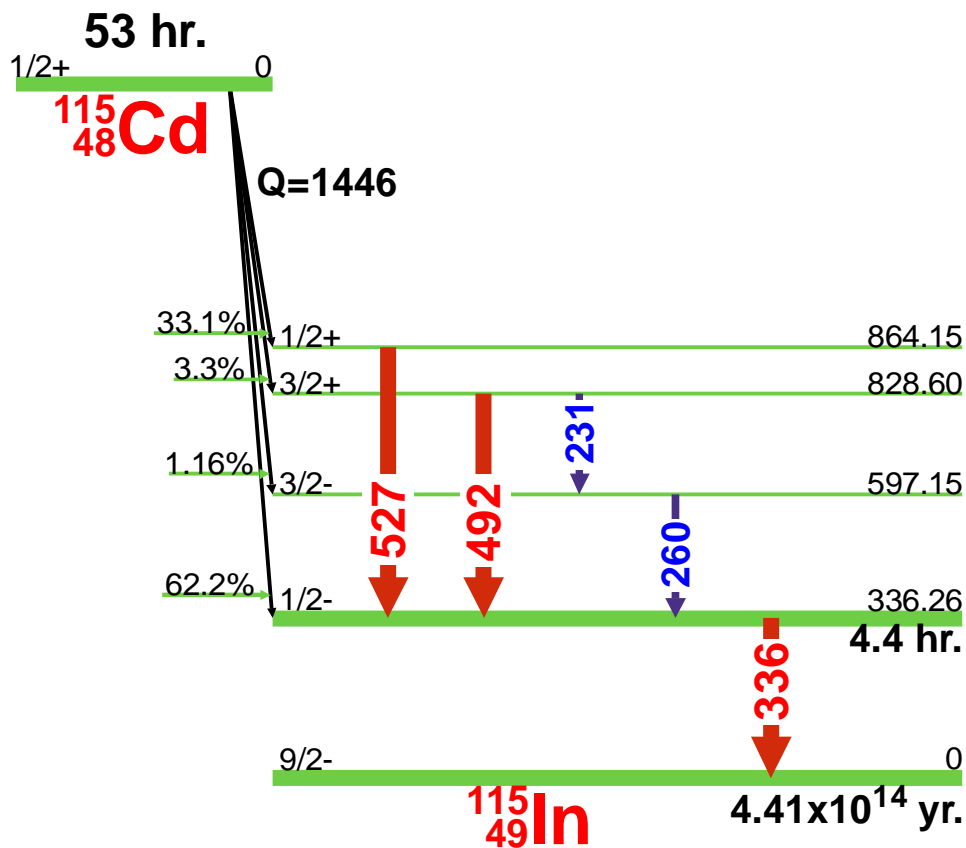




3 GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{115}\text{Cd} - ^{115\text{m}}\text{In}$ Half Life: 53.46(10) hr. - 4.486(4) hr.
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: $^{114}\text{Cd}(n,\gamma)$

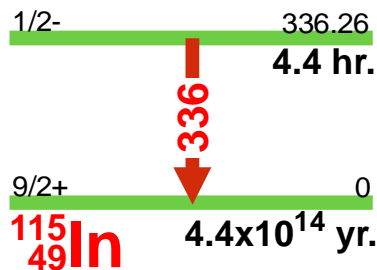
$^{115}\text{Cd}(53 \text{ hr.})$ Decay Scheme

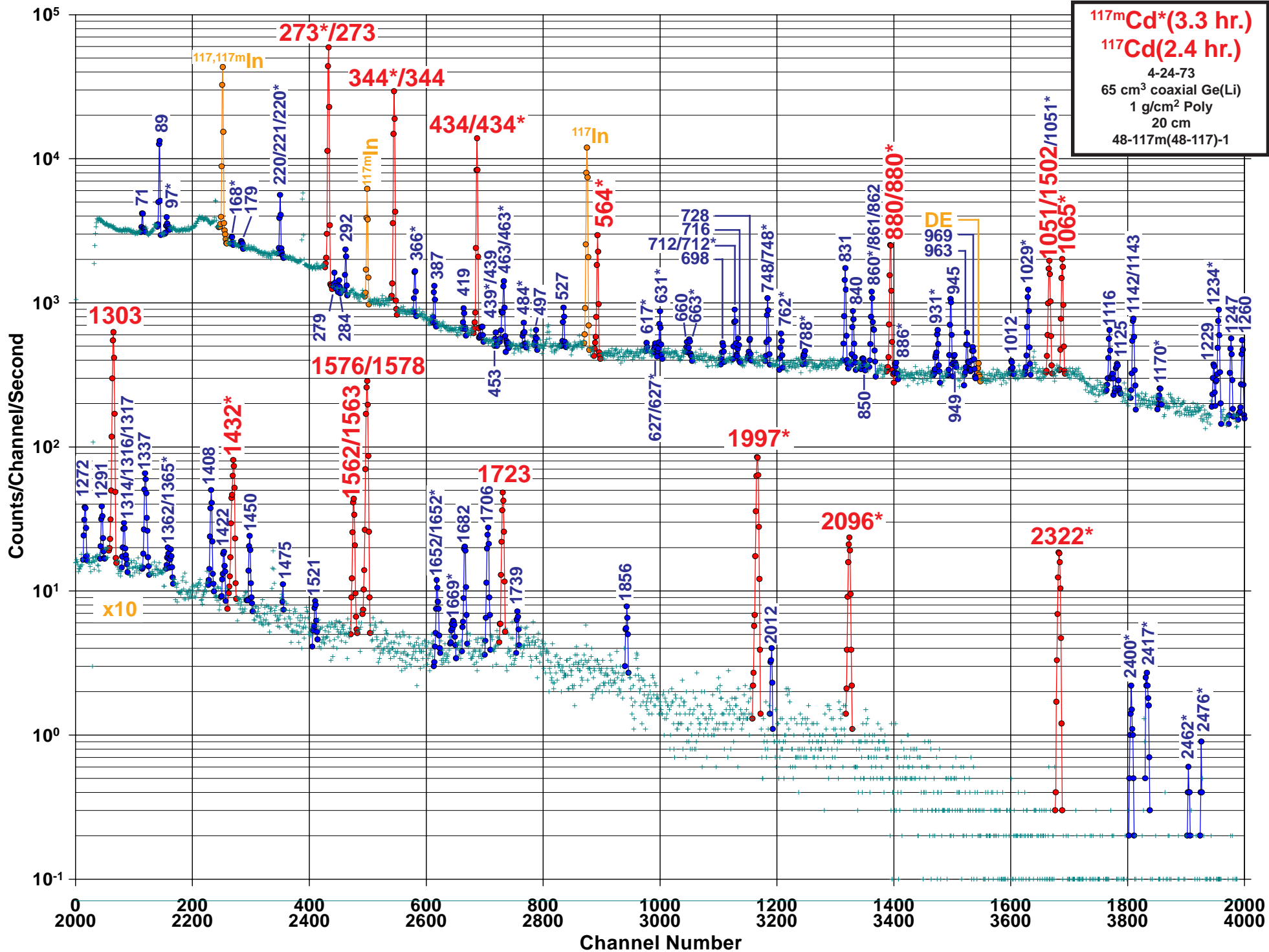


E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
35.57	0.06		0.421	0.009	4
231.443	0.003	1.40	0.740	0.018	3
252.0	1.0		0.0001	0.0001	4
260.896	0.003	3.86	1.94	0.04	2
266.985	0.010	0.18	0.092	0.004	4
328.38	0.10		0.0033	0.0005	4
$^{115\text{m}}\text{In}$ 336.241	0.025	100	45.9	0.9	1
344.2					4
363.95	0.10		0.0061	0.0006	4
492.351	0.004	16.98	8.03	0.18	1
527.901	0.007	58.01	27.4	0.6	1
595.375	0.024		0.0017	0.0002	4
690.227	0.041		0.0006	0.0001	4
705.18	0.25		0.0001		4
856.245	0.013		0.0022	0.0001	4
941.420	0.011		0.0001		4
951.187	0.006		0.0003		4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

$^{115\text{m}}\text{In}(4.4 \text{ hr.})$ Decay Scheme





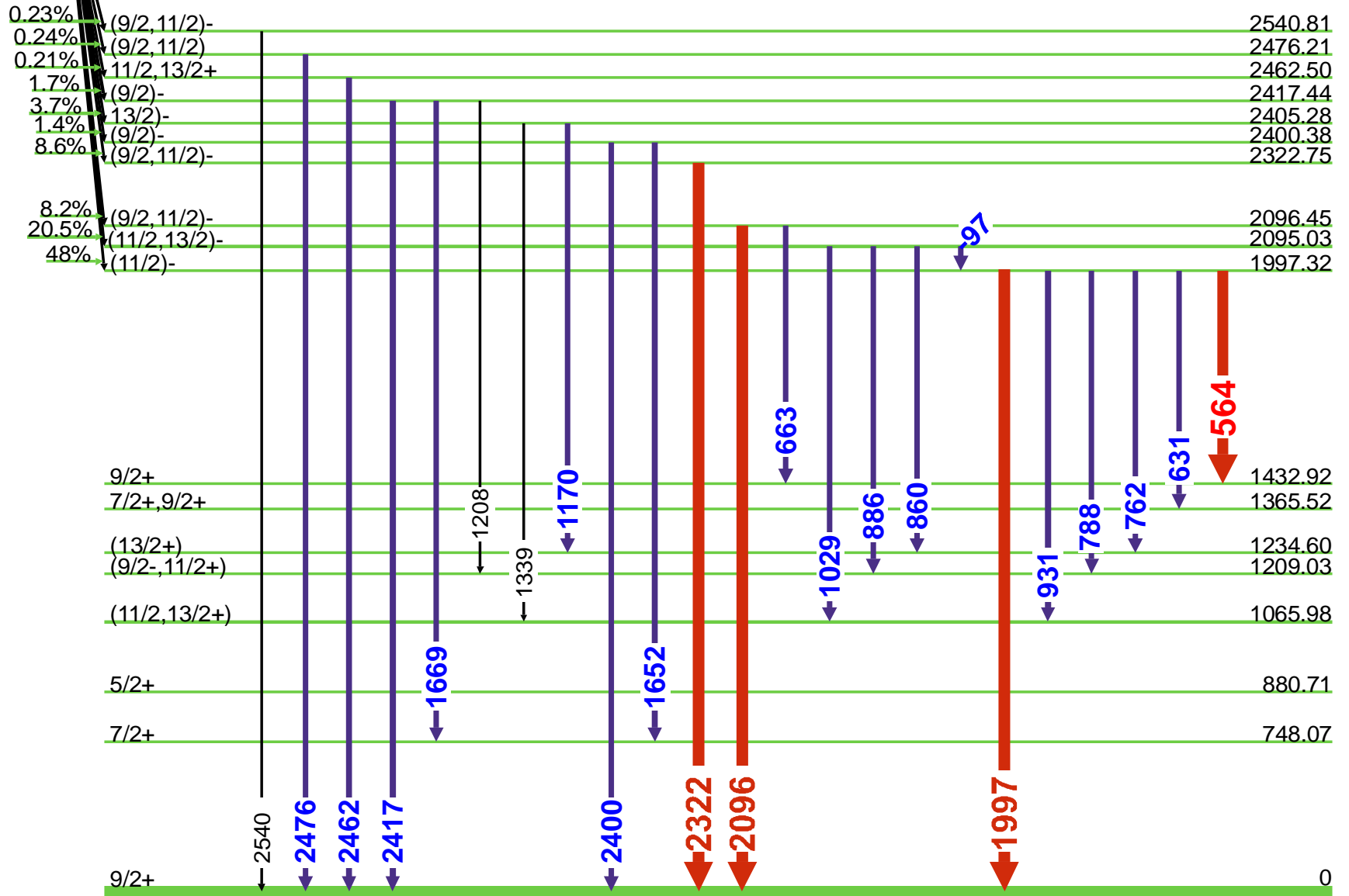
3.3 hr.
(11/2)- 136.4

¹¹⁷₄₈Cd

Q=2516

^{117m}Cd(3.3 hr.) Decay Scheme

gamma-rays emitted from high energy levels



43 min.

¹¹⁷₄₉In

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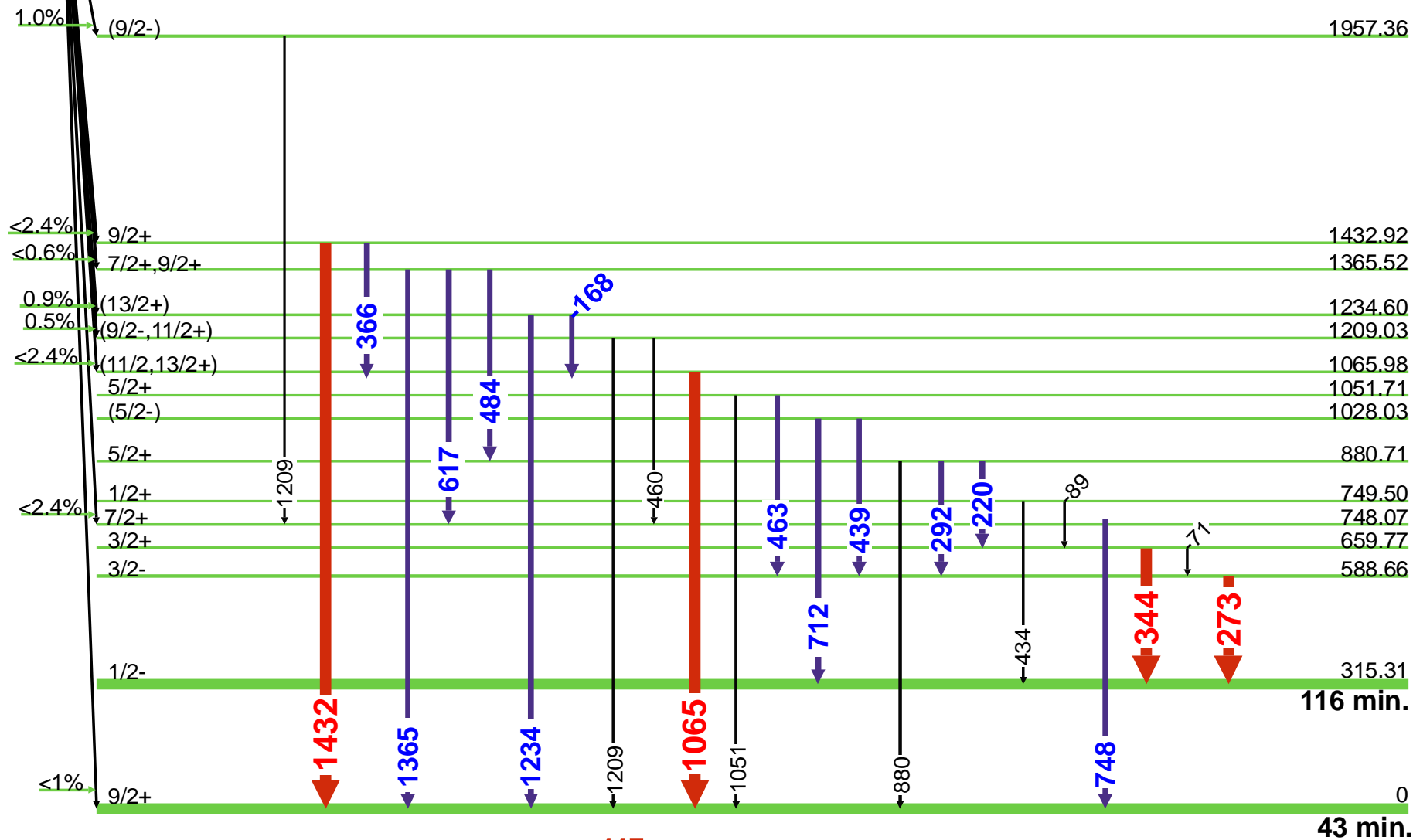
^{117m}Cd(3.3 hr.) Decay Scheme

gamma-rays emitted from low energy levels

3.3 hr.
(11/2)- 136.4

¹¹⁷₄₈Cd

Q=2516



¹¹⁷₄₉In

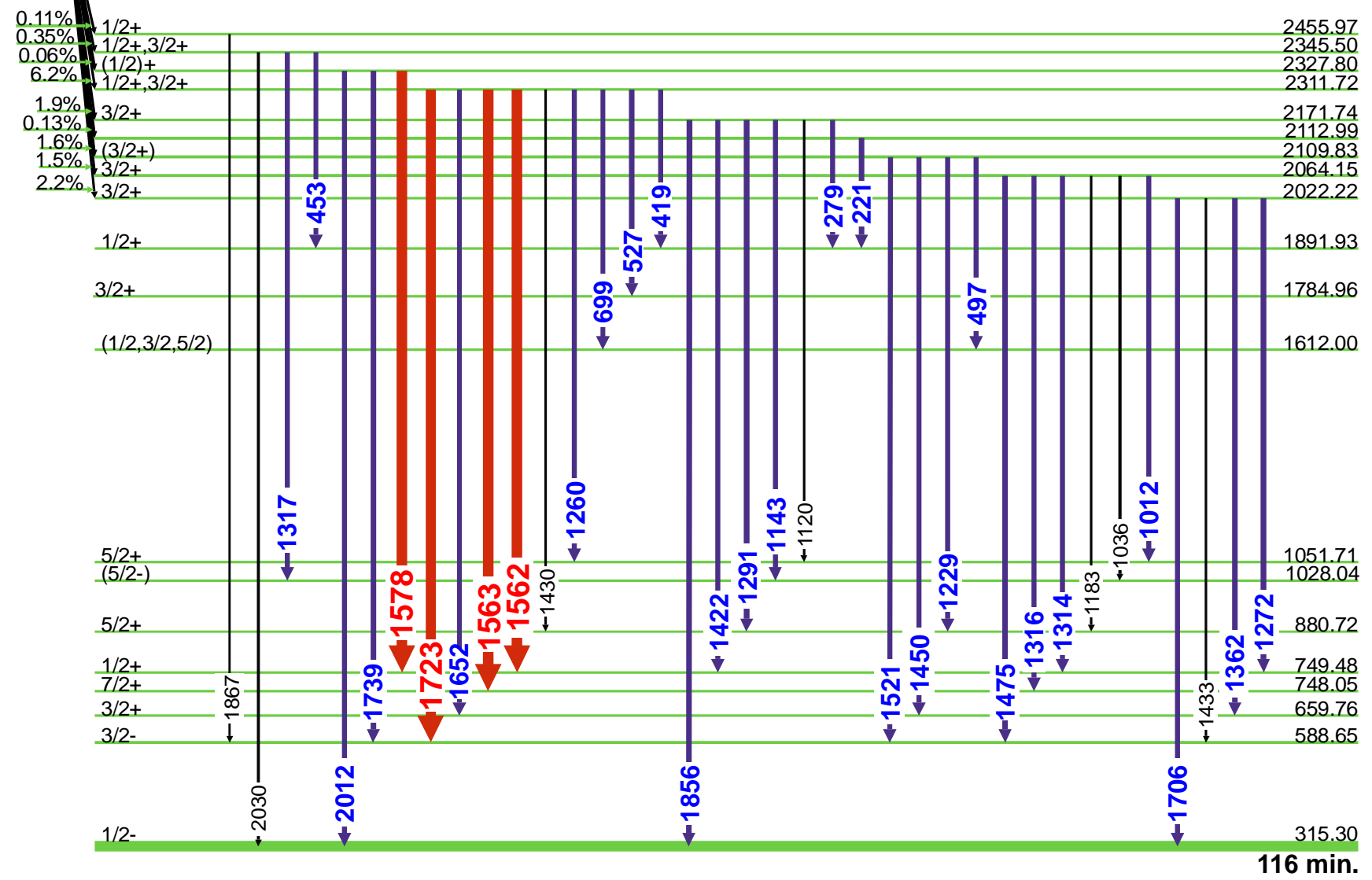


2.4 hr.
1/2+ 0

¹¹⁷₄₈Cd Q=2516

¹¹⁷Cd(2.4 hr.) Decay Scheme

gamma-rays emitted from high energy levels



9/2+ 0
43 min.

¹¹⁷₄₉In

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2.4 hr.

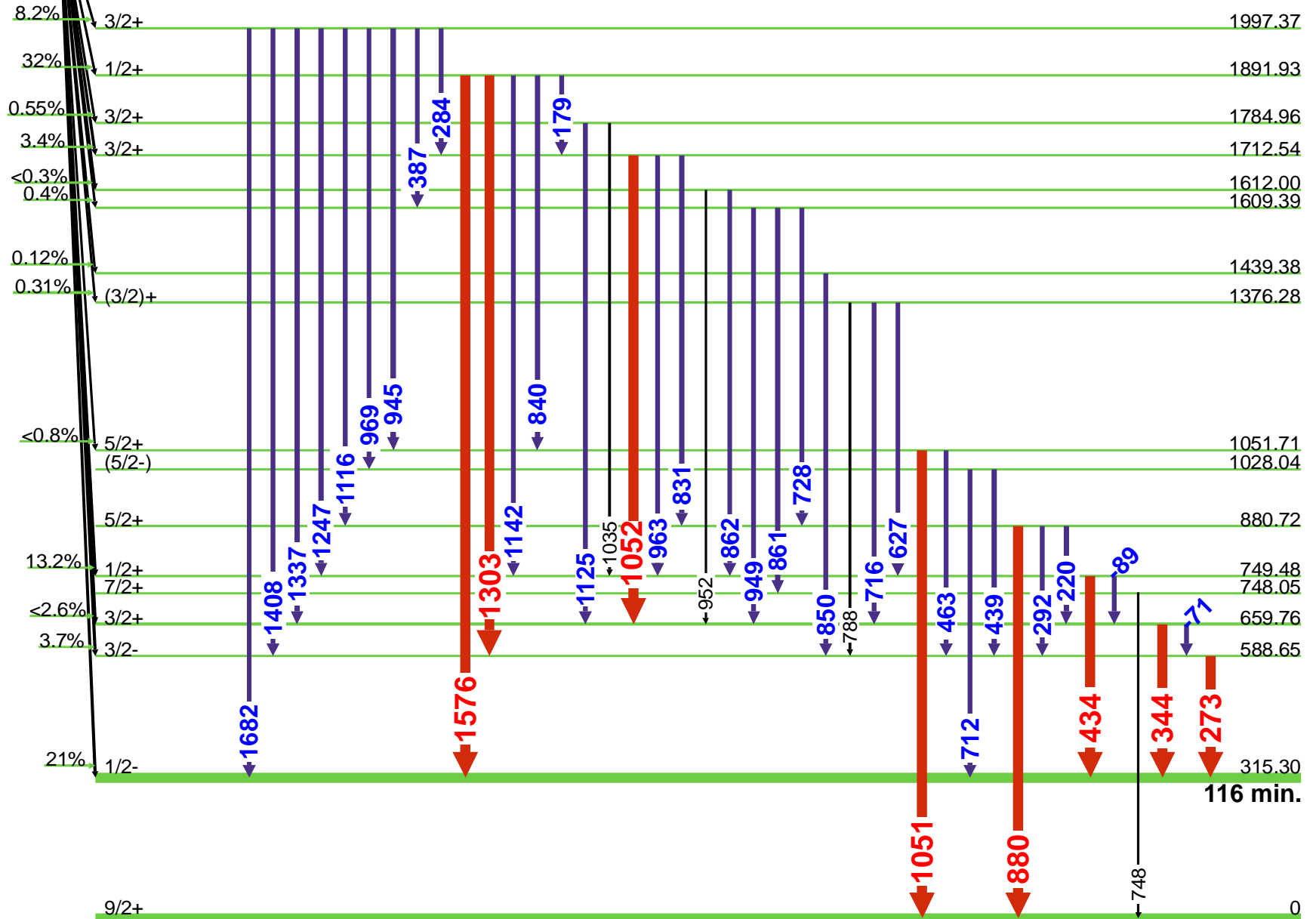
¹¹⁷Cd(2.4 hr.) Decay Scheme

gamma-rays emitted from low energy levels

1/2+ 0

¹¹⁷₄₈Cd

Q=2516



¹¹⁷₄₉In

43 min.

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GAMMA-RAY ENERGIES AND INTENSITIES Page 1 of 3

Nuclide: $^{117m}\text{Cd}^* - ^{117}\text{Cd}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.49(4) hr. - 3.36(5) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{116}\text{Cd}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	
	71.120	0.020	3.0	0.39	0.06	4		387.96	0.04	2.1	0.31	0.06	3	
*	71.12					4		397.20	0.10		0.20	0.06	4	
*	89.72		13.6			2		408.00	0.20		0.09	0.05	4	
	89.730	0.010			3.26		0.21		416.90	0.20		0.017	0.017	4
*	97.70	0.04		1.05	0.13	4		419.79	0.04	0.84	0.18	0.04	4	
*	99.40	0.10		0.10	0.05	4		434.190	0.017	39.0	9.8	0.4	1	
*	101.00	0.20		0.08	0.05	4		434.190	0.017					
	105.40	0.15		0.022	0.011	4		439.39	0.07	0.51	0.18	0.08	4	
	131.40	0.20		0.011	0.006	4		439.39	0.07		0.12	0.06		
*	131.40	0.20				4		442.9	0.3		0.0262	0.0005	4	
	132.70	0.10		0.022	0.011	4		453.8	0.3	0.27	0.036	0.020	4	
*	132.70	0.10				4		460.94	0.04	6.44	1.62	0.13	4	
	160.8	0.3		0.25	0.11	4		463.04	0.03	3.10	0.75	0.06	3	
*	160.8					4		463.04	0.03					
*	168.63	0.05		0.29	0.05	4		484.79	0.03	4.5	1.02	0.13	4	
	171.05	0.07		0.025	0.011	4		497.77	0.10	0.45	0.11	0.06	4	
*	171.05	0.07				4		500.60	0.20		0.014	0.014	4	
	172.20	0.10		0.008	0.006	4		518.8	0.3		0.058	0.029	4	
	179.35	0.08	0.05	0.098	0.028	4		526.6	0.5		0.028	0.028	4	
D	220.92	0.03	4.85	1.17	0.09	3		527.0	0.5		0.14	0.06	4	
	221.0	0.4		0.06	0.06				545.0	0.4		0.16	0.08	4
*	220.92	0.03		0.24	0.16				564.397	0.016	54.86	14.7	0.8	1
*	273.349	0.018	100.	27.9	0.7	1		597.34	0.20		0.1310	0.0025	4	
*	273.349	0.018							597.6	0.3		0.014	0.014	4
	279.80	0.10	0.72	0.11	0.06	4		617.50	0.07	2.3	0.34	0.08	4	
	284.79	0.07	0.30	0.084	0.022	4		627.01	0.11	0.60	0.11	0.03	4	
	292.05	0.03	2.10	0.642	0.085	3		627.26	0.15		0.236	0.004	4	
*	292.05	0.03		0.10	0.10				631.80	0.04	10.3	2.80	0.19	3
*	299.45	0.10		0.45	0.08	4		644.50	0.20		0.017	0.017	4	
	310.0	0.5		0.0698	0.0018	4		660.83	0.08		0.112	0.031	4	
*	310.26	0.15		0.50	0.11	4		663.50	0.06		0.68	0.08	4	
*	313.8	0.4		0.024	0.024	4		684.6	0.4		0.07	0.04	4	
	314.4	0.4		0.08	0.06	4		688.0	0.3		0.011	0.011	4	
	315.302	0.013				4		699.58	0.08	0.70	0.24	0.04	4	
*	315.302	0.013				4		712.71	0.05		1.00	0.13	4	
*	325.30	0.20		0.13	0.05	4		712.71	0.05	3.10	0.56	0.17	3	
*	344.459	0.010	62.8	17.9	0.6	1		716.43	0.07	0.80	0.20	0.04	4	
*	344.459	0.010							728.64	0.07	1.10	0.24	0.04	4
*	366.91	0.03	13.0	3.33	0.24	3		730.8	0.4		0.1048	0.0020	4	
*	381.2	0.4		0.024	0.024	4		736.14	0.08		0.061	0.03	4	
	385.5	0.4		0.0363	0.0009	4		743.9	1.0		0.0262	0.0005	4	

GAMMA-RAY ENERGIES AND INTENSITIES Page 2 of 3

Nuclide: $^{117m}\text{Cd}^* - ^{117}\text{Cd}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.49(4) hr. - 3.36(5) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{116}\text{Cd}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	743.9	1.0		0.0262	0.0005	4
	748.05	0.04		0.56	0.20	4
*	748.06	0.03	20.71	4.5	1.1	3
	757.60	0.20		0.028	0.020	4
*	762.72	0.04	7.23	1.73	0.14	4
*	788.16	0.13		0.50	0.11	4
	788.18	0.10	0.80	0.0558	0.0014	4
*	827.60	0.10		0.26	0.08	4
	831.80	0.03	9.10	2.26	0.10	2
	840.21	0.04	3.30	0.81	0.06	3
	850.72	0.08	1.10	0.12	0.04	4
*	860.41	0.04	30.7	7.9	0.3	3
D	861.3	0.4	2.40	0.28	0.20	3
	862.60	0.05		0.61	0.06	
	880.710	0.017	16.20	3.96	0.22	1
*	880.710	0.017		0.71	0.29	4
*	886.00	0.10		0.39	0.08	4
*	929.30	0.10		0.79	0.13	4
*	931.37	0.04	13.1	3.64	0.25	3
	945.67	0.03	5.60	1.53	0.09	3
	949.63	0.08	1.50	0.22	0.04	4
	952.33	0.08	0.65	0.14	0.03	4
*	957.20	0.10		0.39	0.11	4
	963.11	0.06	2.40	0.61	0.06	3
	965.80	0.20		0.08	0.06	4
	969.30	0.05	2.10	0.45	0.06	3
	970.4	0.3		0.06	0.06	4
	975.5	0.5		0.0725	0.0018	4
	994.3	0.4		0.017	0.017	4
*	995.0	0.5		0.0524	0.0010	4
	1012.3	0.3	0.6	0.08	0.06	4
*	1029.06	0.03	41.9	11.7	0.4	2
D	1035.61	0.07	1.35	0.24	0.04	4
	1036.0	0.4		0.017	0.017	
D	1051.70	0.10	17.20	3.79	0.22	1
	1052.70	0.10		0.73	0.17	
*	1051.70	0.10				
	1061.10	0.20		0.06	0.06	4
*	1065.98	0.03	81.8	23.1	0.7	1
	1116.60	0.05	4.20	1.03	0.06	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	1120.0	0.3		0.262	0.005	4
	1120.05	0.07	1.4	0.24	0.04	4
	1125.10	0.06	2.50	0.45	0.06	3
D	1142.43	0.03	6.40	1.67	0.12	3
	1143.5	0.3		0.14	0.06	
*	1170.71	0.10		0.66	0.13	4
	1183.40	0.10	0.8	0.13	0.03	4
*	1196.20	0.10		0.39	0.11	4
*	1205.5	0.3		0.13	0.04	4
	1208.3	0.4		0.05	0.05	4
*D	1209.0	0.4		0.18	0.08	
	1209.0	0.4		0.13	0.08	
	1229.11	0.07	2.6	0.61	0.06	3
	1232.30	0.20		0.28	0.06	4
*	1234.59	0.03	39.9	11.0	0.4	2
	1247.89	0.04	4.50	1.20	0.06	2
	1249.3	0.4		0.028	0.028	4
*	1256.90	0.20		0.18	0.08	4
	1260.00	0.03	4.20	1.14	0.06	2
	1272.73	0.03	2.80	0.73	0.06	3
	1276.00	0.10		0.025	0.011	4
	1291.00	0.04	2.70	0.67	0.06	3
	1303.27	0.03	70.0	18.4	0.6	1
	1314.71	0.06		0.59	0.06	
D	1316.0	0.4	2.15	0.028	0.028	3
	1317.5	0.4		0.017	0.017	
	1337.57	0.07	7.30	1.62	0.12	2
*	1339.3	0.5		2.07	0.24	4
	1362.40	0.08	1.20	0.24	0.04	3
*	1365.54	0.05	6.95	1.65	0.11	4
*	1371.2	0.5		0.0314	0.0006	4
	1404.40	0.10		0.12	0.03	4
	1408.72	0.03	5.25	1.28	0.06	2
	1422.27	0.06	1.15	0.33	0.06	3
D	1430.97	0.05		0.558	0.014	
	1433.50	0.20		0.112	0.084	
*	1432.91	0.03	51.0	13.4	0.4	1
*	1442.1	0.3		0.0183	0.0004	4
	1450.15	0.07	2.50	0.61	0.06	3
	1468.90	0.20		0.039	0.011	4
	1475.46	0.07	1.80	0.42	0.06	3



GAMMA-RAY ENERGIES AND INTENSITIES Page 3 of 3

Nuclide: $^{117m}\text{Cd}^* - ^{117}\text{Cd}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

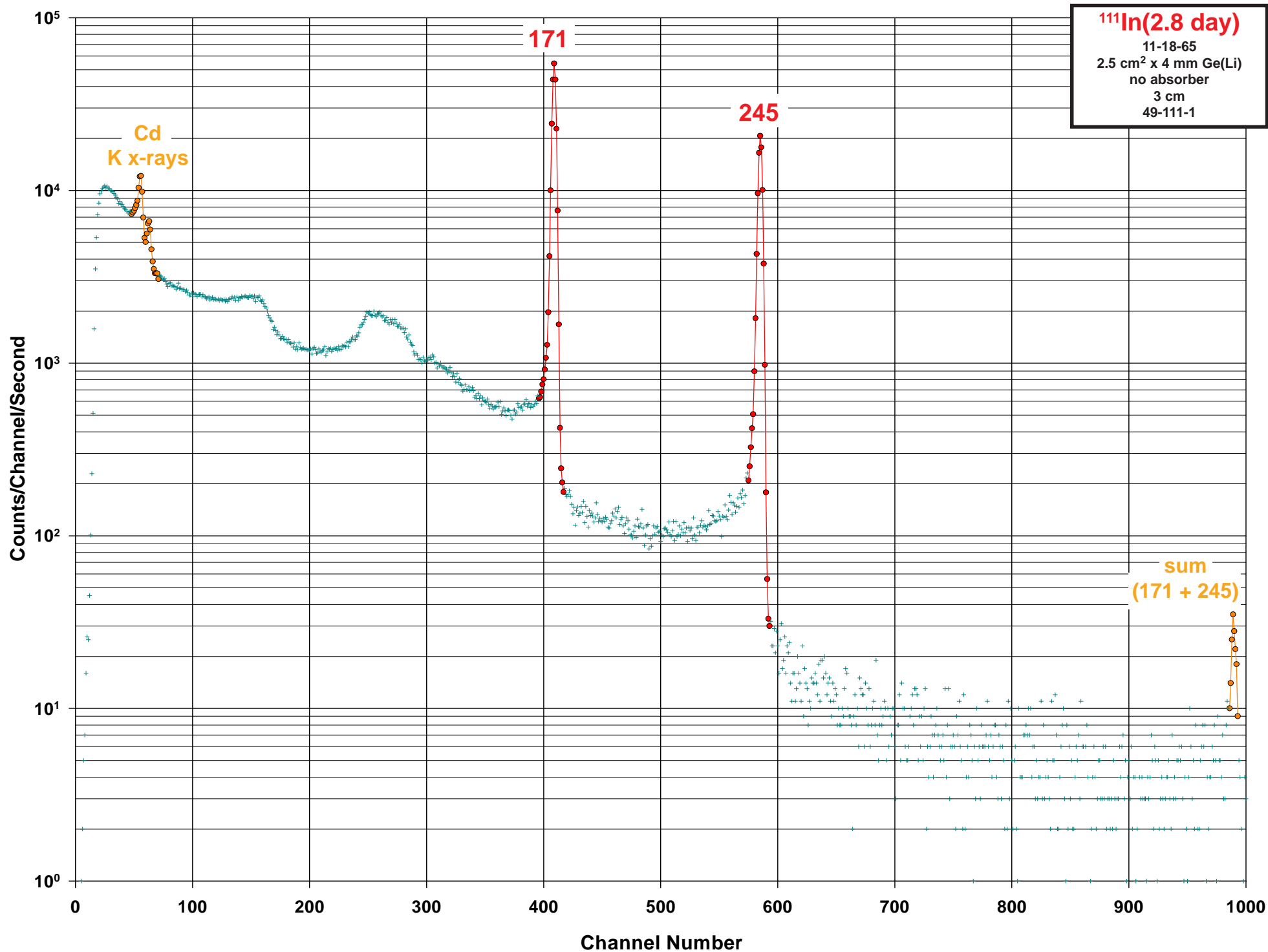
Half Life: 2.49(4) hr. - 3.36(5) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{116}\text{Cd}(n,\gamma)$

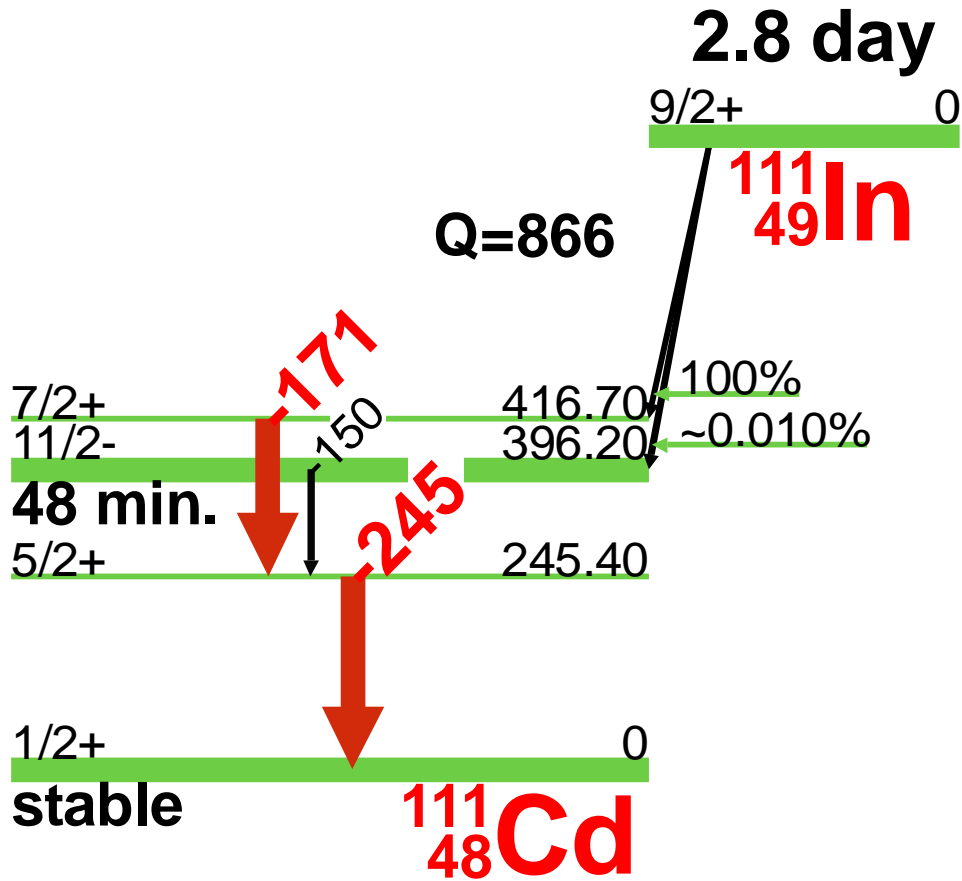
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1511.90	0.20		0.07	0.03	4
	1521.00	0.12	0.5	0.09	0.03	4
D	1562.24	0.04	5.90	1.42	0.07	1
	1563.6	0.4		0.08	0.06	
D	1576.62	0.03	43.5	11.2	0.4	1
	1578.4	0.3		0.14	0.06	
	1583.10	0.10		0.053	0.025	4
	1596.0	0.4		0.028	0.028	4
	1597.3	0.4		0.06	0.06	4
	1652.10	0.20	6.10	0.28	0.11	3
*	1652.24	0.11		0.47	0.11	
*	1669.5	0.3	2.8	0.63	0.08	4
	1682.07	0.05	3.0	0.70	0.06	3
	1685.8	0.3		0.039	0.017	4
	1706.93	0.04	4.30	1.00	0.06	2
	1723.06	0.03	7.60	2.01	0.10	1
	1739.13	0.09	0.5	0.13	0.03	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1748.70	0.20		0.08	0.03	4
	1756.80	0.20		0.045	0.022	4
	1856.40	0.10	1.0	0.25	0.06	4
	1867.30	0.10	0.5	0.11	0.03	4
*	1957.50	0.20		0.16	0.04	4
*	1997.33	0.03	100	26.2	0.5	1
	2012.49	0.08	0.31	0.109	0.022	4
	2030.14	0.08	0.3	0.064	0.020	4
*	2096.40	0.04	27.6	7.44	0.21	1
*	2322.75	0.08	28.0	7.86	0.24	1
*	2400.45	0.16	2.75	0.76	0.05	3
*	2414.20	0.20		0.08	0.08	4
*	2417.40	0.10	3.81	1.02	0.06	3
*	2440.4	0.4		0.262	0.005	4
*	2462.5	0.3	0.86	0.212	0.024	4
*	2476.20	0.20	0.81	0.186	0.019	4
*	2540.73	0.14	0.60	0.149	0.019	4





¹¹¹In(2.8 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹¹¹In

Half Life: 2.8047(5) day

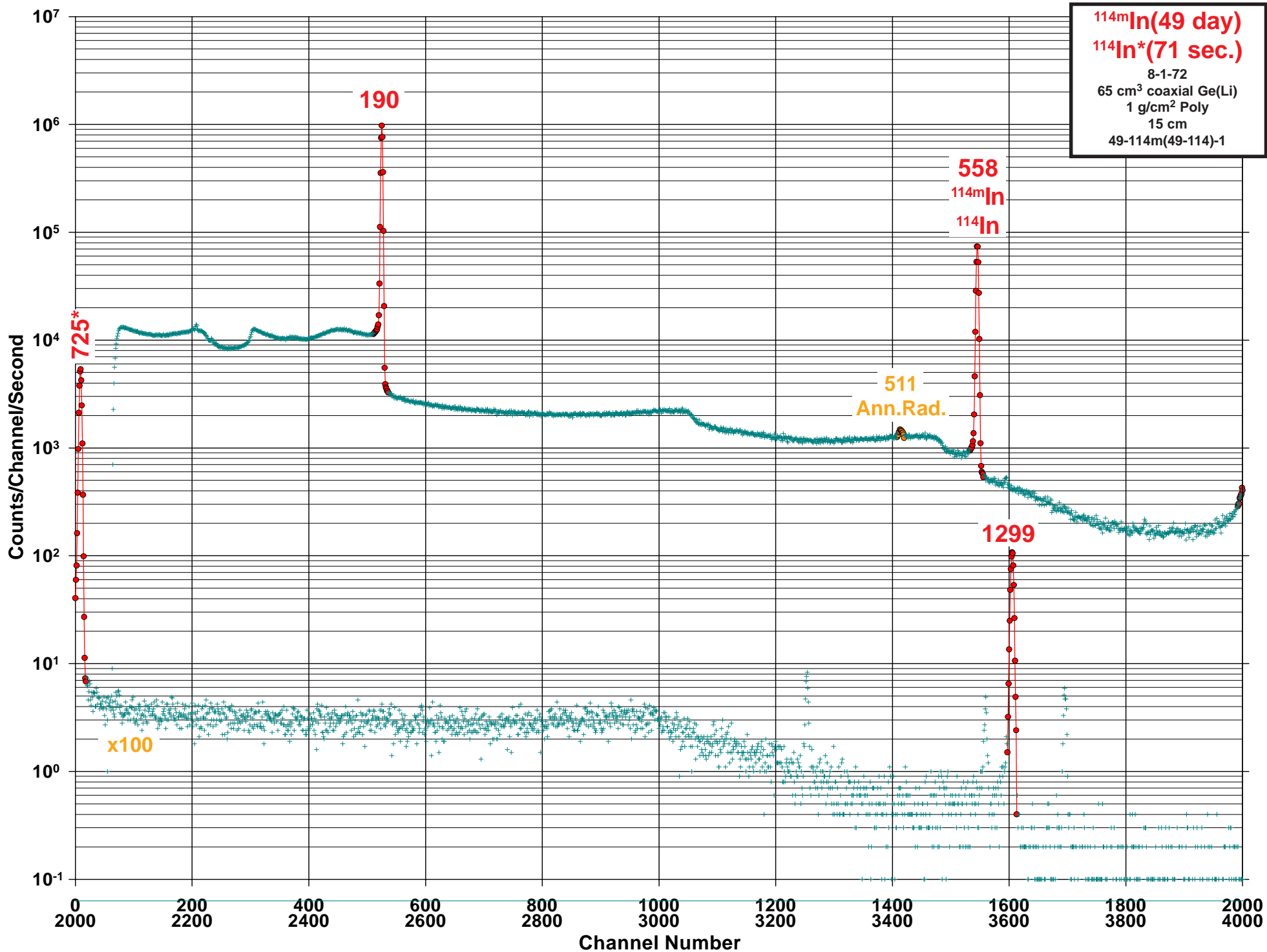
Detector: 2.5 cm² x 4mm Ge (Li)

Method of Production: ¹¹¹Cd(p,n)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
150.81	0.03		0.0028		4
171.28	0.03	100	90.2	1.0	1
245.40	0.02	93.0	94.0	1.0	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{114m}\text{In} - ^{114}\text{In}^*$

Half Life: 49.51(1) day - 71.9(1) sec.*

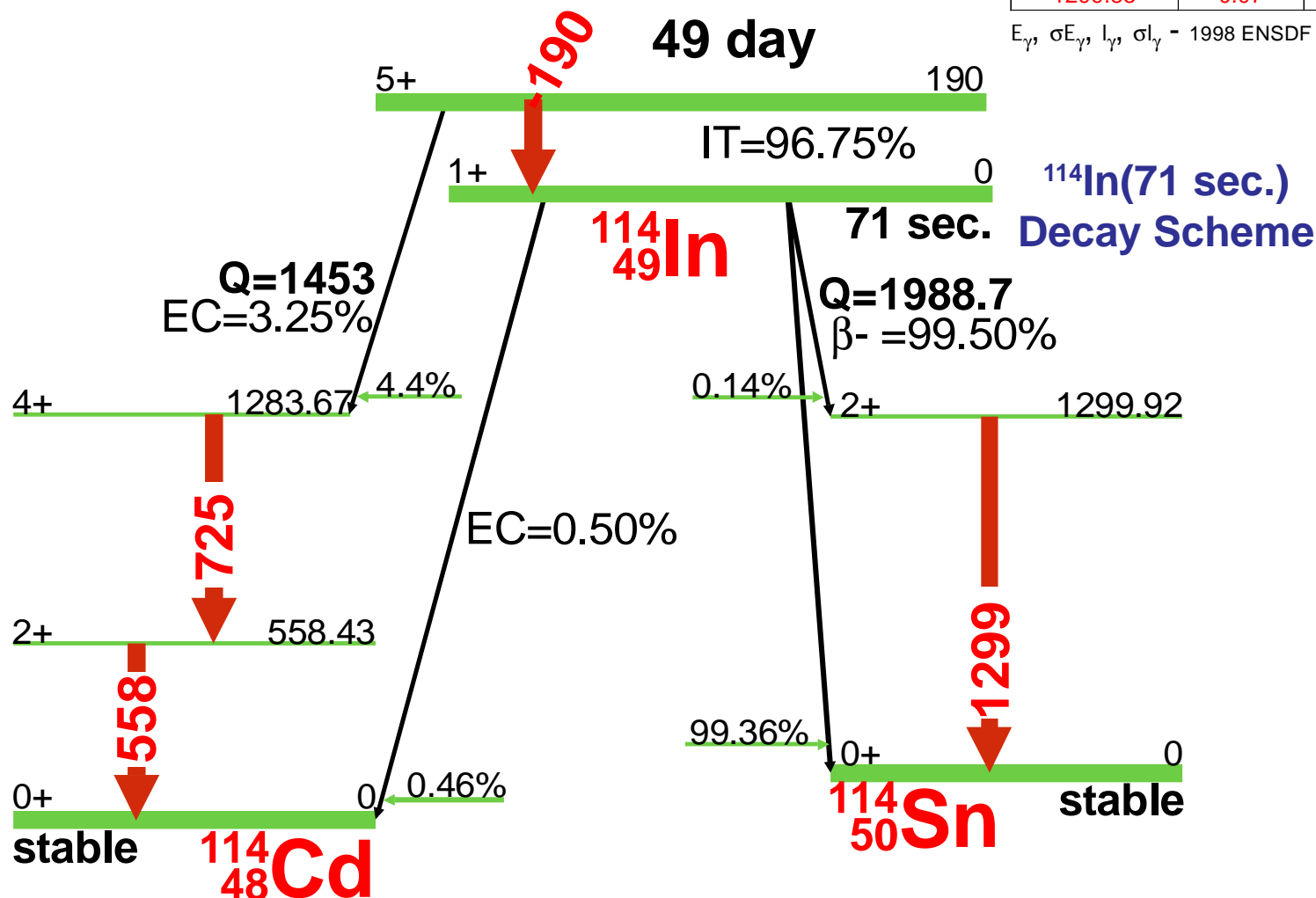
Detector: 65 cm³ coaxial Ge (Li)

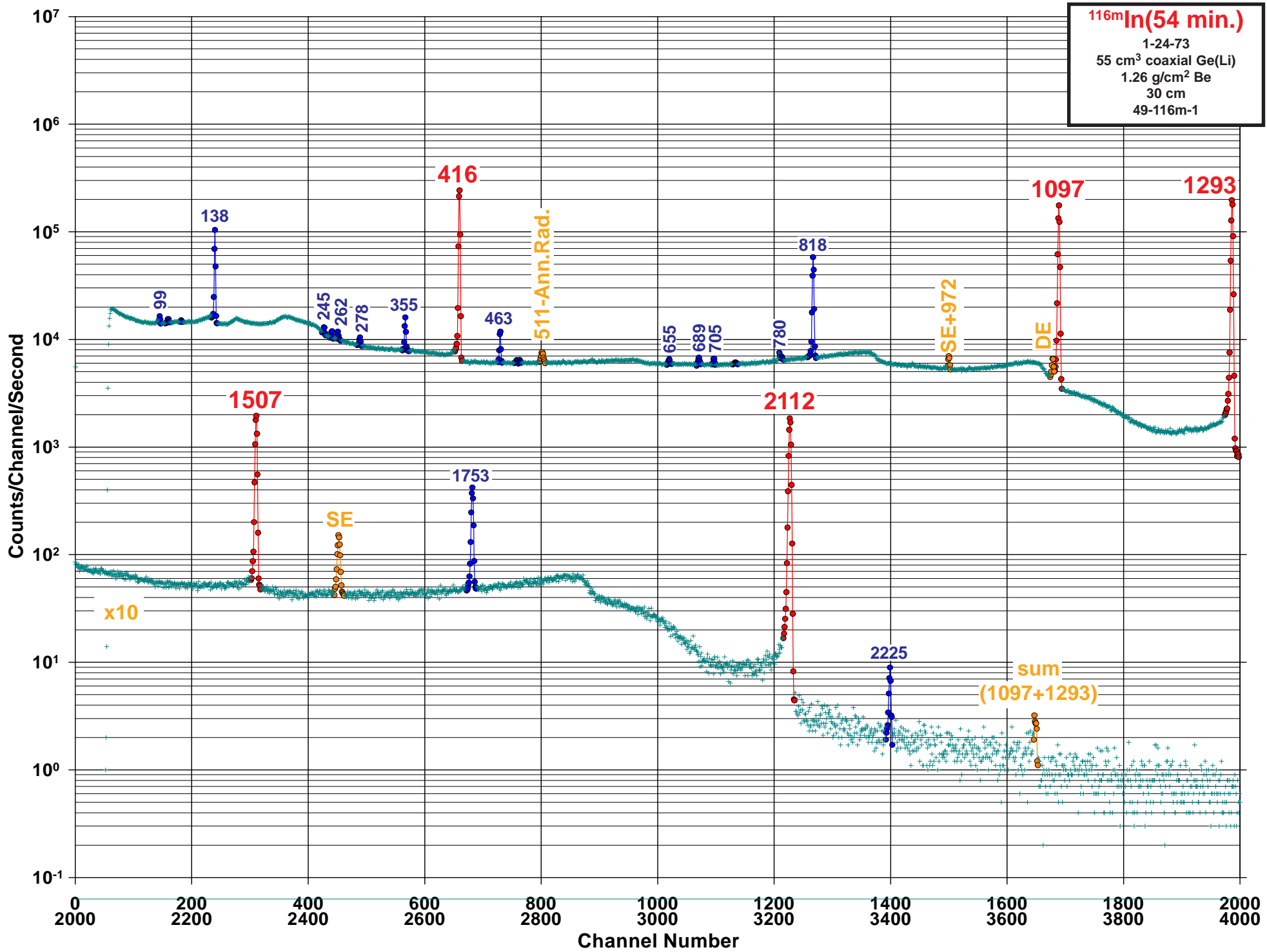
Method of Production: $^{113}\text{In}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	190.29	0.03	100	15.56	0.15	1
	558.43	0.03	28.5	3.2	2.2	1
D *	558.43	0.03		0.06	0.02	
*	575.80	0.20		0.0039	0.0012	4
*	725.24	0.03	28.1	3.2	2.2	1
*	747.80	0.20		0.00018	0.00005	4
*	1299.83	0.07	??	0.139	0.010	1

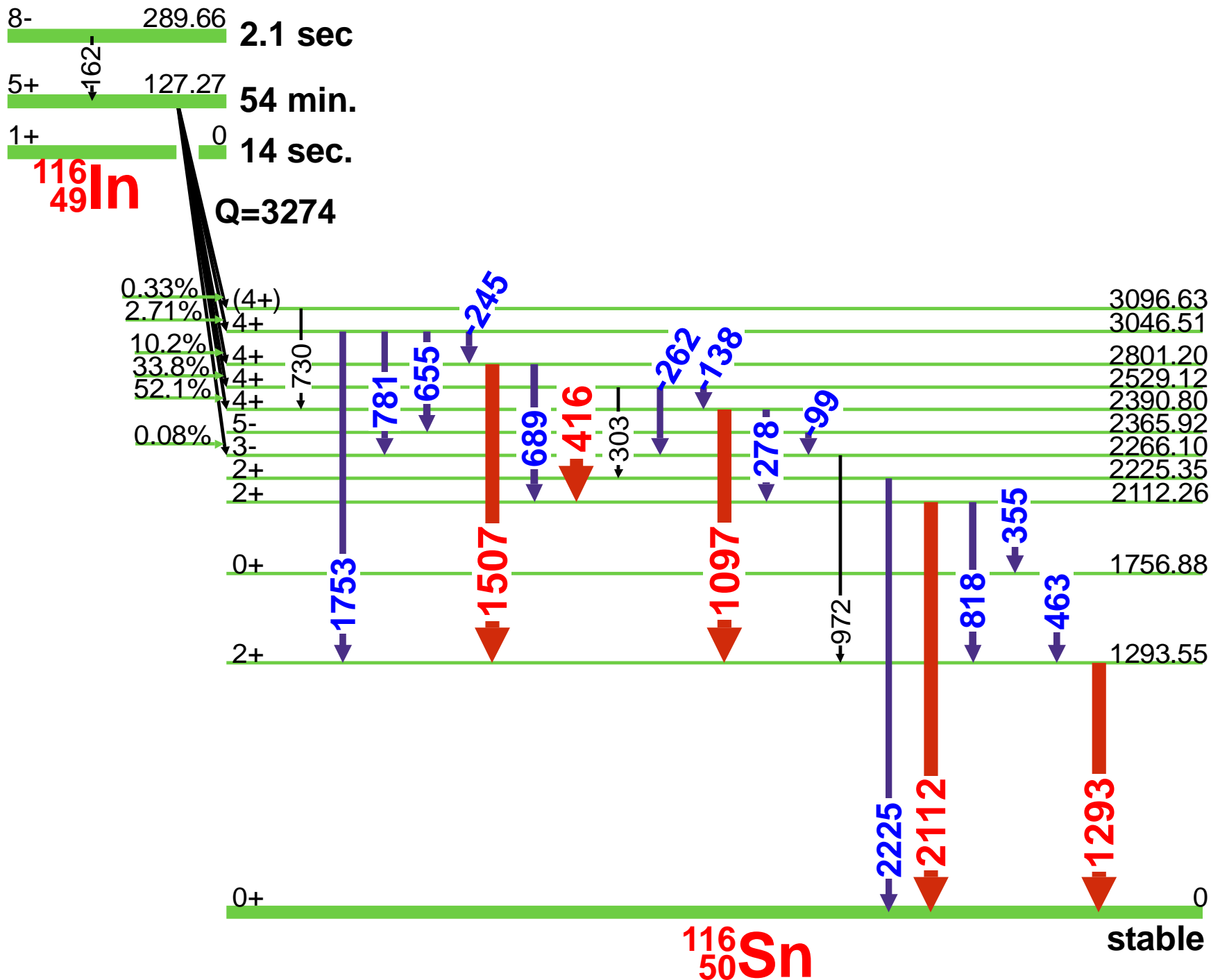
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

^{114m}In (49 day) Decay Scheme





^{116m}In(54 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{116m}In E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

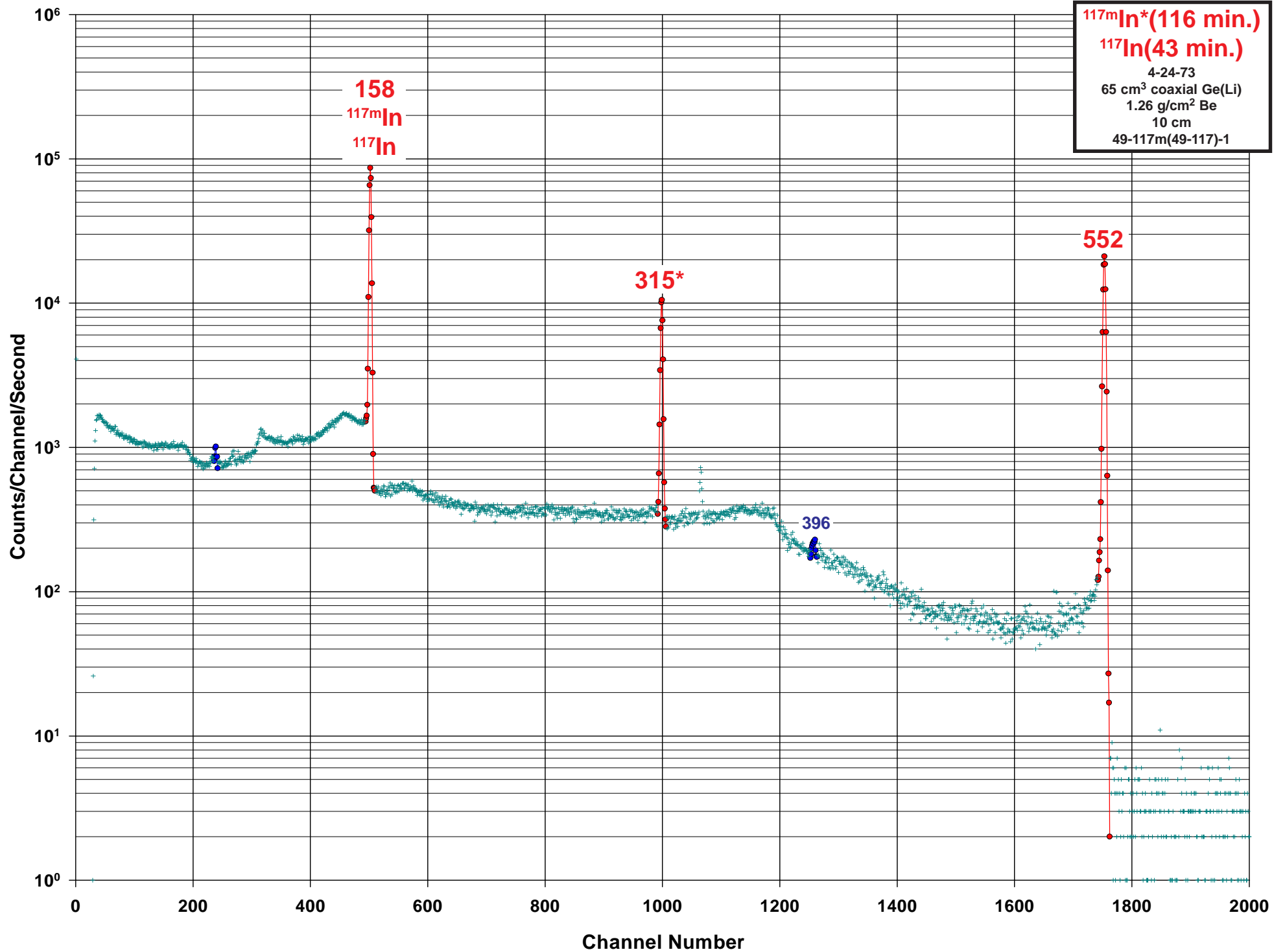
Half Life: 54.29(17) min.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{115}\text{In}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
99.81	0.10		0.017	0.007	4
116.5	1.0		0.050	0.020	4
124.75	0.07		0.010	0.005	4
138.326	0.008	3.50	3.29	0.12	2
162.6	0.5		0.070	0.020	4
165.5	0.0		0.0005		4
196.5	0.5		0.050	0.020	4
245.0	0.3	0.38	0.037	0.008	4
262.95	0.08	0.34	0.118	0.025	4
272.4	0.8		0.08	0.03	4
278.49	0.08	0.25	0.144	0.017	4
303.80	0.07	0.22	0.118	0.017	4
345.2	0.8		0.029	0.010	4
355.36	0.04	0.84	0.83	0.04	3
416.86	0.03	29.37	27.7	1.2	1
434.9	0.7		0.036	0.014	4
458.5	0.5		0.070	0.020	4
463.14	0.12	0.83	0.83	0.05	3
474.9	0.8		0.017	0.008	4
500.1	0.8		0.030	0.010	4
Ann. 511.009					
536.0	0.6		0.035	0.013	4
567.4	0.9		0.041	0.013	4
639.1	1.0		0.030	0.010	4
655.7	0.4	0.14	0.11	0.04	4

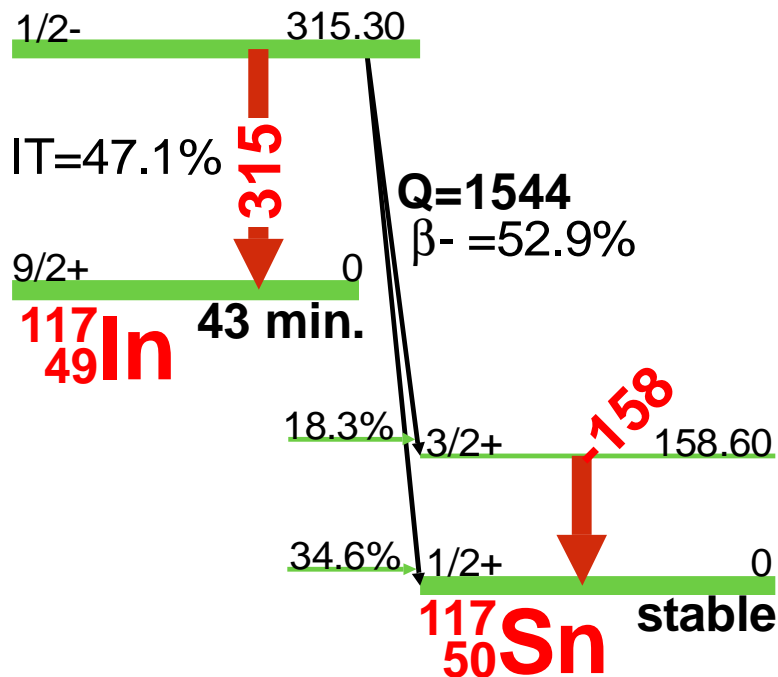
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
679.9	1.0		0.030	0.010	4
689.0	0.3	0.26	0.160	0.025	4
705.7	0.3	0.20	0.169	0.025	4
730.7	0.3		0.068	0.025	4
736.			0.003		4
D 780.40	0.20	0.44	0.27	0.05	4
781.1	0.8		0.110	0.020	
818.70	0.20	13.72	11.5	0.4	2
830.9	0.4		0.052	0.010	4
932.2	0.3		0.076	0.016	4
972.40	0.20	0.63	0.454	0.016	4
1072.3	0.7		0.020	0.015	4
1097.30	0.20	67.91	56.2	1.1	1
1235.5	1.0		0.093	0.017	4
1254.1	1.0		0.040	0.019	4
1293.54	0.15	100	84.4	1.7	1
1507.40	0.20	11.86	10.0	0.3	1
1712.3	1.0				4
1753.8	0.6	2.89	2.46	0.08	2
1757.07	0.21				4
2112.1	0.4	18.58	15.5	0.4	1
2225.5	0.8	0.06	0.052	0.008	3





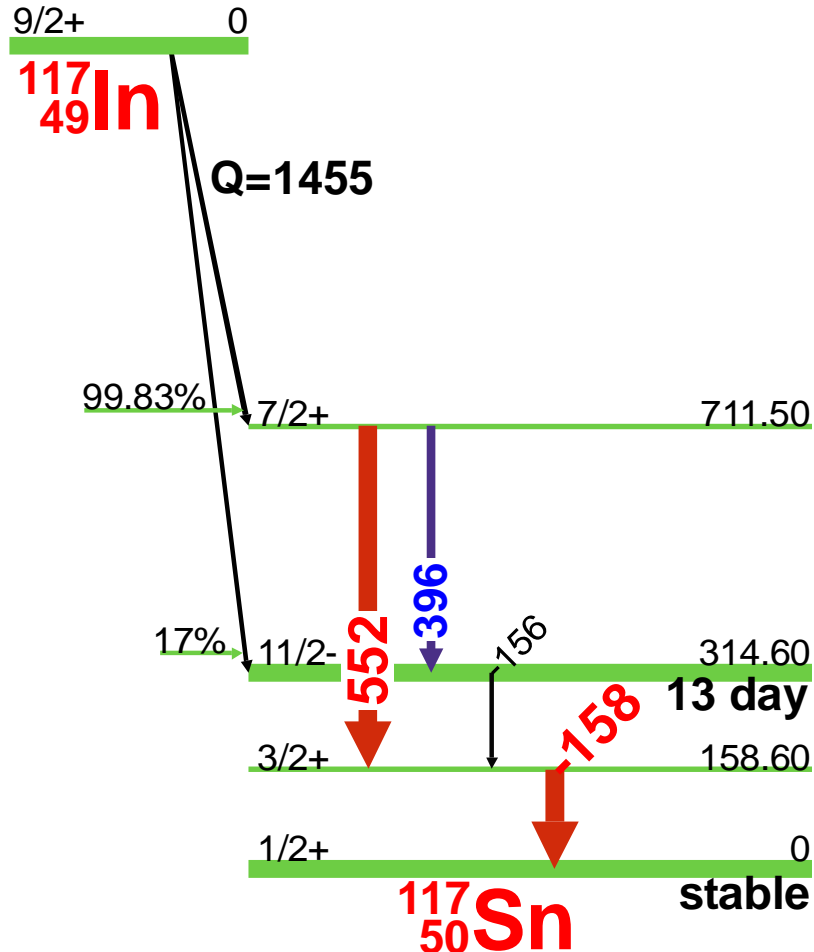
^{117m}In(116 min.) Decay Scheme

116 min.



¹¹⁷In(43 min.) Decay Scheme

43 min.



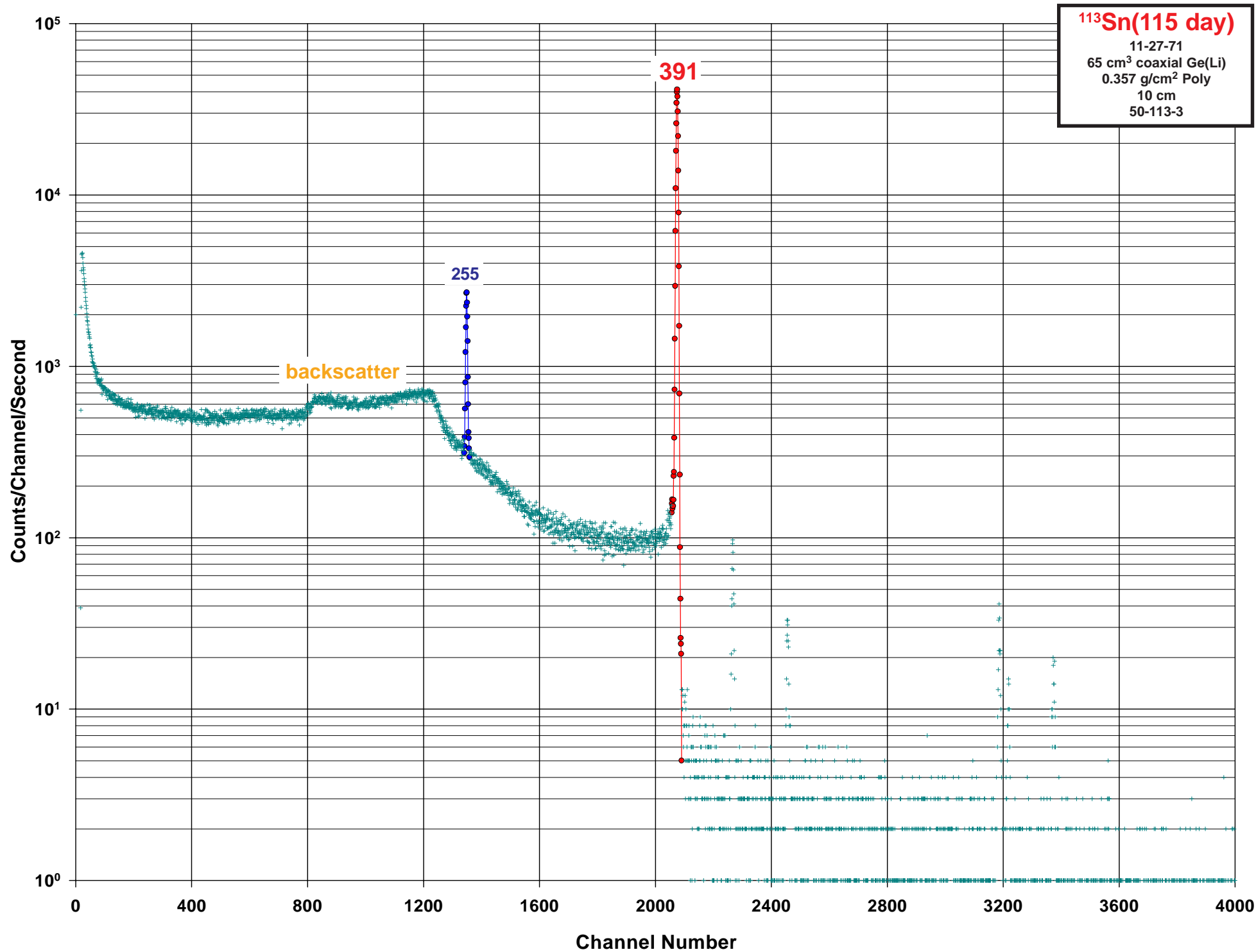
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{117m}In* - ¹¹⁷In Half Life: 116.2(3) min. - 43.2(3) min.
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: ¹¹⁶Cd(n, γ) β

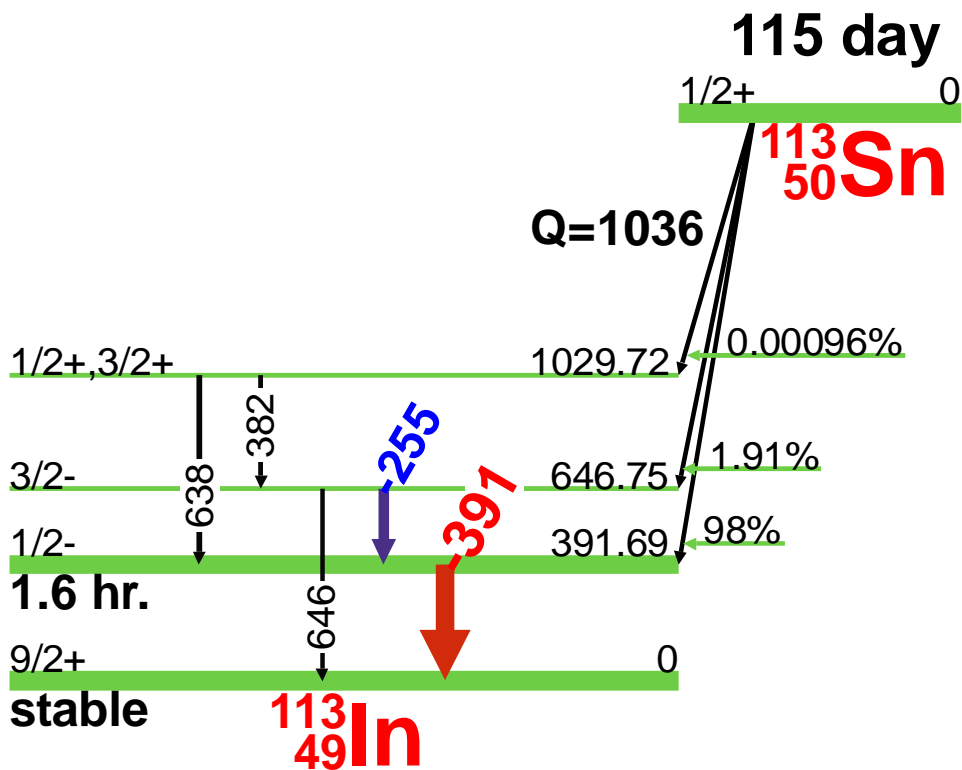
	E _{γ} (keV)	σ E _{γ}	I _{γ} (rel)	I _{γ} (%)	σ I _{γ}	S
	156.					4
	158.60	0.20	98.6	87.	9.	1
*	158.60	0.20		15.9	1.7	
	315.302	0.013		19.1	0.8	1
	396.6	0.4	0.18	0.174	0.008	4
	552.90	0.20	100	100.	10.	1
*	846.1	1.2		0.0019	0.0010	4
*	861.6	0.5		0.019	0.004	4
*	1004.4	0.7		0.0062	0.0013	4
*	1020.3	0.7		0.0068	0.0014	4

E _{γ} , σ E _{γ} , I _{γ} , σ I _{γ} - 1998 ENSDF Data





¹¹³Sn(115 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹¹³Sn

Half Life: 115.09(4) day

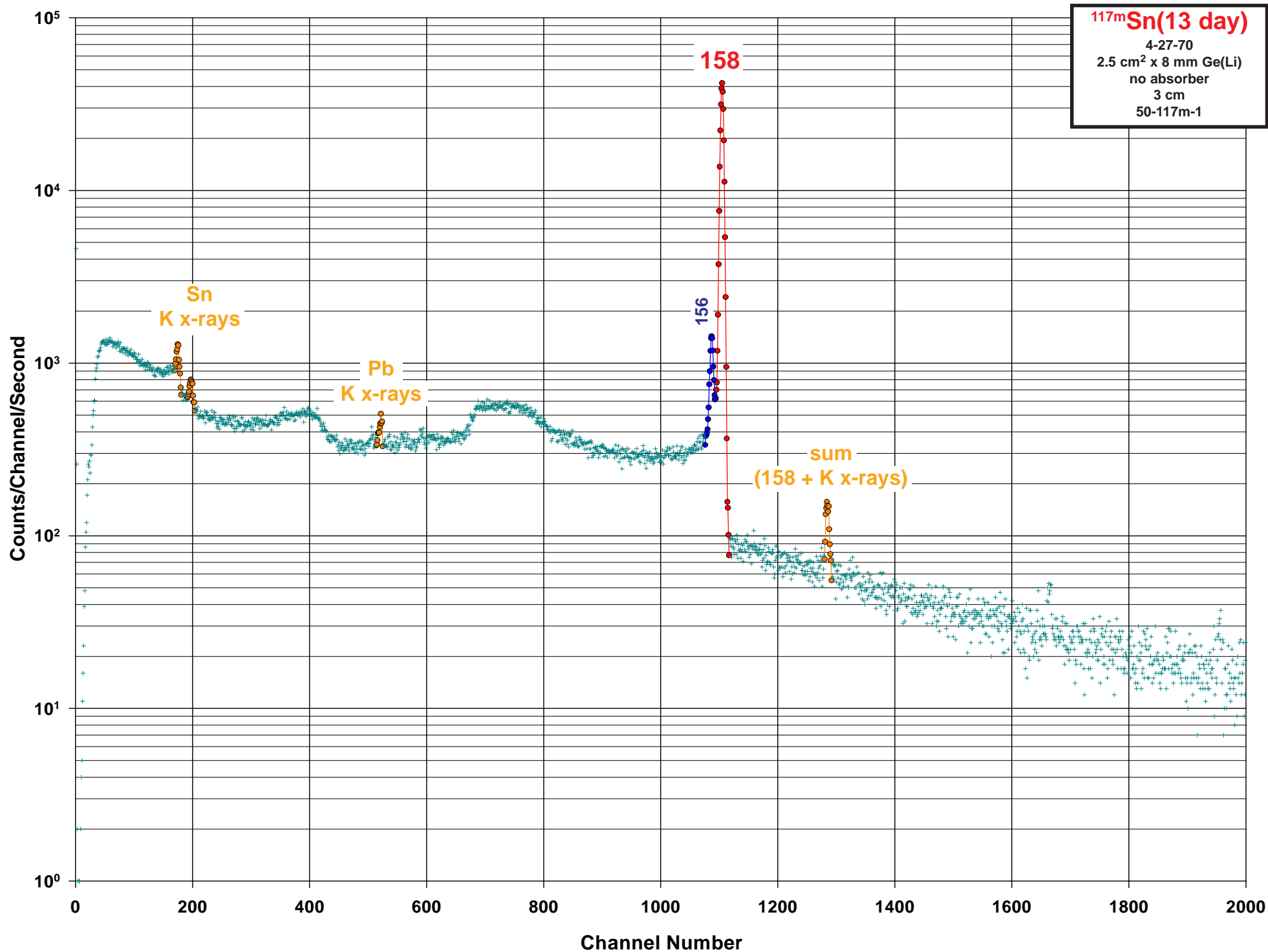
Detector: 65 cm³ coaxial (Li)

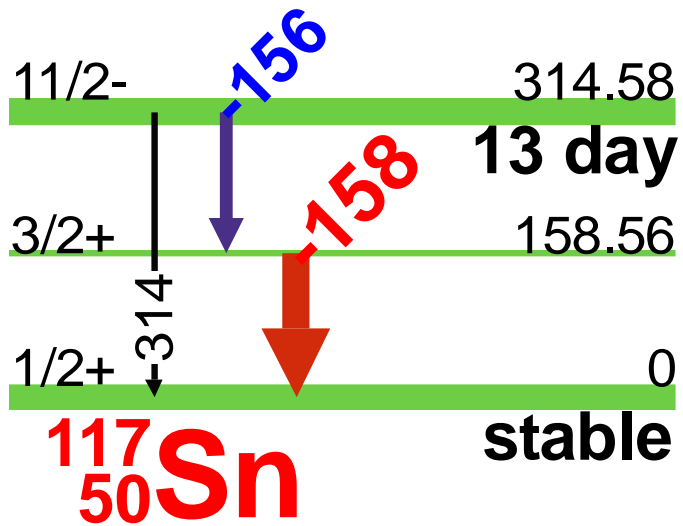
Method of Production: ¹¹²Sn (n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
255.06	0.05	3.44	1.824	0.081	3
382.97			0.0001		4
391.688	0.015	100	64.0	2.0	1
638.03	0.08		0.0010		4
646.80	0.10				4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





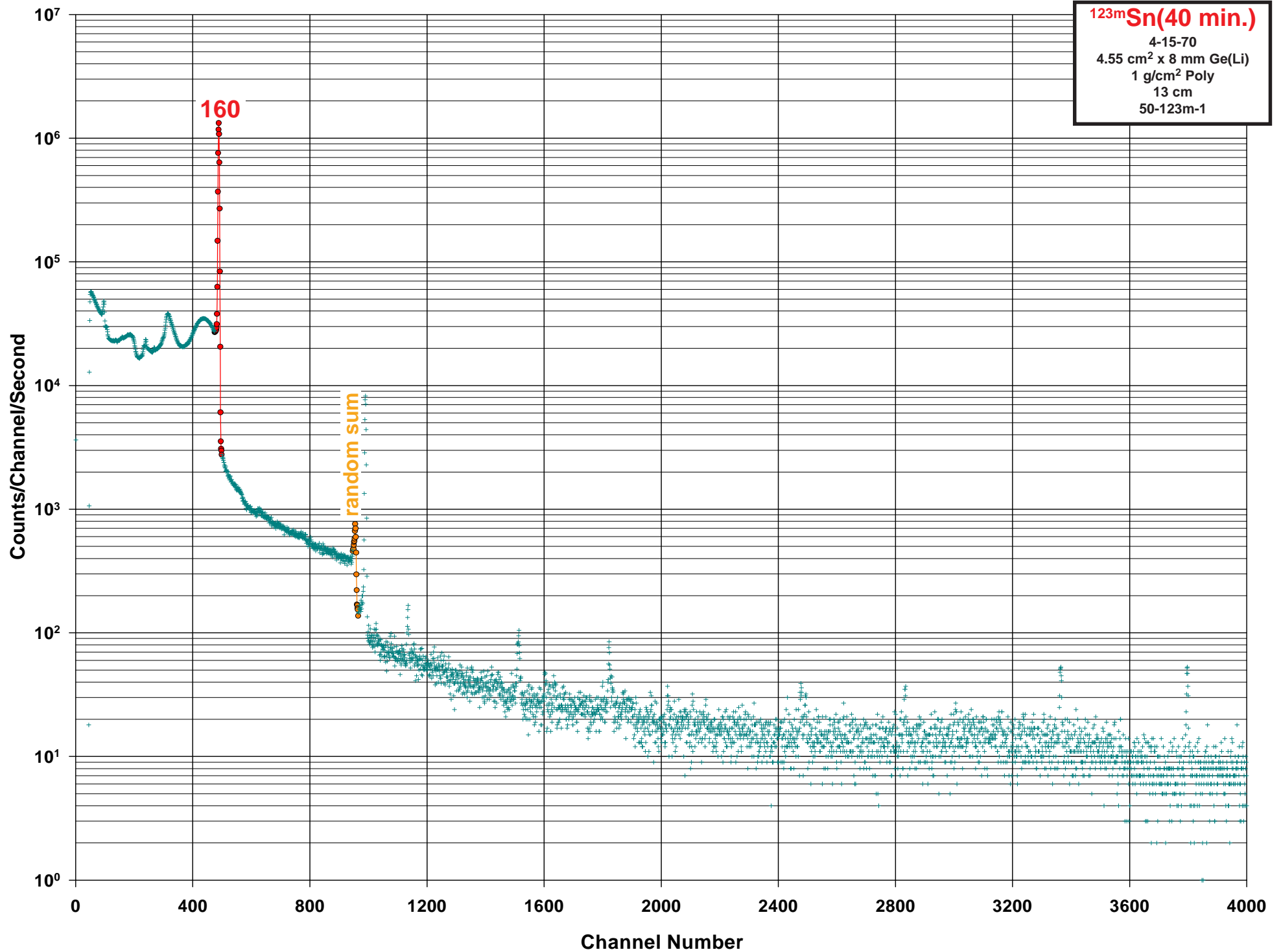
^{117m}Sn (13 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{117m}Sn

Half Life: 13.60(4) day

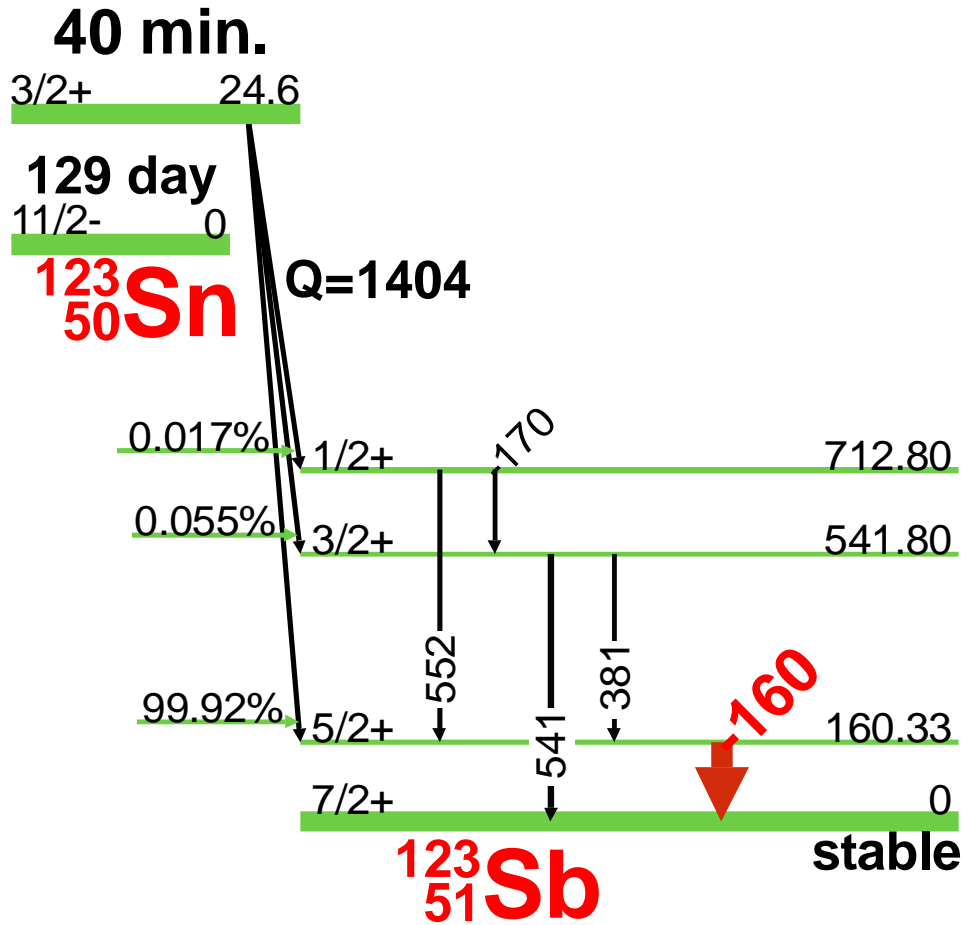
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{116}\text{Sn}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
156.02	0.03	2.59	2.113	0.012	3
158.56	0.02	100	86.4	0.4	1
314.3	0.3		0.0004		4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



^{123m}Sn(40 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{123m}Sn

Half Life: 40.06(1) min.

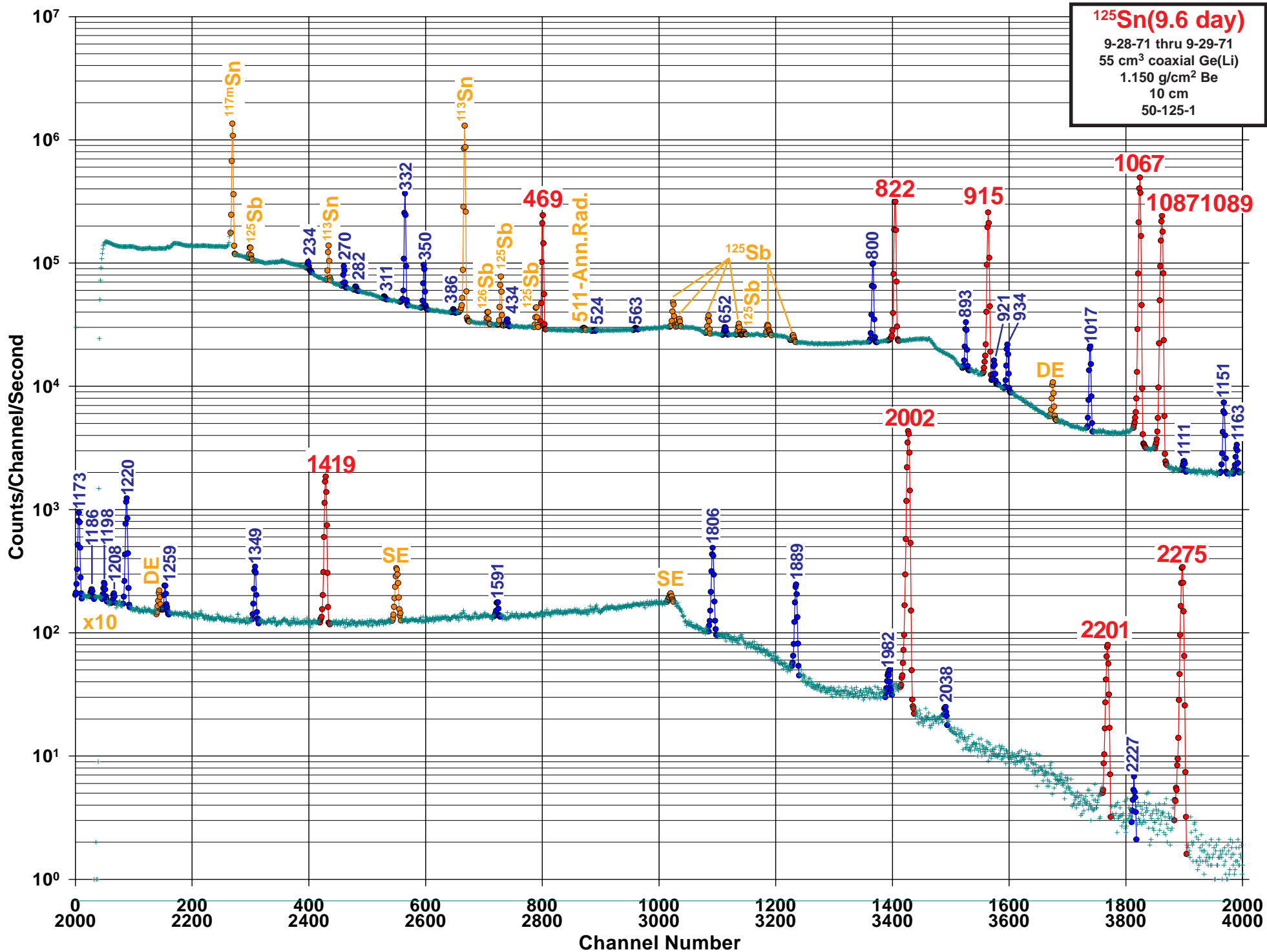
Detector: 4.55 cm² x 8mm Ge (Li)

Method of Production: ¹²²Sn(n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
160.32	0.05	100	85.7	0.4	1
170.9	0.7		0.007	0.004	4
381.4	0.3		0.042	0.003	4
541.8	0.4		0.02	0.003	4
552.5	0.3		0.0103	0.0017	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





9.6 day

¹²⁵Sn(9.6 day) Decay Scheme

11/2- 0



Q=2364

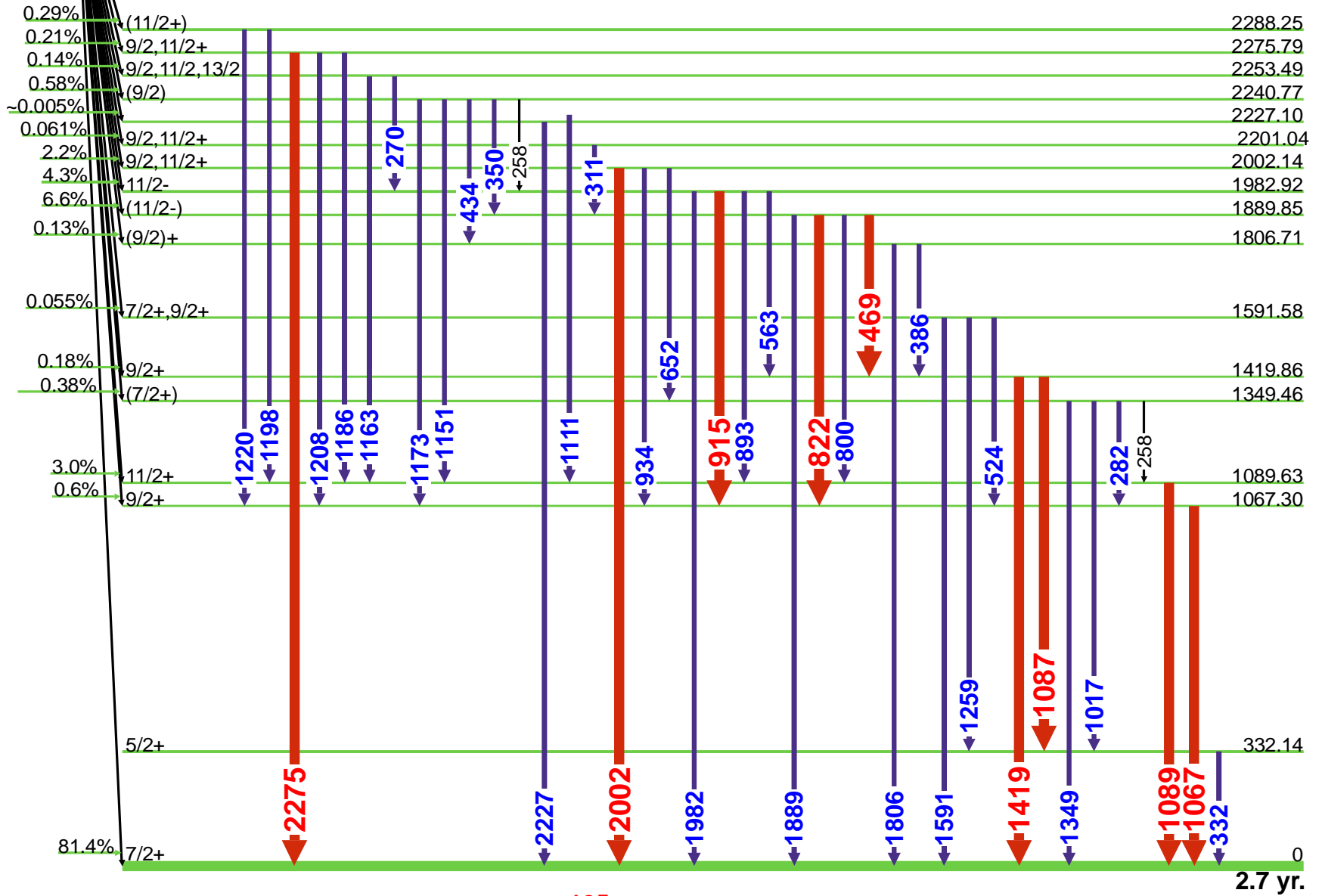


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GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{125}Sn E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

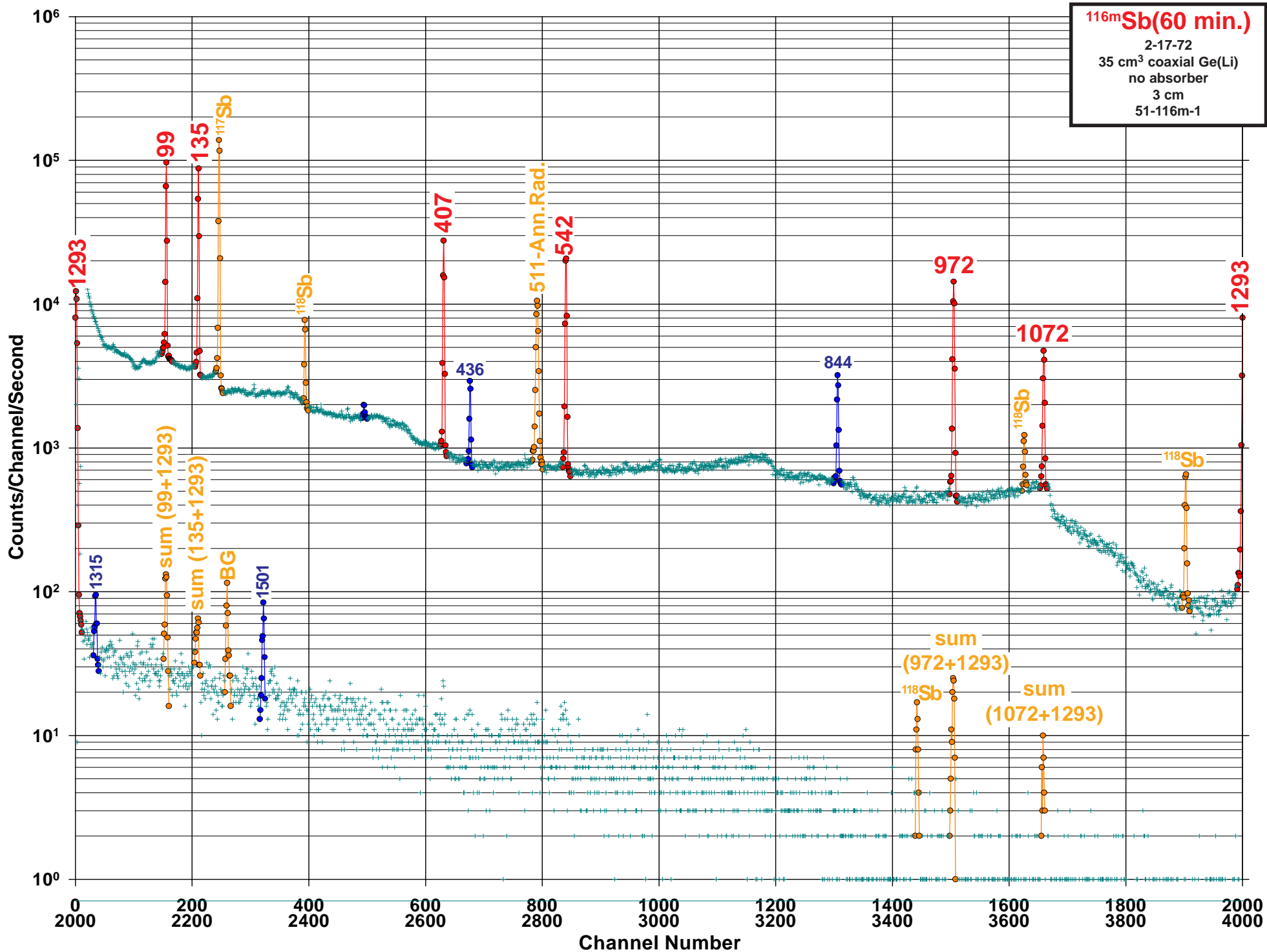
Half Life: 9.64(3) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{124}\text{Sn}(n,\gamma)$

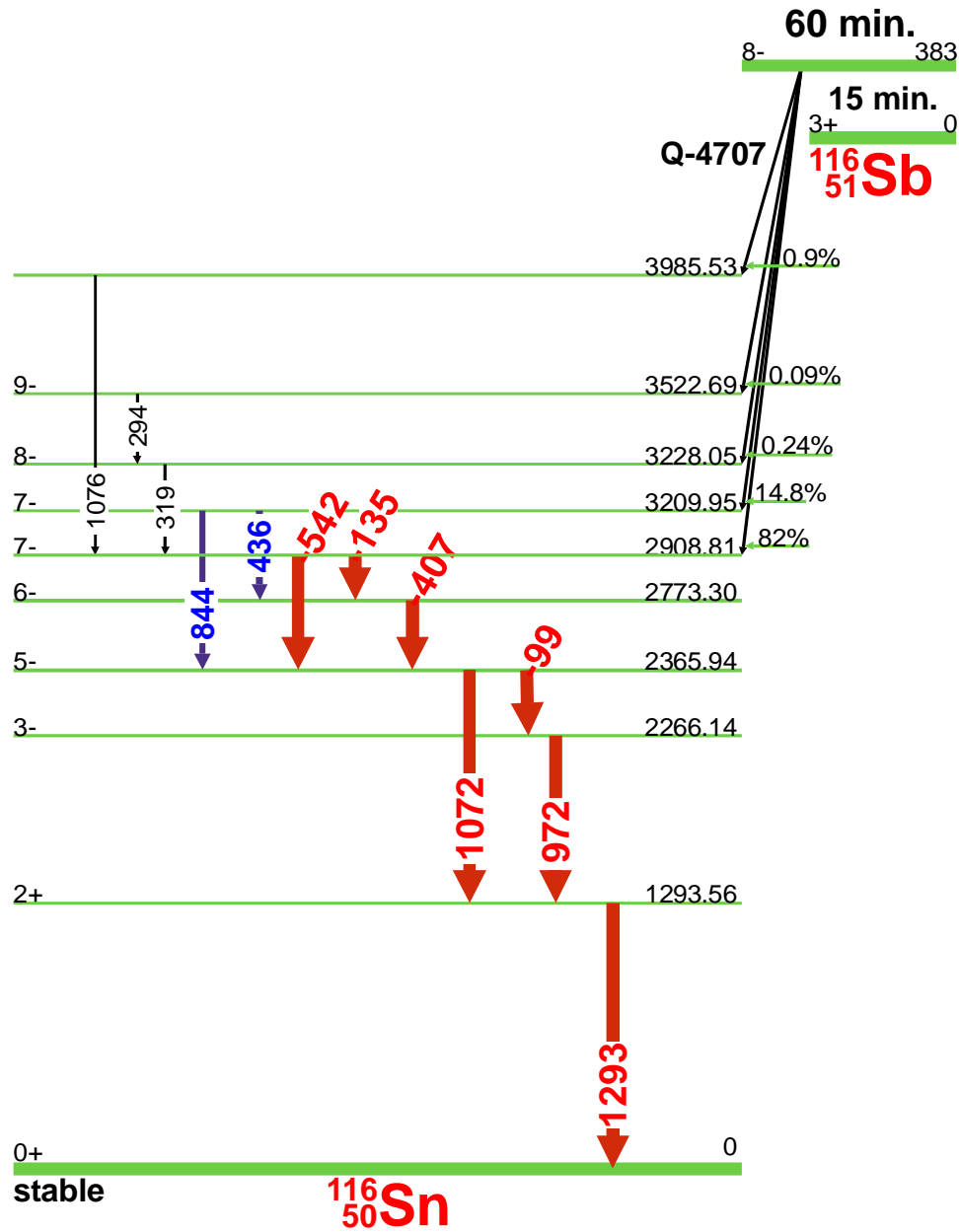
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	234.70	0.10	0.34	0.035	0.010	4
	258.25	0.10	0.136	0.019	0.005	4
	258.25	0.10				
	270.60	0.05	0.99	0.107	0.029	4
	282.45	0.05	0.150	0.018	0.005	4
	286.20	0.20	0.057	0.0058	0.0018	4
	311.30	0.10	0.095	0.0087	0.0025	4
	332.10	0.05	13.9	1.4	0.4	2
	350.95	0.05	2.73	0.26	0.07	3
	363.50	0.20		0.0029	0.0009	4
	386.60	0.20		0.0049	0.0016	4
	398.0	1.0		0.0005	0.0001	4
	434.13	0.10	0.303	0.024	0.007	4
	469.85	0.05	15.2	1.5	0.4	1
	487.20	0.20		0.013	0.004	4
	524.30	0.05	0.10	0.0097	0.0028	4
	563.00	0.20	0.07	0.016	0.005	4
	652.60	0.10	0.44	0.041	0.011	4
	684.00	0.20		0.011	0.004	4
	800.28	0.05	11.4	1.07	0.29	3
	822.48	0.05	45.0	4.3	1.2	1
	890.5	0.5		0.009	0.003	4
	893.40	0.05	3.42	0.2910	0.0804	3
	903.5	0.5		0.013	0.004	4
	912.0	0.5		0.0068	0.0027	4
	915.55	0.05	43.1	4.1	1.1	1
	921.43	0.05	1.25	0.082	0.022	4
	934.63	0.05	2.54	0.21	0.06	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1017.40	0.05	3.36	0.32	0.09	3
	1067.10	0.05	100.	9.7	2.6	1
D	1087.70	0.10	59.8	1.2	0.3	1
	1089.15	0.10		4.6	1.2	
	1111.40	0.10		0.014	0.004	4
	1137.5	0.5		0.0029	0.0008	4
	1151.23	0.05	1.22	0.11	0.03	3
	1163.84	0.05	0.32	0.031	0.008	4
	1173.30	0.05	1.71	0.18	0.05	3
	1186.15	0.15	0.078	0.0087	0.0025	4
	1198.70	0.15	0.220	0.016	0.004	4
	1208.40	0.20	0.104	0.0078	0.0028	4
	1220.88	0.10	2.66	0.27	0.07	2
	1259.35	0.10	0.259	0.031	0.008	3
	1291.30	0.20		0.0049	0.0020	4
	1349.42	0.10	0.63	0.059	0.016	3
	1419.70	0.05	5.31	0.49	0.13	1
	1557.30	0.10		0.0041	0.0015	4
	1591.40	0.20	0.169	0.025	0.007	4
	1806.701	0.022	1.73	0.15	0.04	2
	1889.895	0.022	1.00	0.074	0.020	2
	1982.50	0.20	0.081	0.0032	0.0013	4
	2002.147	0.018	22.1	1.9	0.5	1
	2038.30	0.20		0.0029	0.0009	4
	2201.019	0.017	0.46	0.039	0.011	1
	2227.0	0.5	0.015	0.0019	0.0005	4
	2275.766	0.015	2.10	0.18	0.05	1





^{116m}Sb(60 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{116m}Sb

Half Life: 60.3(6) min.

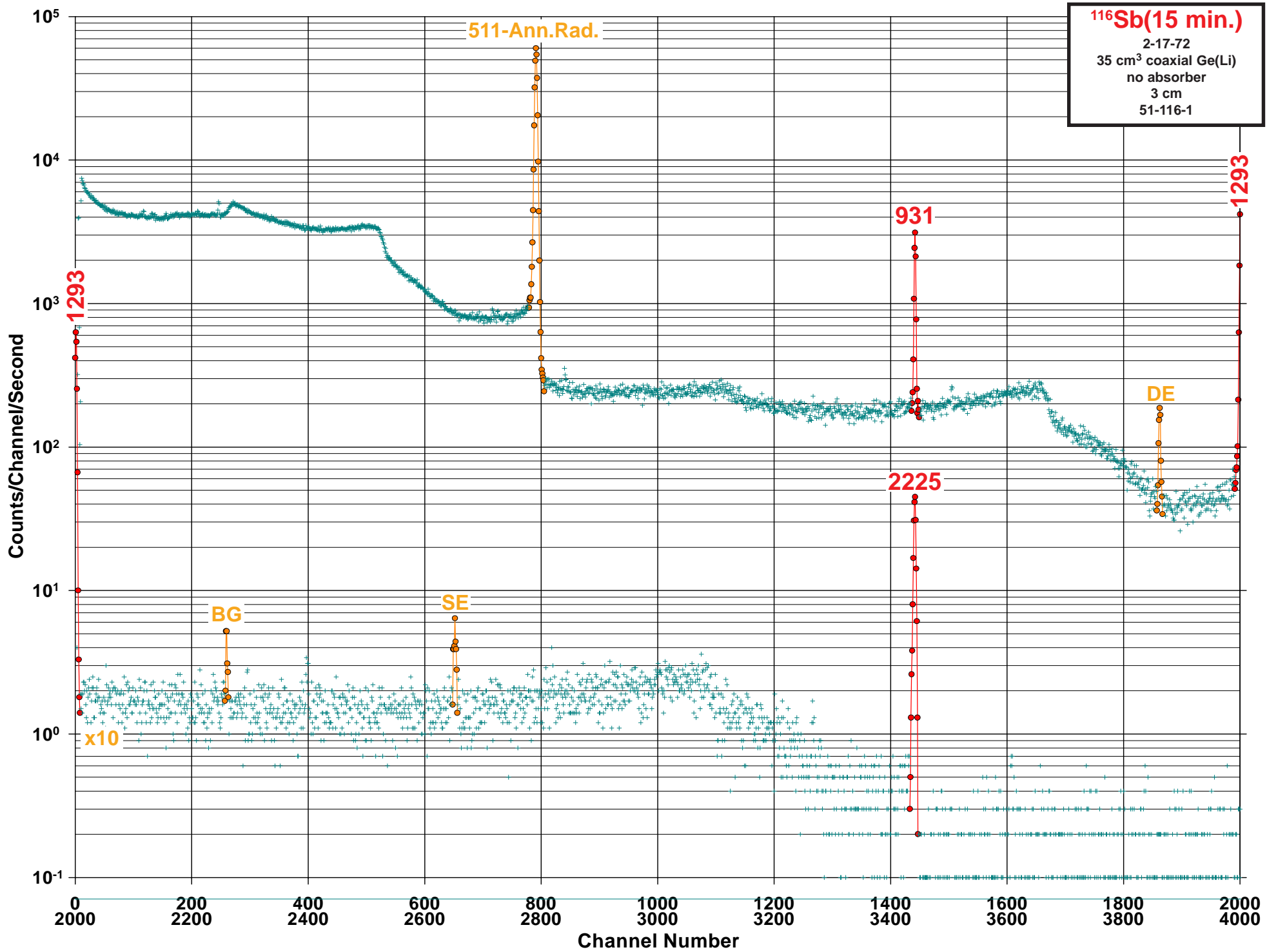
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁶Sn(p,n)

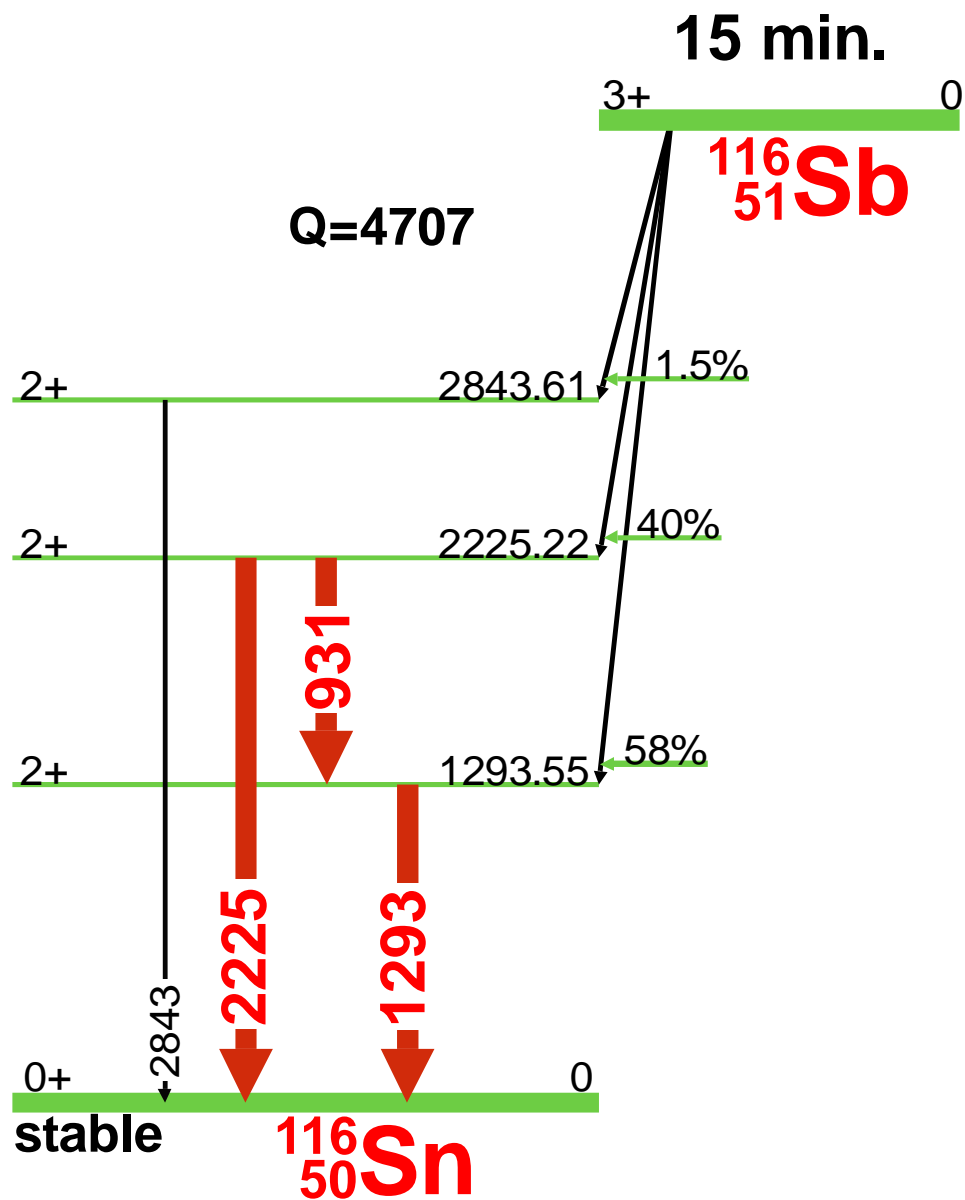
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	99.802	0.011	32.0	28.3	1.2	1
	135.511	0.010	29.0	28.5	1.2	1
	294.60	0.20		0.09	0.05	4
	319.24	0.12		0.33	0.03	4
	407.351	0.015	42.0	38.8	1.6	1
	436.666	0.021	4.1	3.58	0.16	3
Ann.	511.006			52.	4.	1
	542.867	0.015	52.1	48.1	2.0	1
	844.001	0.019	12.0	11.2	0.5	2
	972.573	0.016	72.3	74.	3.	1
	1072.373	0.020	28.0	25.5	1.1	1
	1076.72	0.13		0.9	0.3	4
	1293.557	0.011	100	100.	4.	1
	1315.53	0.04	0.56	0.40	0.04	2
	1501.03	0.17	0.65	0.57	0.15	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹¹⁶Sb(15 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

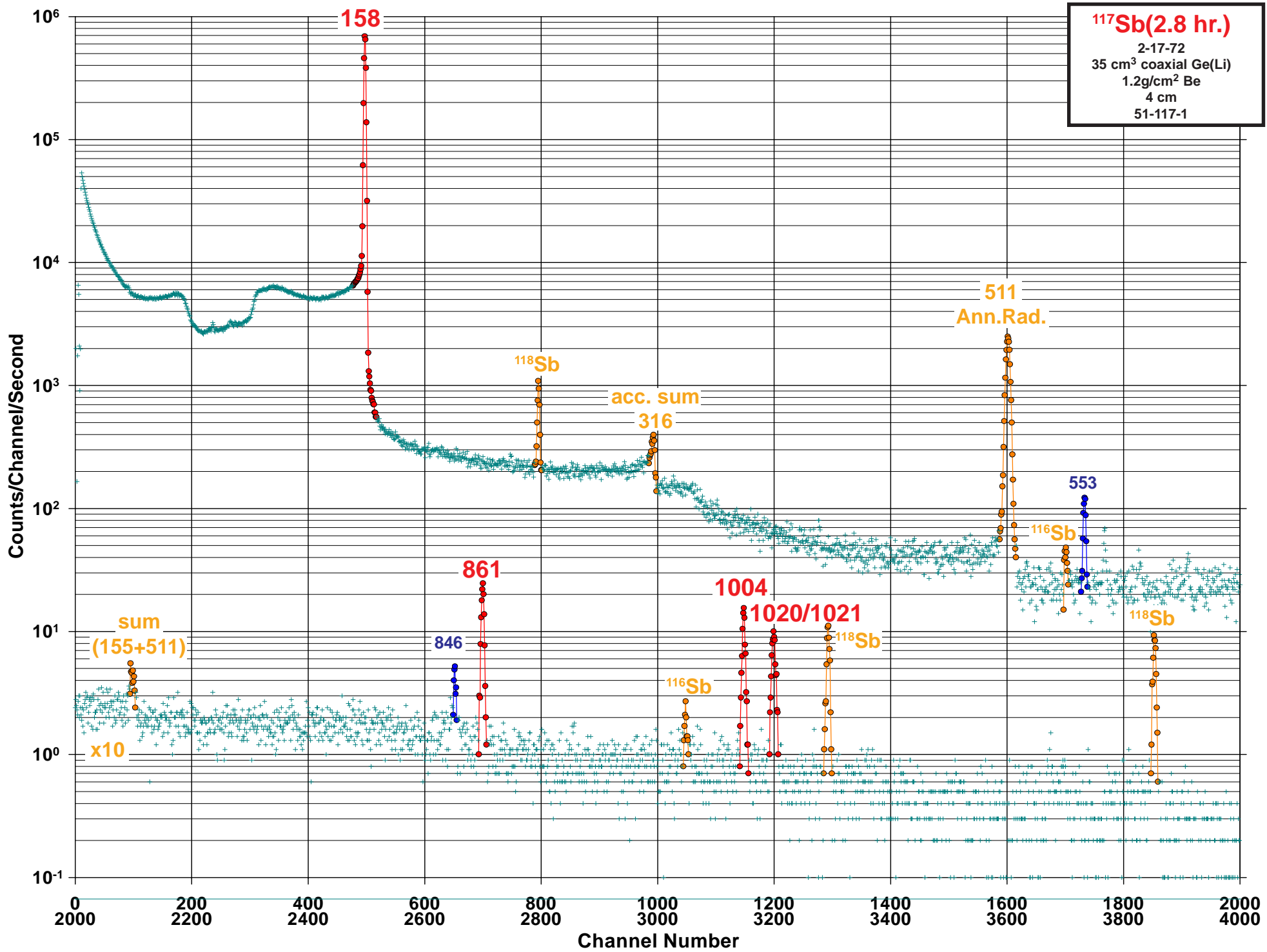
Nuclide: ^{116}Sb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 15.8(8) min.

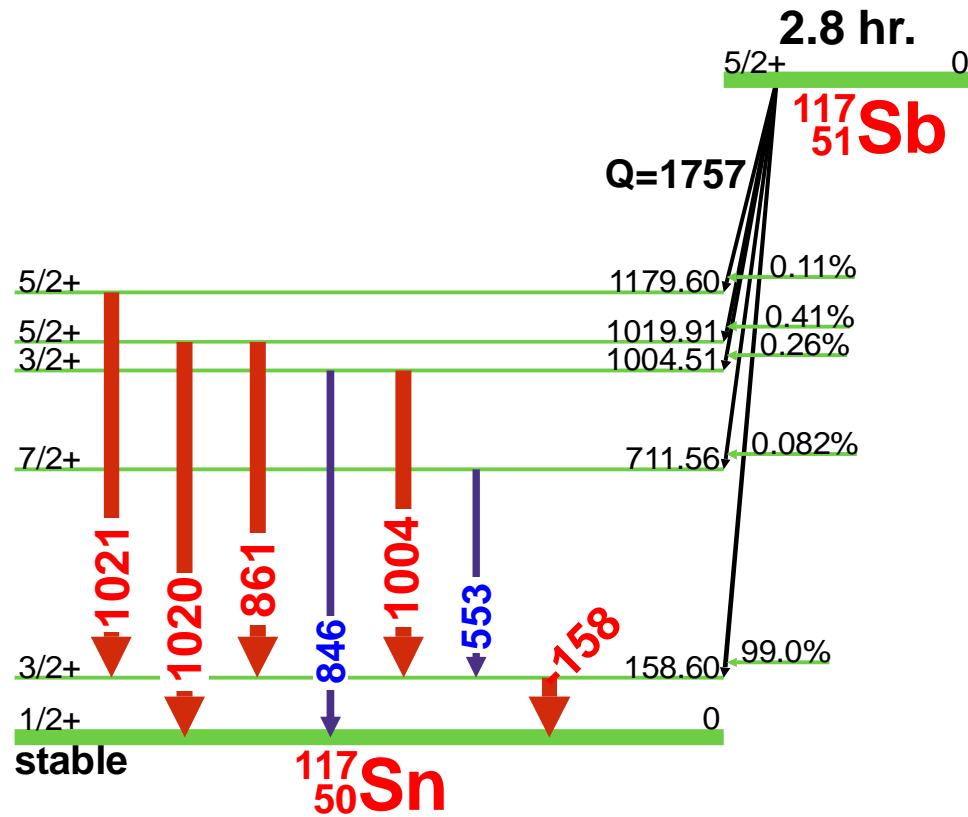
Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{116}\text{Sn}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
84.9	0.5				4
113.1					4
138.2	0.3		0.017	0.007	4
198.0	0.0		0.0011	0.0001	4
310.0	0.3		0.0042	0.0017	4
355.63	0.24		0.020	0.009	4
359.9	0.7		0.013	0.009	4
374.37	0.24		0.039	0.010	4
378.1	0.6		0.0017	0.0009	4
416.86	0.08		0.076	0.026	4
463.12	0.04		0.349	0.027	4
466.6	0.4		0.0042	0.0017	4
468.59	0.06		0.191	0.016	4
Ann. 511.006			107.	8.	1
567.9	0.5		0.014	0.009	4
577.40	0.20		0.016	0.009	4
604.7	0.4		0.0059	0.0017	4
693.5	0.6		0.014	0.007	4
733.8	0.7		0.028	0.013	4
770.3	0.4		0.0051	0.0017	4
788.5	0.6		0.0051	0.0026	4
818.68	0.07		0.249	0.022	4
828.90	0.20		0.0034	0.0009	4
831.1	0.7		0.0204	0.0086	4
931.84	0.05	29.1	24.8	1.9	1
961.7	1.0		0.0051	0.0026	4
972.60	0.08		0.220	0.022	4
980.2	0.4		0.006	0.003	4
1001.0	0.5		0.046	0.018	4
1002.5	1.0		0.0076	0.0026	4
1097.40	0.07		0.276	0.026	4
1145.8	0.4		0.010	0.004	4
1150.1	0.5		0.026	0.013	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1200.0	0.6		0.036	0.010	4
1252.2	0.7		0.025	0.009	4
1292.10	0.20		0.048	0.012	4
1293.558	0.015	100	85.	6.	1
1331.9	0.4		0.021	0.009	4
1356.34	0.25		0.034	0.008	4
1368.21	0.19		0.049	0.008	4
1474.8	0.3		0.040	0.008	4
1481.30	0.20		0.0110	0.0008	4
1507.83	0.11		0.101	0.013	4
1550.01	0.09		0.40	0.03	4
1666.39	0.11		0.106	0.013	4
1702.1	0.4		0.027	0.009	4
1751.8	0.4		0.0212	0.0015	4
1794.5	0.3		0.042	0.010	4
1885.9	0.6		0.021	0.009	4
1934.3	1.0		0.0076	0.0026	4
2077.6	0.4		0.033	0.010	4
2112.27	0.10		0.32	0.03	4
2123.0	0.4		0.023	0.007	4
2219.8	0.5		0.034	0.010	4
2225.19	0.13	16.8	14.6	1.3	1
2300.2	0.5		0.014	0.008	4
2454.4	0.3		0.026	0.005	4
2585.70	0.25		0.032	0.006	4
2650.2	1.1		0.005	0.003	4
2843.71	0.15		1.10	0.12	4
2960.0	0.3		0.207	0.023	4
3088.6	0.4		0.091	0.011	4
3515.5	1.2		0.0017	0.0009	4
3586.3	0.8		0.0059	0.0017	4
3903.30	0.10		0.0025	0.0017	4
4270.	6.		0.0022	0.0002	4



¹¹⁷Sb(2.8 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹¹⁷Sb

Half Life: 2.80(1) hr.

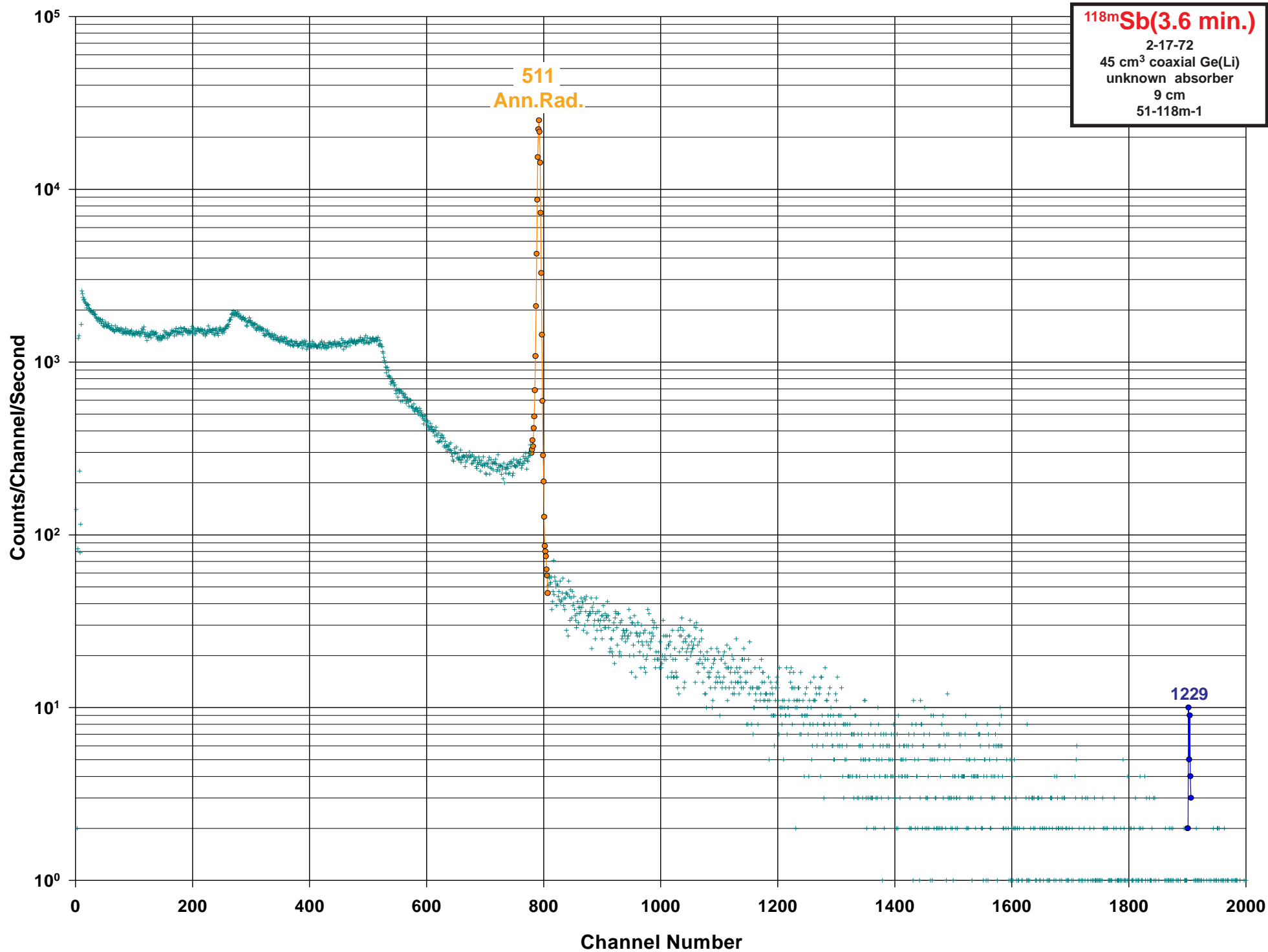
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁸Sn(p,2n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	158.562	0.015	100	85.9	0.4	1
Ann.	511.006			3.4	0.4	1
	553.00	0.10	0.095	0.082	0.013	2
	846.0	0.3	0.06	0.052	0.017	3
	861.35	0.05	0.36	0.31	0.03	1
	1004.51	0.15	0.24	0.206	0.026	1
D	1020.6	0.5	0.21	0.103	0.017	1
	1021.0	0.5		0.112	0.017	
	1287.6	0.3		0.028	0.006	4
	1339.5	1.0		0.009	0.003	4
	1420.1	0.4		0.017	0.006	4
	1446.4	0.5		0.056	0.016	4
	1578.0	0.3		0.019	0.006	4

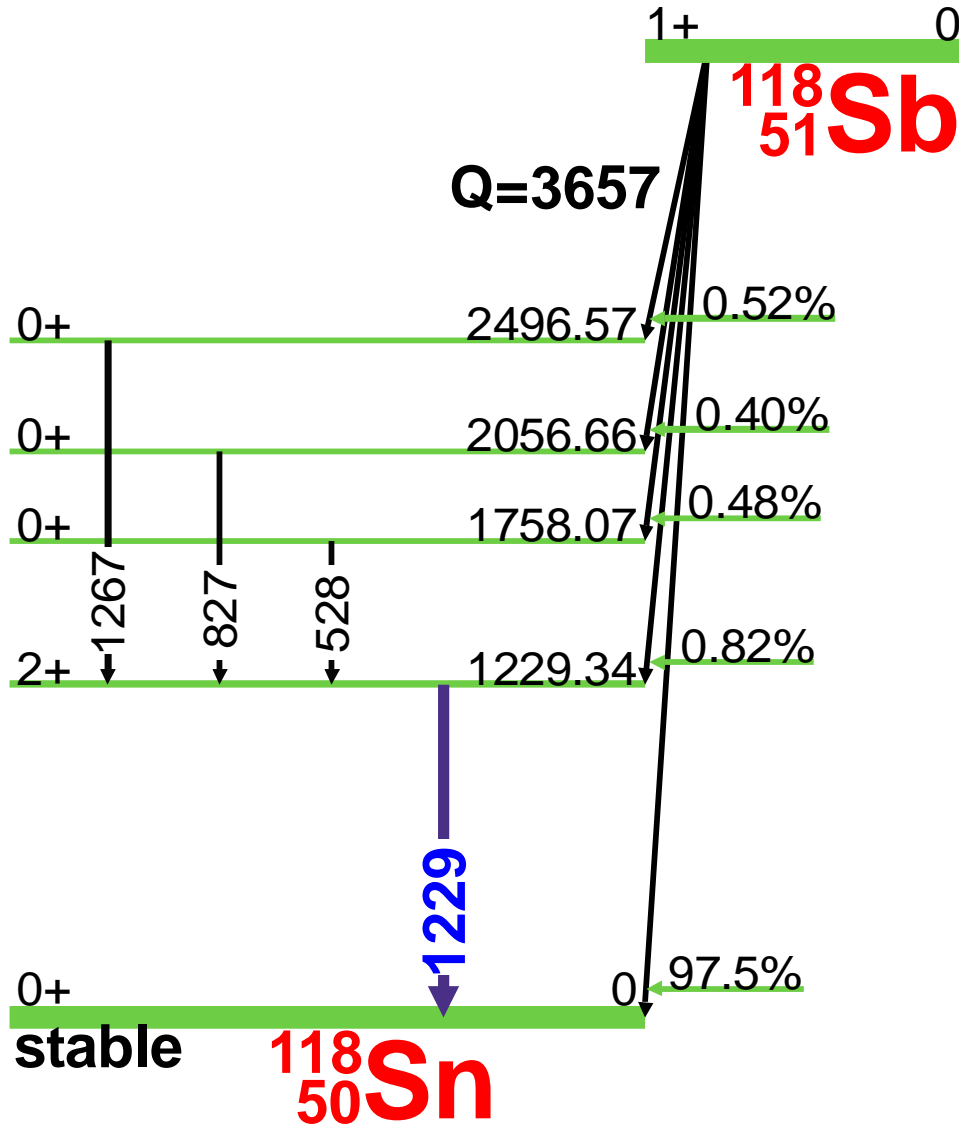
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{118m}Sb(3.6 min.) Decay Scheme

3.6 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{118m}Sb

Half Life: 3.6(1) min.

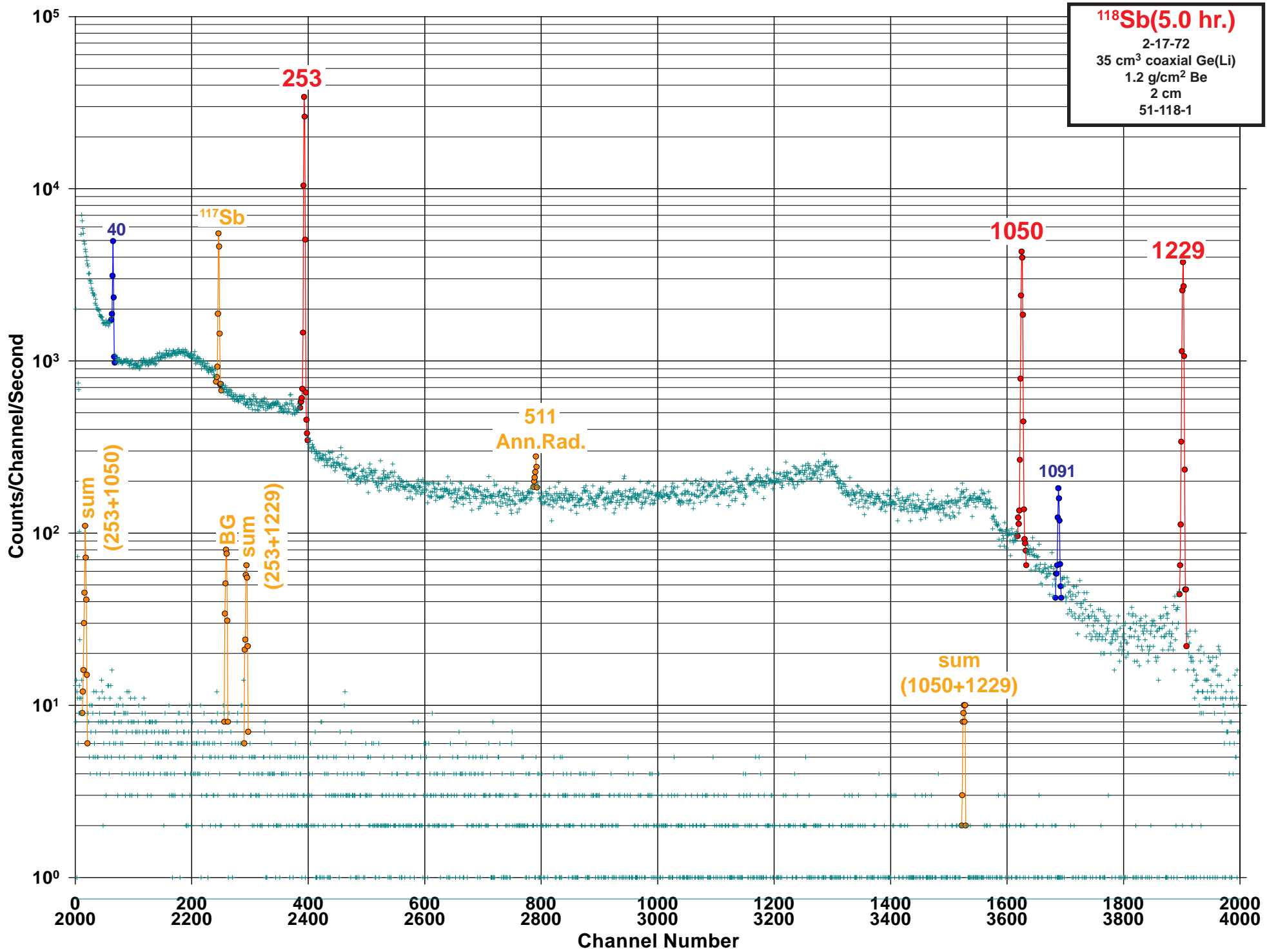
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁸Sn(p,n)

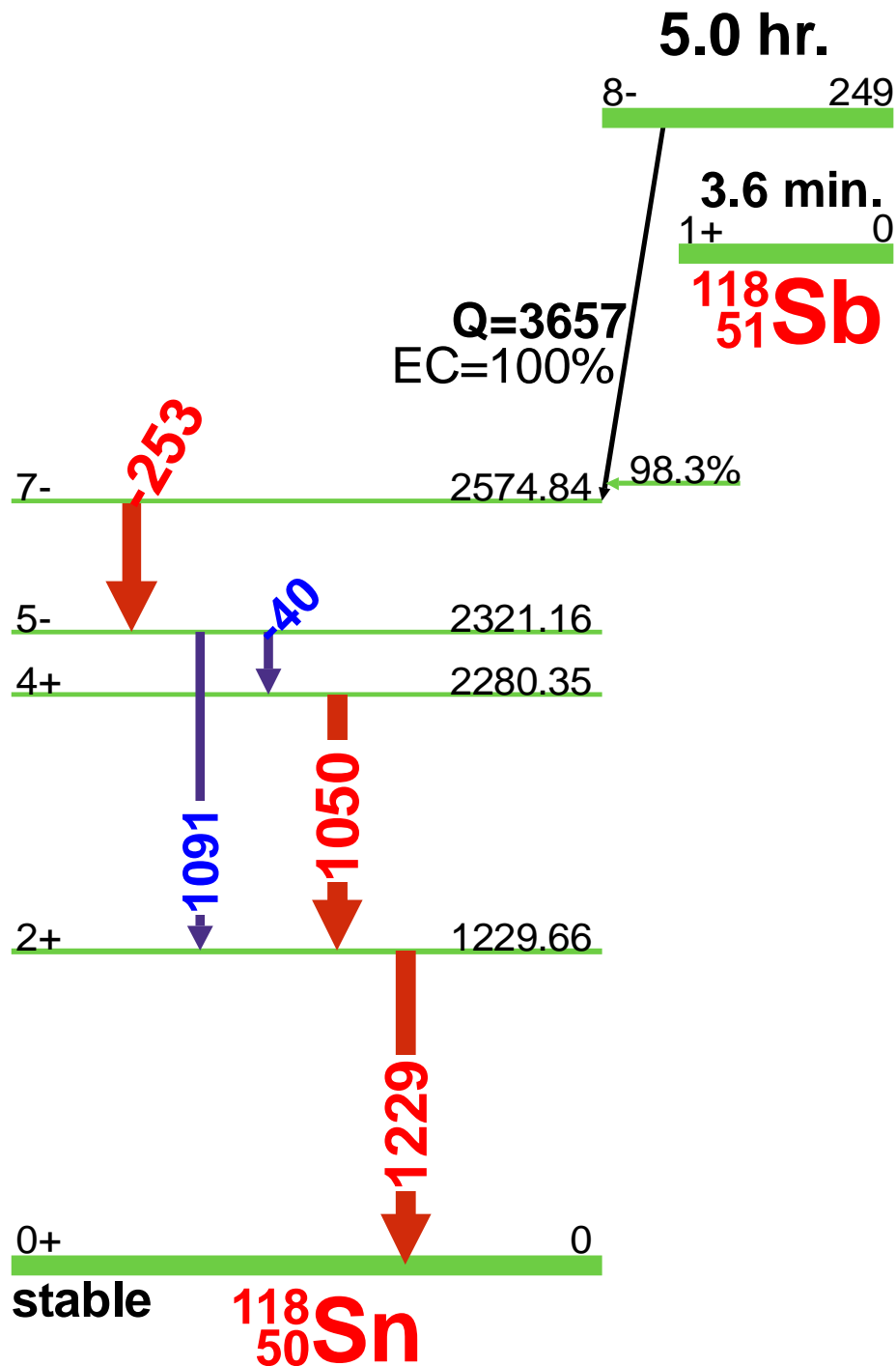
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	298.58	0.04				4
Ann.	511.006			145.5	0.7	1
	528.73	0.03		0.48	0.06	4
	813.2	1.0		0.015	0.008	4
	827.34	0.07		0.40	0.05	4
	1098.5	0.5		0.080	0.024	4
	1172.9	0.5		0.048	0.008	4
	1229.33	0.03		2.5	0.3	3
	1267.23	0.05		0.52	0.07	4
	1447.4	1.0		0.022	0.008	4
	1699.70	0.10		0.078	0.016	4
	1758.05	0.05				4
	1907.20	0.20		0.045	0.011	4
	2044.0	2.0		0.008	0.005	4
	2056.64	0.05				4
	2327.0	0.8		0.0107	0.0026	4
	2496.56	0.00				4
	2677.5	0.6		0.012	0.005	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹¹⁸Sb(5.0 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹¹⁸Sb

Half Life: 5.00(2) hr.

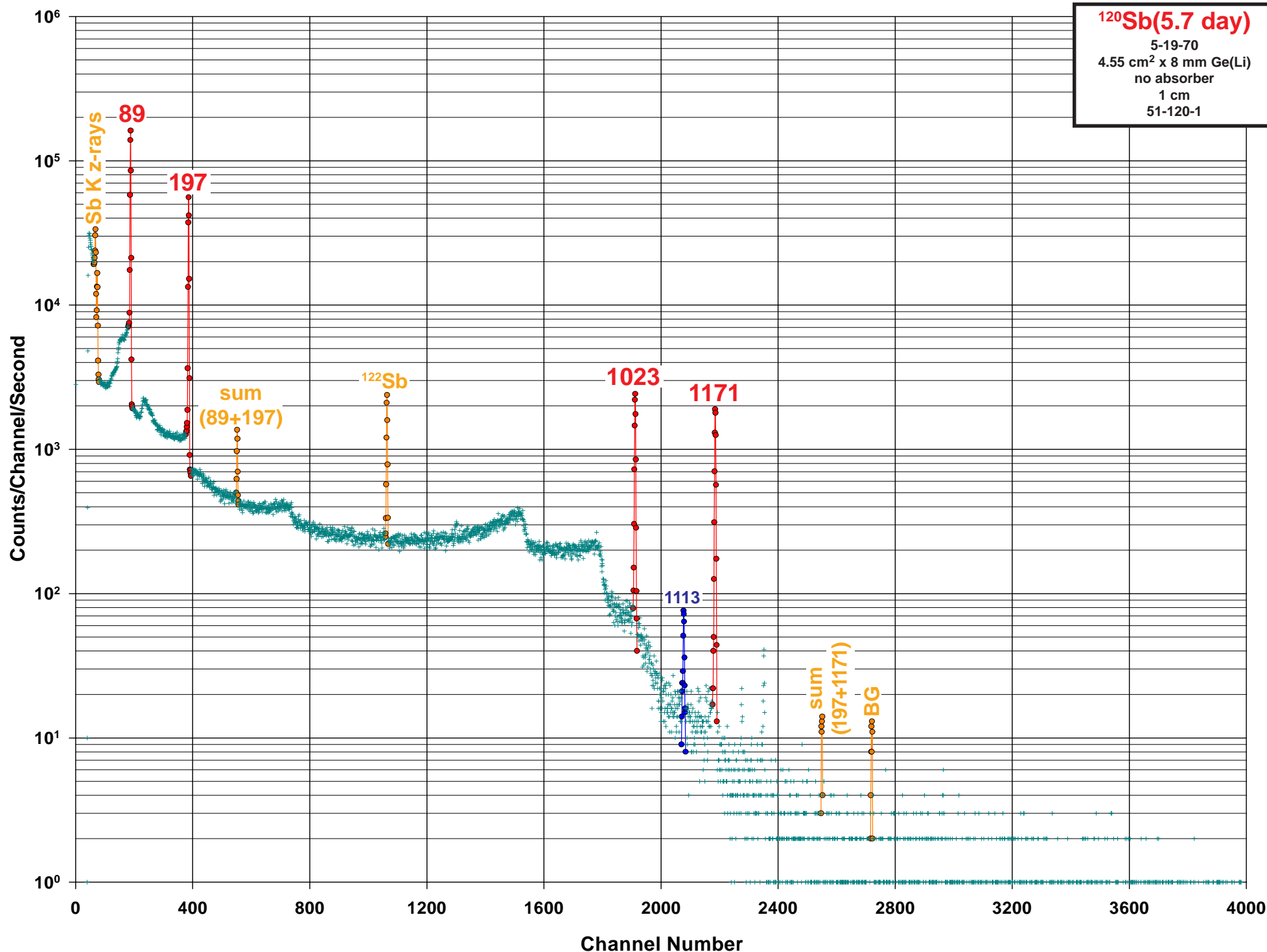
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹¹⁸Sn(p,n)

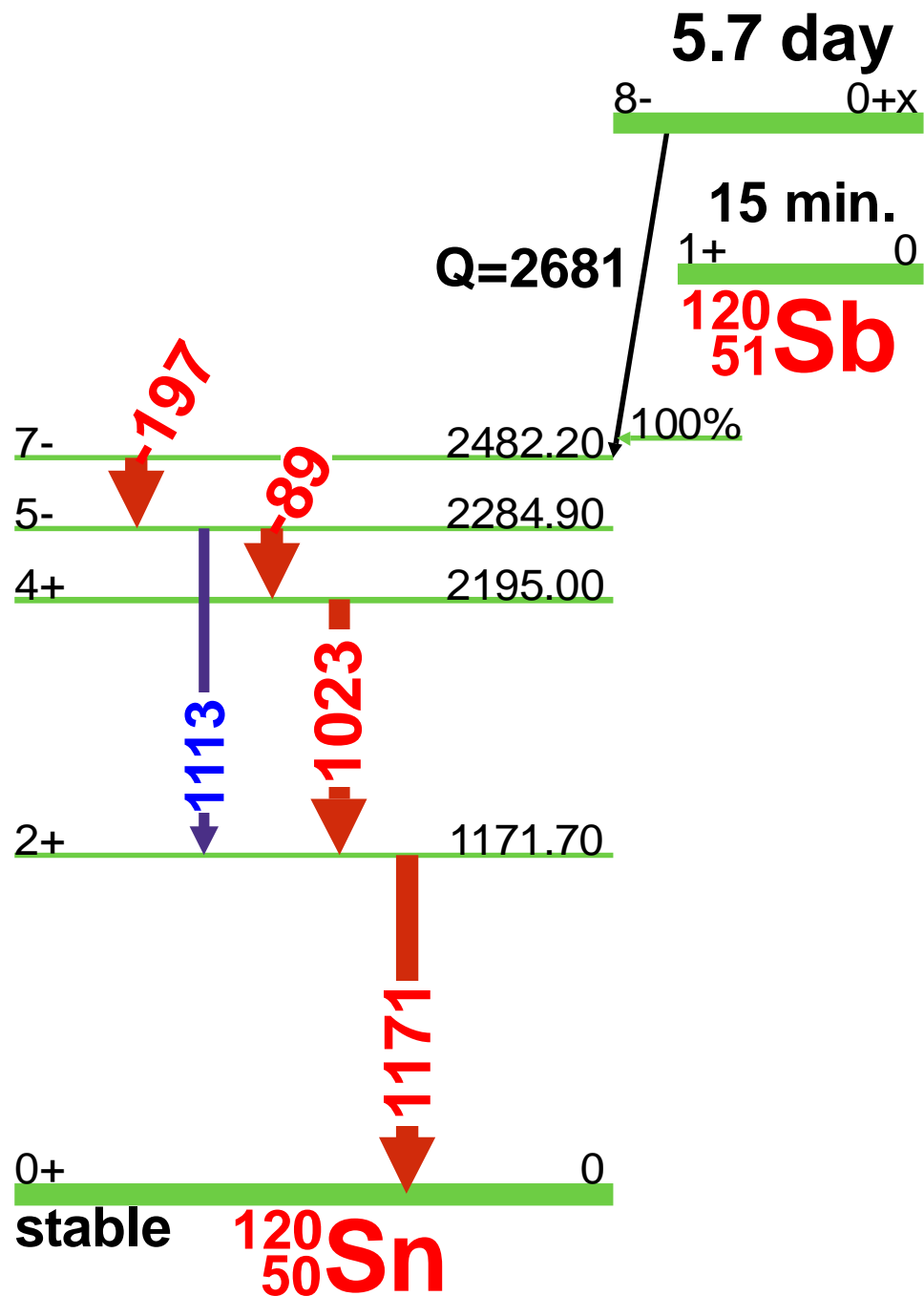
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	40.80	0.10		30.0	2.0	2
	253.678	0.010	99.3	99.	6.	1
Ann.	511.006			0.317	0.014	4
	984.0	1.0		1.5	0.5	4
	1050.69	0.03	97.3	97.	5.	1
	1091.51	0.08	3.6	3.6	0.3	3
	1229.65	0.05	100.	100.	5.	1
	1303.0	2.0		0.50	0.20	4
	1481.	3.		0.50	0.20	4
	2361.	5.		0.010	0.010	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





¹²⁰Sb(5.7 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹²⁰Sb

Half Life: 5.76(2) day

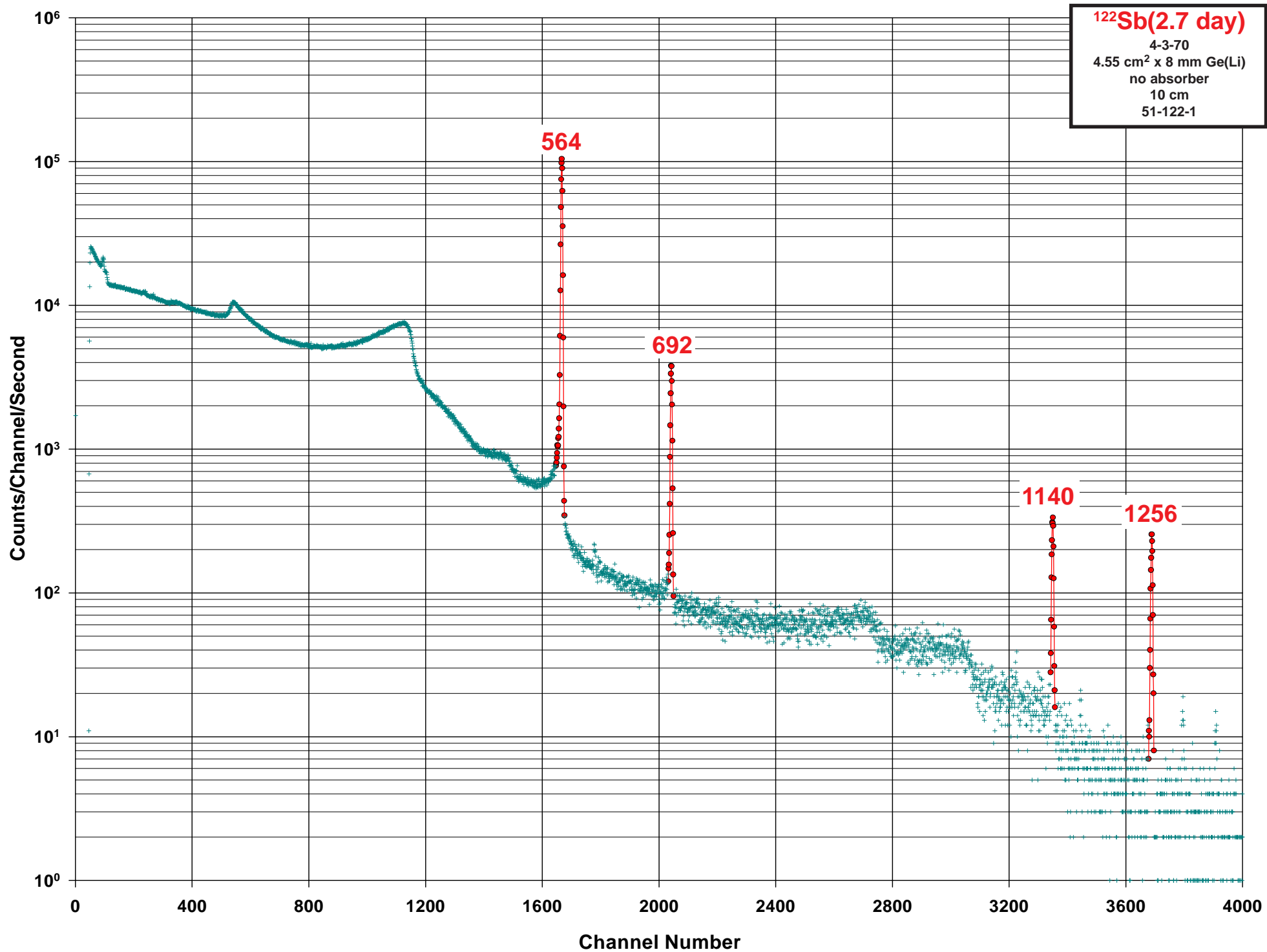
Detector: 4.55 cm² x 8mm Ge (Li)

Method of Production: ¹²¹Sb(γ ,n)

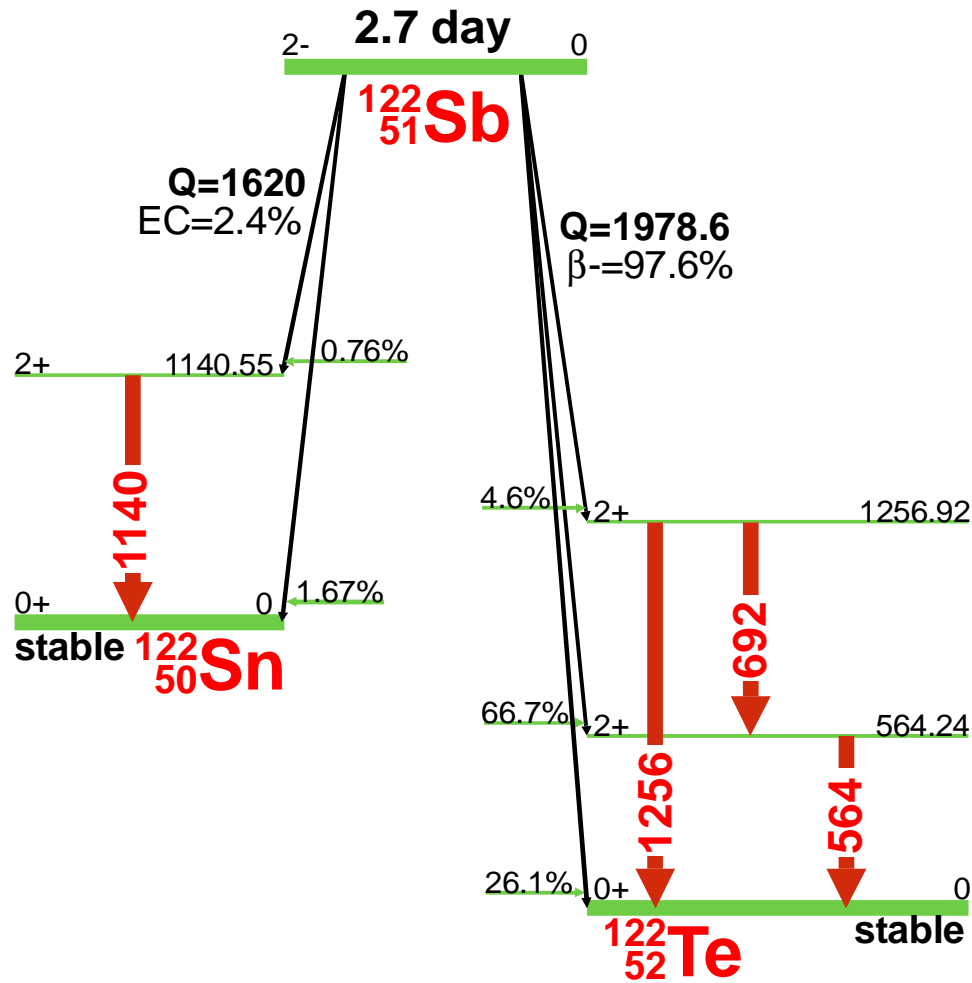
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
89.8	0.3	74.0	79.5	1.6	1
197.3	0.3	88.0	87.0	1.1	1
1023.3	0.4	100.	99.4	0.3	1
1113.4	0.6	2.8	0.821	0.010	2
1171.7	0.3	100	100.		1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





¹²²Sb(2.7 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹²²Sb

Half Life: 2.7238(2) day

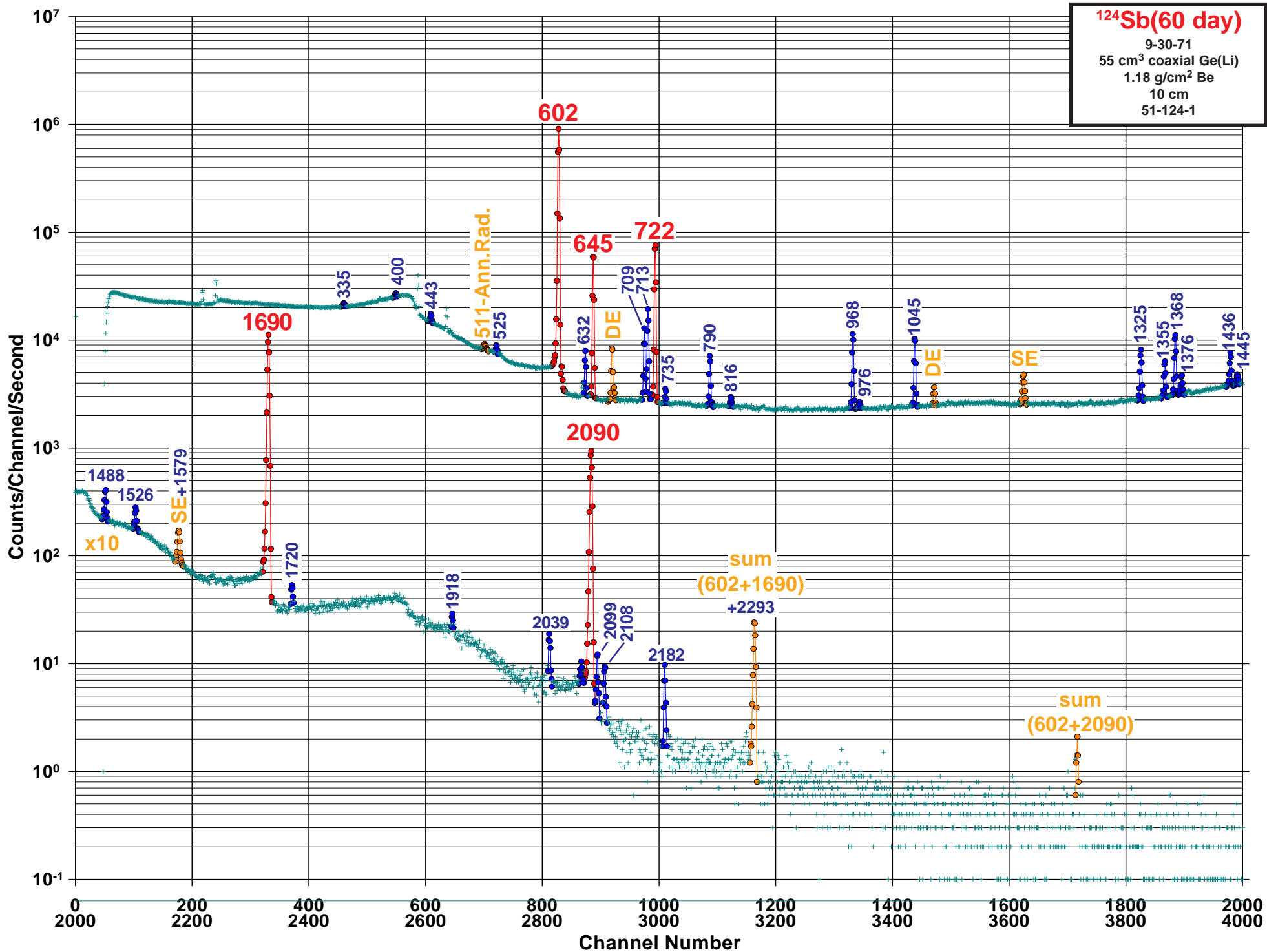
Detector: 4.55 cm² x 8mm Ge (Li)

Method of Production: ¹²¹Sb(γ ,n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
Ann.	511.006			0.0125		4
	564.24	0.04	100	72.42	0.16	1
	615.0	0.4		0.012	0.004	4
	692.65	0.04	5.6	3.95	0.13	1
	793.3	0.4		0.017	0.004	4
	1140.46	0.10	1.2			1
	1188.0	1.0		0.0043	0.0007	4
	1256.93	0.04	1.0	0.83	0.04	1
	1752.4	1.5		0.0094	0.0014	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





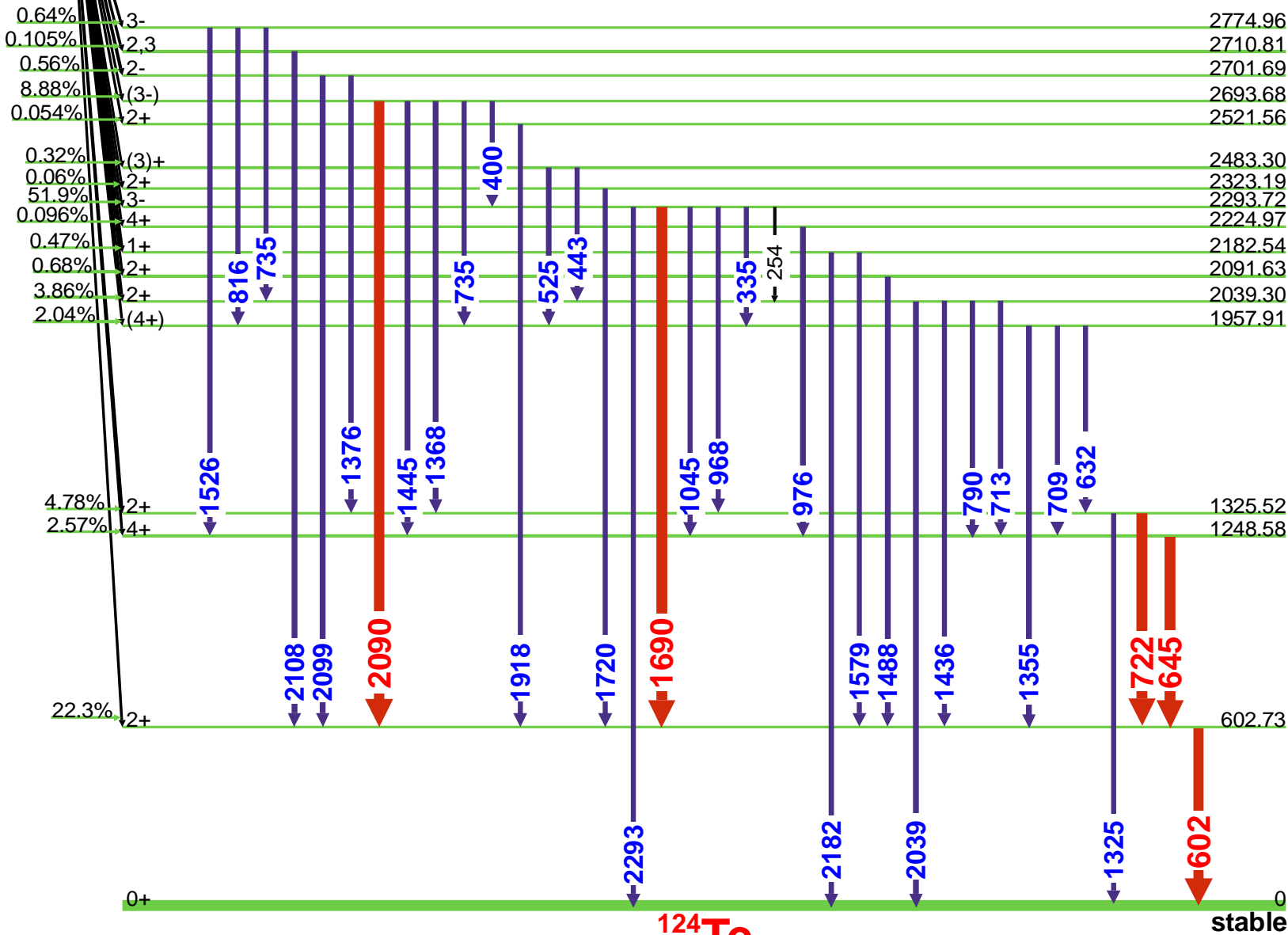
60 day

¹²⁴Sb(60 day) Decay Scheme

3- 0

¹²⁴₅₁Sb

Q=2905.4



¹²⁴₅₂Te

stable



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{124}Sb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

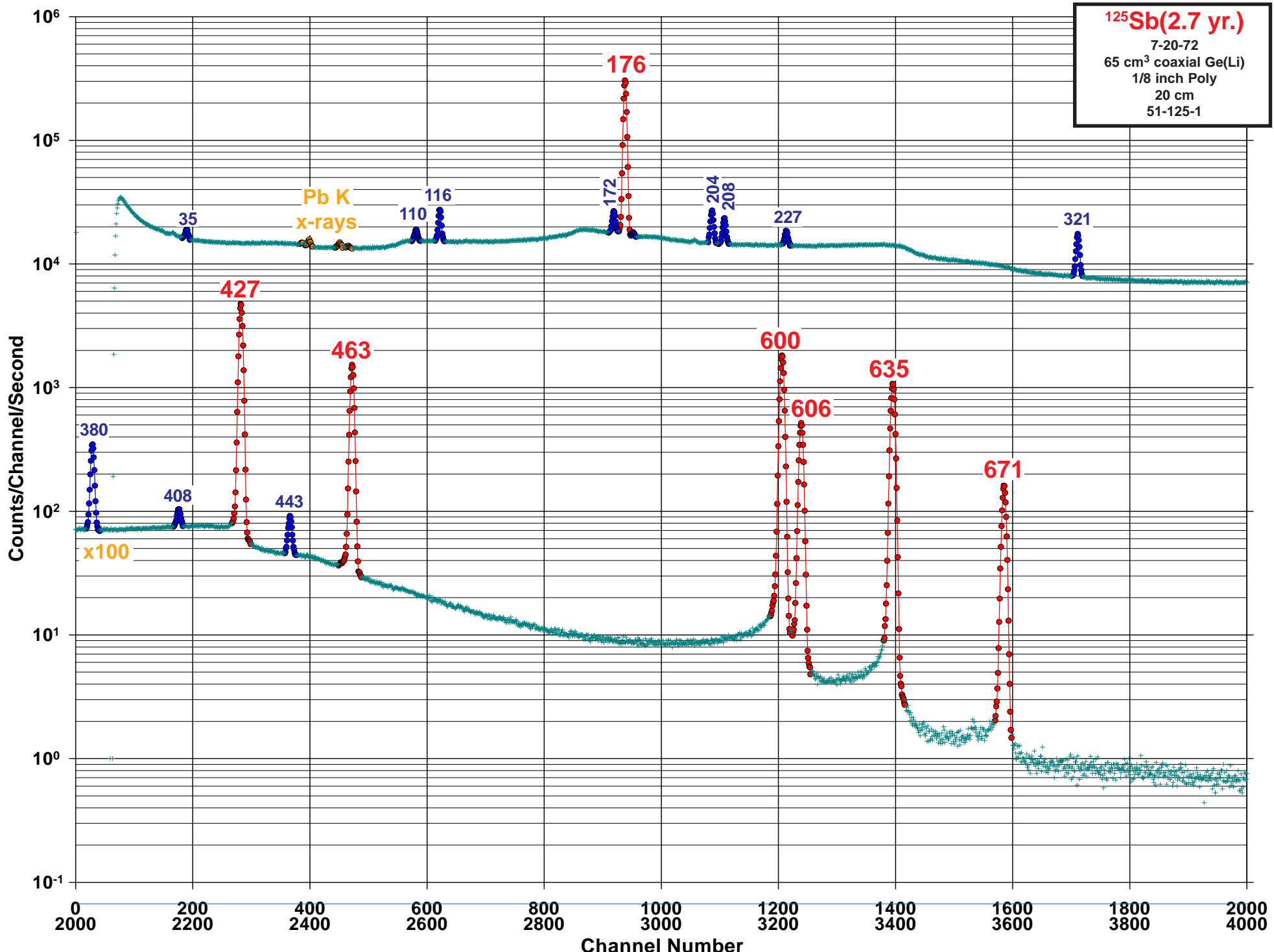
Half Life: 60.20(3) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{123}\text{Sb}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	148.21	0.10		0.0039	0.0008	4
	189.61	0.19		0.0064	0.0011	4
	210.31	0.19		0.0055	0.0009	4
	254.39	0.09		0.0162	0.0010	4
	291.4	0.3		0.0087	0.0008	4
	335.80	0.09	0.078	0.075	0.003	4
	346.1	0.3		0.0063	0.0017	4
	370.42	0.10		0.038	0.005	4
	400.01	0.06	0.099	0.140	0.007	4
	443.96	0.05	0.5	0.1898	0.0020	4
	468.61	0.10		0.0501	0.0029	4
	481.1	0.4		0.0238	0.0019	4
Ann.	511.006					
	525.41	0.05	0.41	0.138	0.004	4
	530.3	0.4		0.0424	0.0020	4
	571.6	0.4		0.0191	0.0013	4
	602.727	0.002	100.	98.3	0.3	1
	632.39	0.05		0.1051	0.0010	4
	645.854	0.001	7.53	7.456	0.029	1
	662.49	0.10		0.030	0.004	4
	709.320	0.013	1.35	1.360	0.012	2
	713.781	0.005	2.31	2.286	0.018	2
	722.784	0.002	10.89	10.81	0.05	1
D	735.74	0.03	0.14	0.056	0.006	4
	735.74	0.03		0.072	0.007	
	765.8	0.3		0.0122	0.0002	4
	775.2	0.5		0.0094	0.0017	4
	790.711	0.005	0.77	0.743	0.005	3
	816.8	0.3	0.11	0.0732	0.0018	4
	856.9	0.3		0.0239	0.0010	4
	899.6	0.3		0.0173	0.0014	4
	968.199	0.003	1.95	1.892	0.010	3
	976.23	0.11	0.09	0.0836	0.0016	4
	1045.128	0.003	1.94	1.841	0.012	3
	1053.8	0.3		0.0049	0.0020	4
	1086.32	0.19		0.0380	0.0018	4

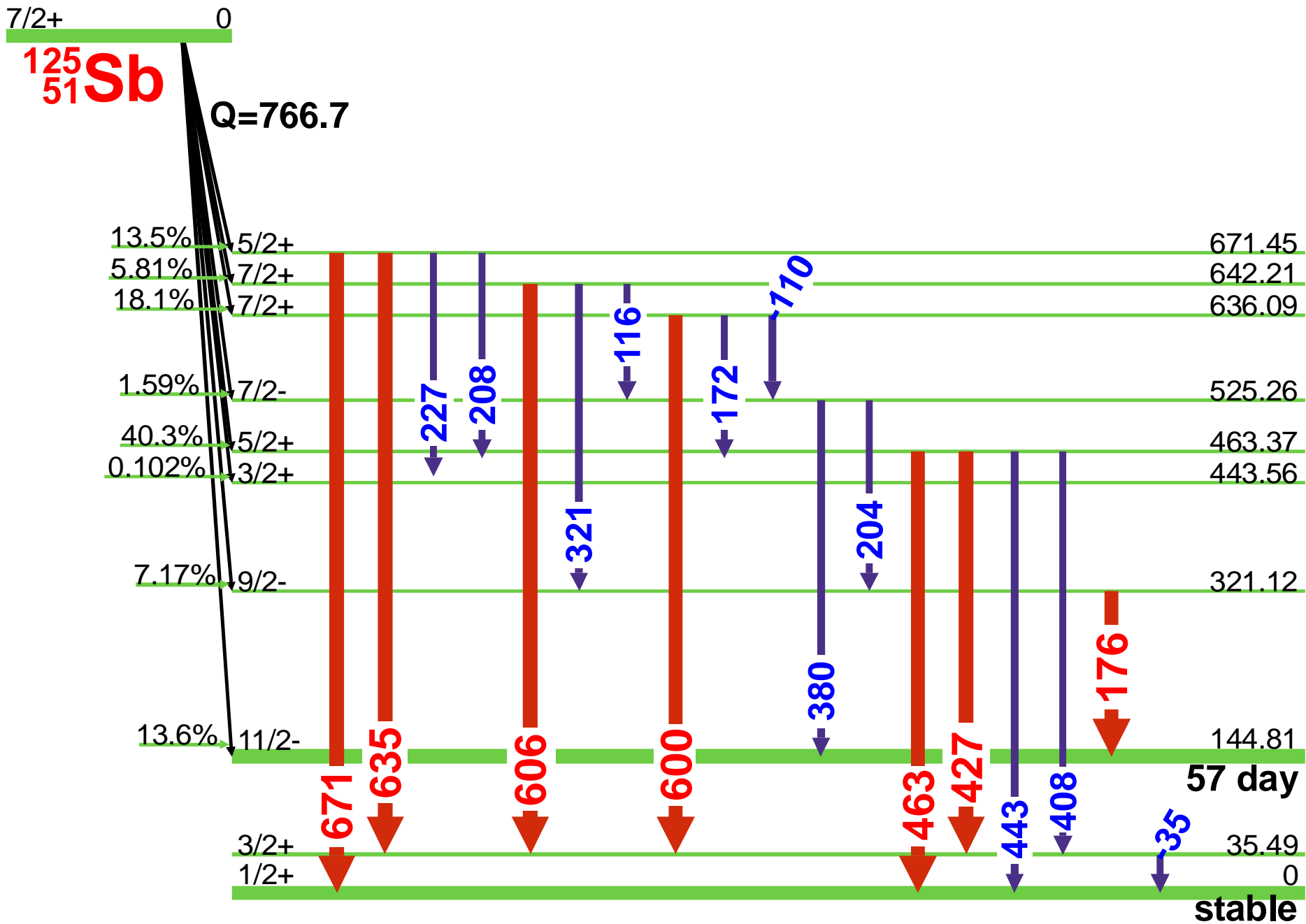
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1263.13	0.19		0.0415	0.0018	4
	1301.3	0.3		0.0345	0.0010	4
	1325.508	0.003	1.66	1.588	0.015	3
	1355.175	0.022	1.09	1.042	0.013	4
	1368.160	0.004	2.61	2.623	0.018	3
	1376.11	0.05	0.50	0.485	0.005	4
	1385.19	0.19		0.063	0.003	4
	1436.561	0.006	1.26	1.222	0.008	3
	1445.06	0.04	0.31	0.331	0.004	4
	1488.888	0.024	0.91	0.675	0.006	4
	1526.18	0.05	0.53	0.411	0.005	4
	1565.8	0.6		0.0138	0.0029	4
	1579.78	0.05	0.59	0.38	0.05	3
	1622.4	0.4		0.0411	0.0010	4
	1657.	0.				4
	1690.975	0.004	49.15	47.79	0.18	1
	1720.30	0.15	0.10	0.0955	0.0017	4
	1757.9	0.6		0.0048	0.0023	4
	1851.51	0.19		0.0065	0.0013	4
	1918.82	0.20		0.0547	0.0016	4
	2015.7	0.5		0.0117	0.0006	4
	2039.30	0.03	0.07	0.0645	0.0019	3
	2078.6	0.3		0.021	0.004	4
	2090.936	0.005	5.70	5.51	0.03	1
	2099.10	0.10	0.05	0.0459	0.0009	4
	2108.08	0.08	0.05	0.0435	0.0013	4
	2172.1	0.5		0.0021	0.0004	4
	2182.61	0.09	0.05	0.0426	0.0010	3
	2283.30	0.10		0.0081	0.0012	4
	2293.71	0.04	0.17	0.0321	0.0010	2
	2323.1	0.3		0.0024	0.0002	4
	2454.4	0.4		0.0015	0.0004	4
	2682.0	0.4		0.0017	0.0002	4
	2693.68	0.06		0.0030	0.0005	4
	2808.0	0.6		0.0015	0.0002	4





2.7 yr.

^{125}Sb (2.7 yr.) Decay Scheme



^{125}Te



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{125}Sb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

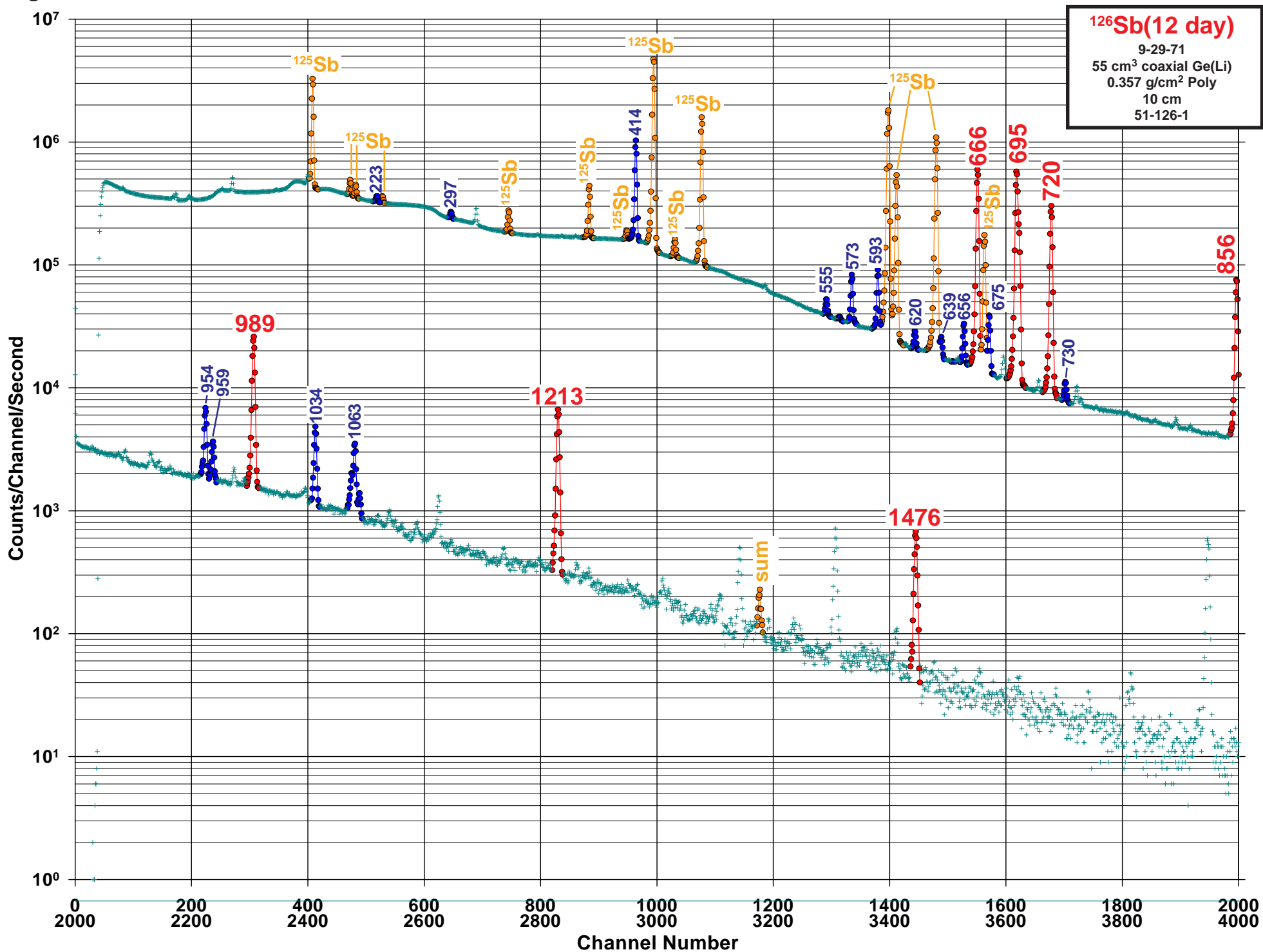
Half Life: 2.7582(11) yr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{124}\text{Sn}(n,\gamma)\beta$

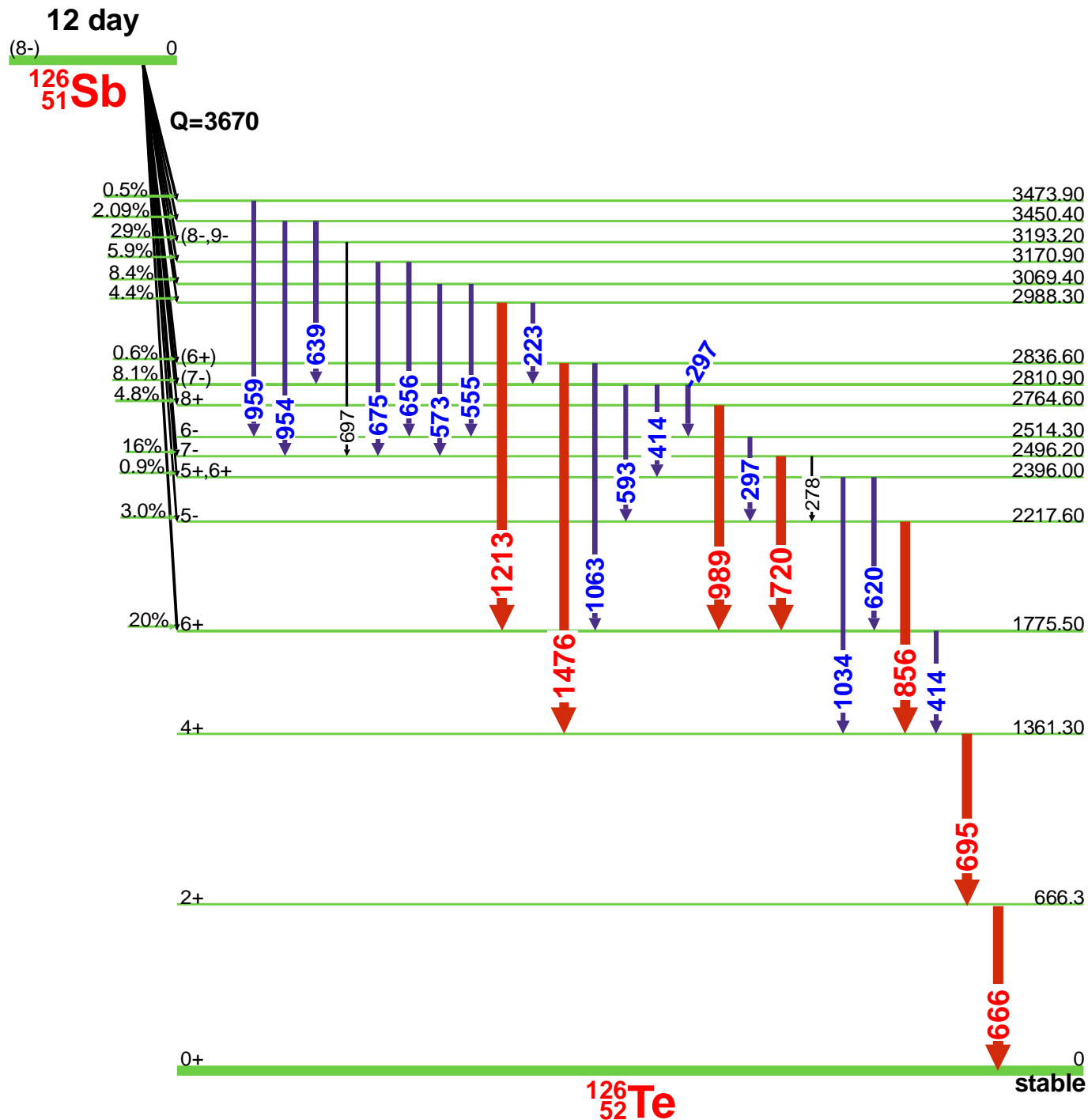
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
19.88	0.15		0.0201	0.0009	4
35.489	0.005		4.29	0.18	4
58.3			0.0269	0.0014	4
110.89	0.12	0.27	0.0011	0.0001	4
116.952	0.011	0.73	0.284	0.009	3
146.08	0.10		0.0006	0.0001	4
172.719	0.008	0.94	0.198	0.013	4
176.313	0.002	21.5	6.82	0.21	1
178.842	0.005		0.0287	0.0025	4
198.654	0.011		0.0136	0.0015	4
204.139	0.008	1.14	0.326	0.010	3
208.079	0.004	0.91	0.241	0.008	4
227.891	0.010	0.54	0.130	0.004	4
314.94	0.11		0.0039	0.0004	4
321.03	0.04	1.45	0.411	0.013	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
380.452	0.008	5.12	1.52	0.05	2
408.065	0.010	0.63	0.184	0.006	4
427.875	0.006	100.	29.6	0.9	1
443.554	0.009	1.20	0.302	0.010	3
463.365	0.004	35.4	10.5	0.3	1
491.28	0.00				4
497.36	0.12		0.009	0.004	4
600.600	0.004	59.5	17.9	0.5	1
606.718	0.003	17.0	5.03	0.15	1
635.954	0.005	38.1	11.3	0.4	1
642.1			0.047	0.003	4
671.445	0.004	6.26	1.79	0.06	1
693.			0.0001		4
729.8			0.0007	0.0002	4





¹²⁶Sb(12 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{126}Sb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.46(3) day

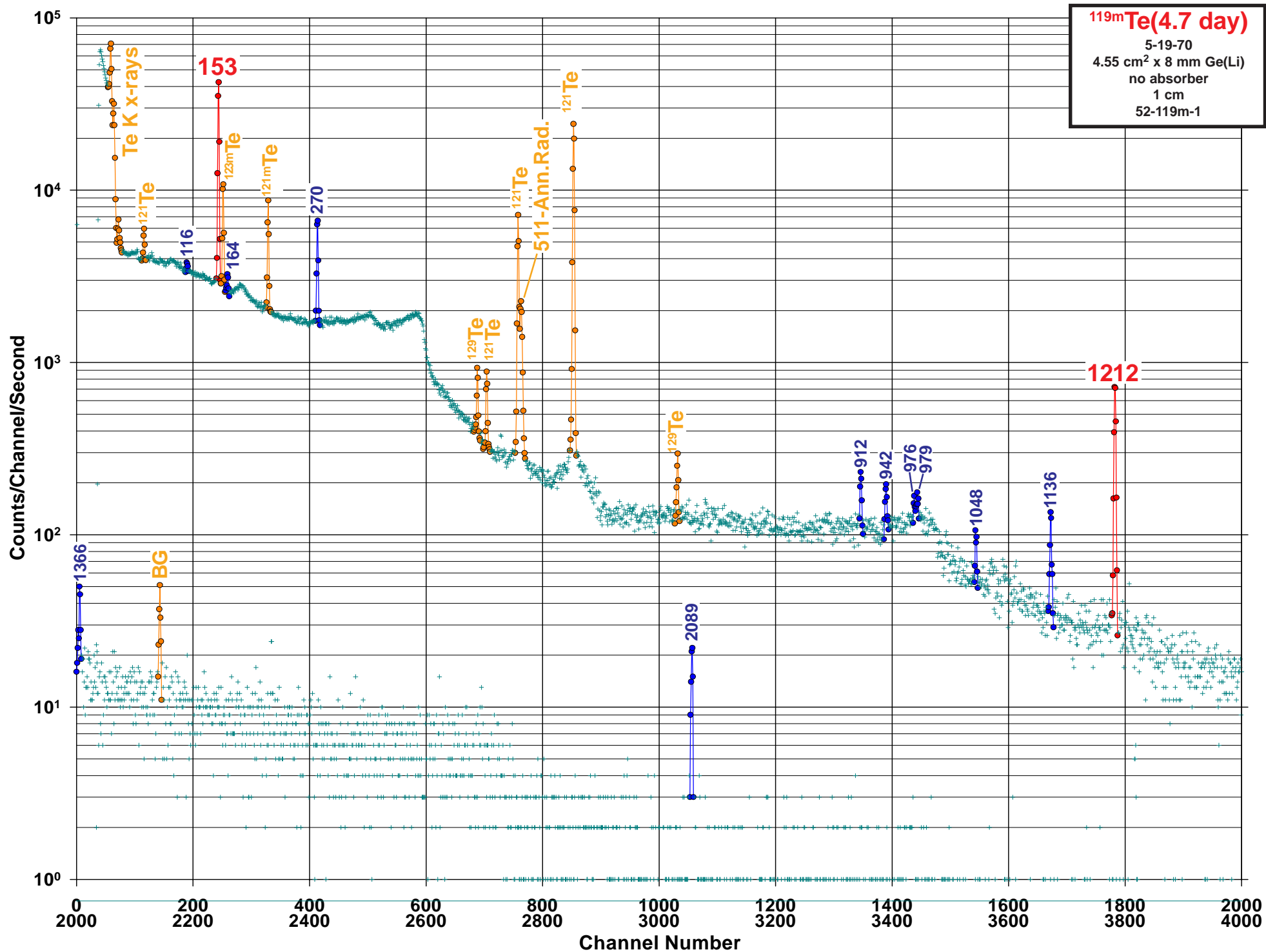
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: U(n,f)chem

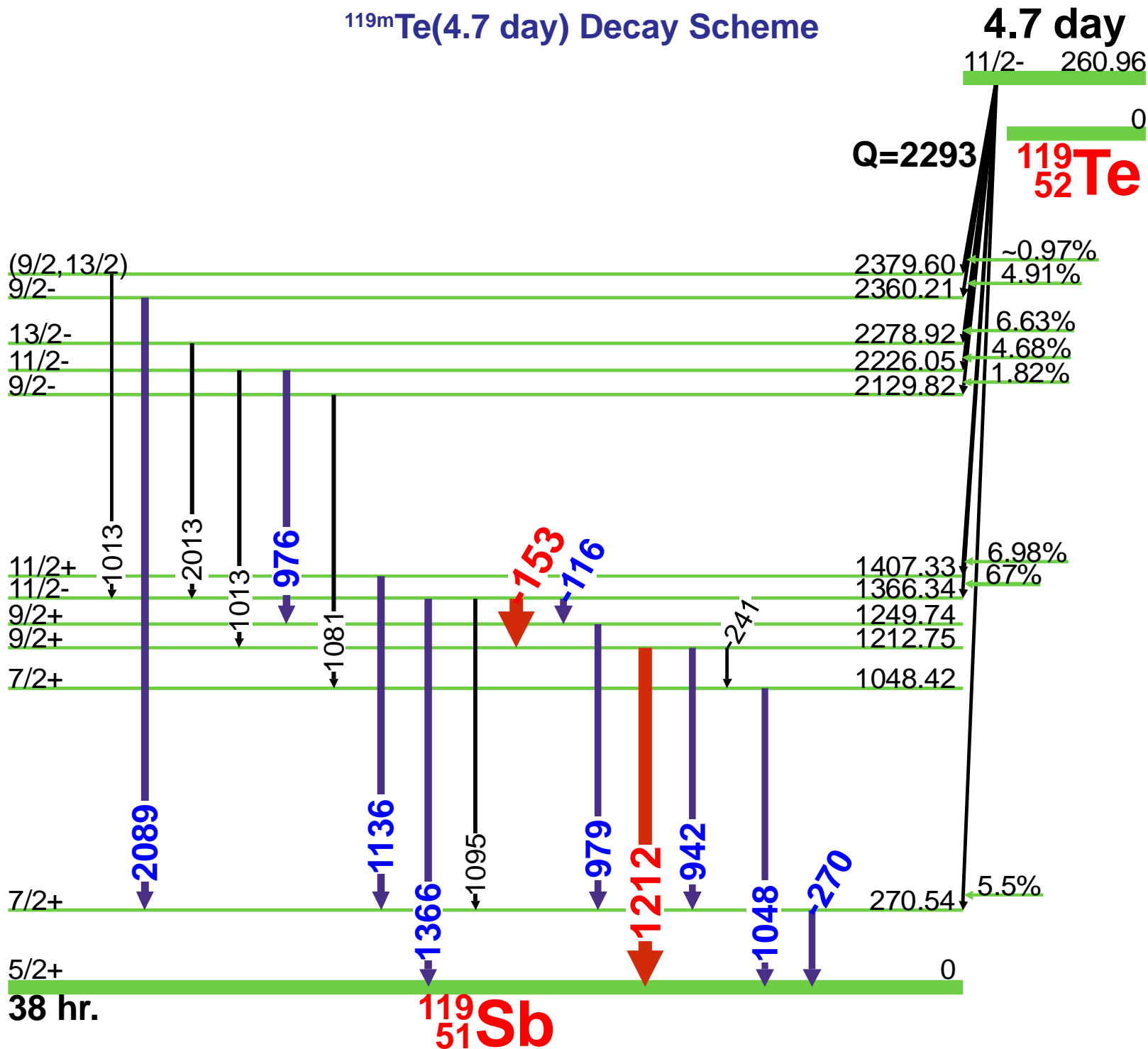
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	149.3	0.2		0.40	0.20	4
	208.6	0.8		0.50	0.20	4
	223.80	0.20	2.6	1.39	0.10	4
	278.60	0.20	3.0	2.4	0.6	4
D	297.30	0.20	7.0	0.50	0.20	4
	297.30	0.20		4.5	0.4	
	363.5	0.9		0.27	0.05	4
	386.3	0.9		0.20	0.05	4
D	414.80	0.20	81.0	83.3	2.1	2
	414.80	0.20		1.0	0.3	
	555.20	0.20	2.5	1.69	0.20	4
	573.80	0.20	7.8	6.7	0.3	3
	593.00	0.20	8.2	7.5	0.4	3
	605.40	0.20		1.3944	0.0014	4
	620.20	0.20	1.5	0.90	0.10	4
	639.70	0.20	1.9	0.90	0.10	4
	646.00	0.20		0.9960	0.0010	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	656.30	0.20	3.1	2.19	0.10	3
	666.30	0.20	100.	99.60	0.10	1
	675.00	0.20	5.1	3.7	1.0	3
	695.00	0.20	90.0	99.60	0.10	1
	697.00	0.20	35.0	29.	7.	2
	720.50	0.20	58.0	53.8	2.4	1
	730.90	0.20	0.40	0.5976	0.0006	4
	856.70	0.20	18.0	17.6	0.9	1
	954.00	0.20	1.4	1.20	0.10	3
	959.60	0.20	0.58	0.50	0.10	3
	989.30	0.20	7.8	6.8	0.3	1
	1034.80	0.20	1.3	1.00	0.05	2
	1063.90	0.20	1.0	0.9	0.6	3
	1213.00	0.20	2.6	2.39	0.20	1
	1476.20	0.20	0.37	0.28	0.03	1





^{119m}Te(4.7 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{119m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

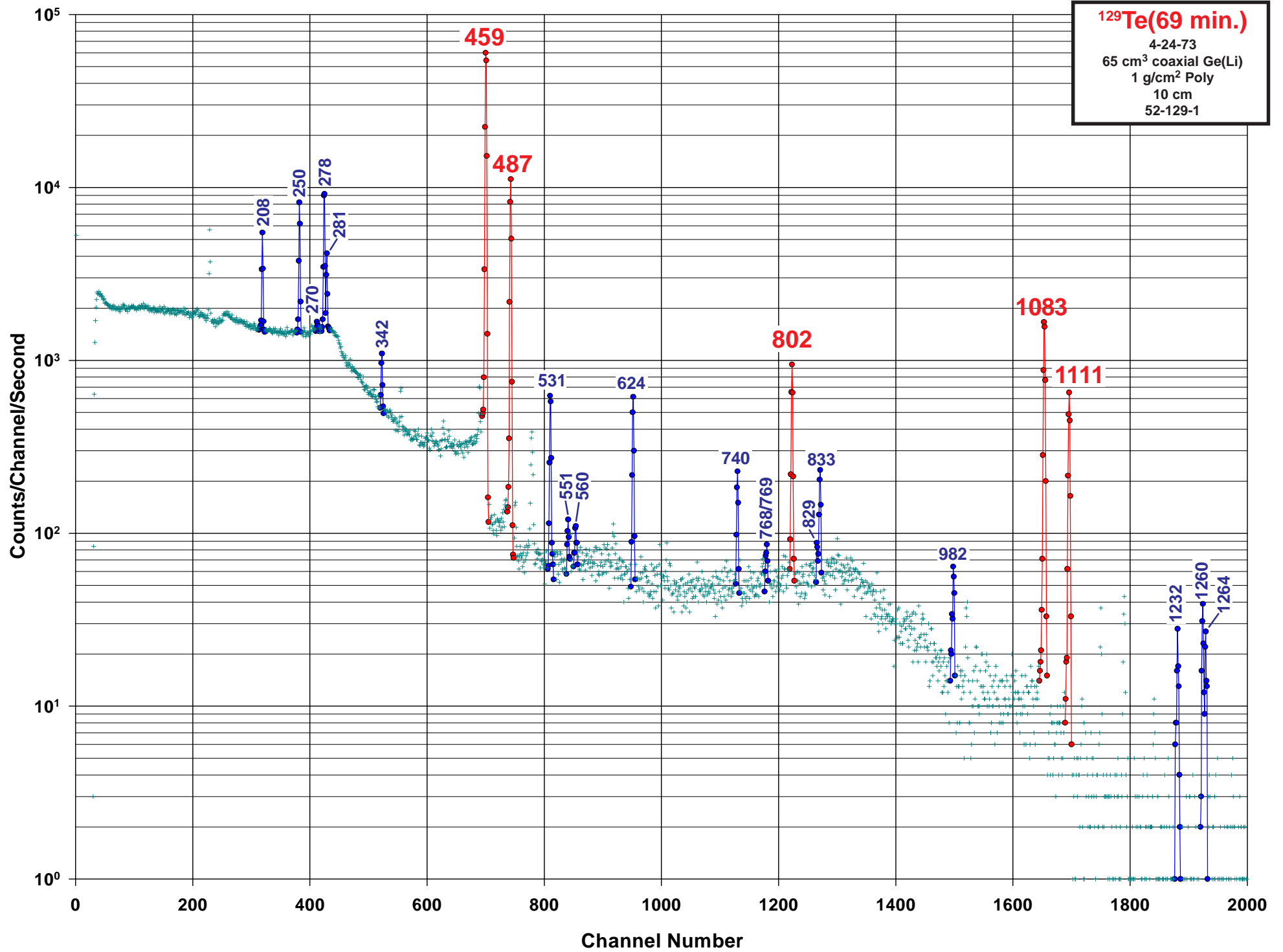
Half Life: 4.70(4) day

Detector: 4.55 cm² X 8 mm Ge (Li)Method of Production: $^{120}\text{Te}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	116.62	0.06	0.75	0.450	0.027	4
	153.59	0.03	100	66.2	2.7	1
	164.34	0.05	1.9	1.30	0.05	4
	184.11	0.20		0.026	0.013	4
	190.54	0.20		0.033	0.013	4
	201.17	0.20		0.013	0.007	4
	241.78	0.08		0.060	0.013	4
	270.53	0.04	41.0	28.0	0.4	3
	369.7	0.3		0.033	0.013	4
	395.42	0.06		0.331	0.026	4
Ann.	511.006			0.77	0.08	4
	700.33	0.08		0.46	0.05	4
	760.3	0.5		0.046	0.020	4
	777.91	0.19		0.07	0.04	4
	818.80	0.17		0.106	0.026	4
	859.68	0.09		0.159	0.020	4
	871.46	0.13		0.38	0.03	4
	912.60	0.05	8.9	6.25	0.08	4
	917.6	0.3		0.09	0.04	4
	942.21	0.06	7.1	5.09	0.06	4
	952.82	0.15		0.09	0.04	4
	970.91	0.15		0.23	0.03	4
	972.8			0.10	0.07	4
	976.37	0.07	3.7	2.71	0.07	4
	979.29	0.07	4.3	3.01	0.07	4

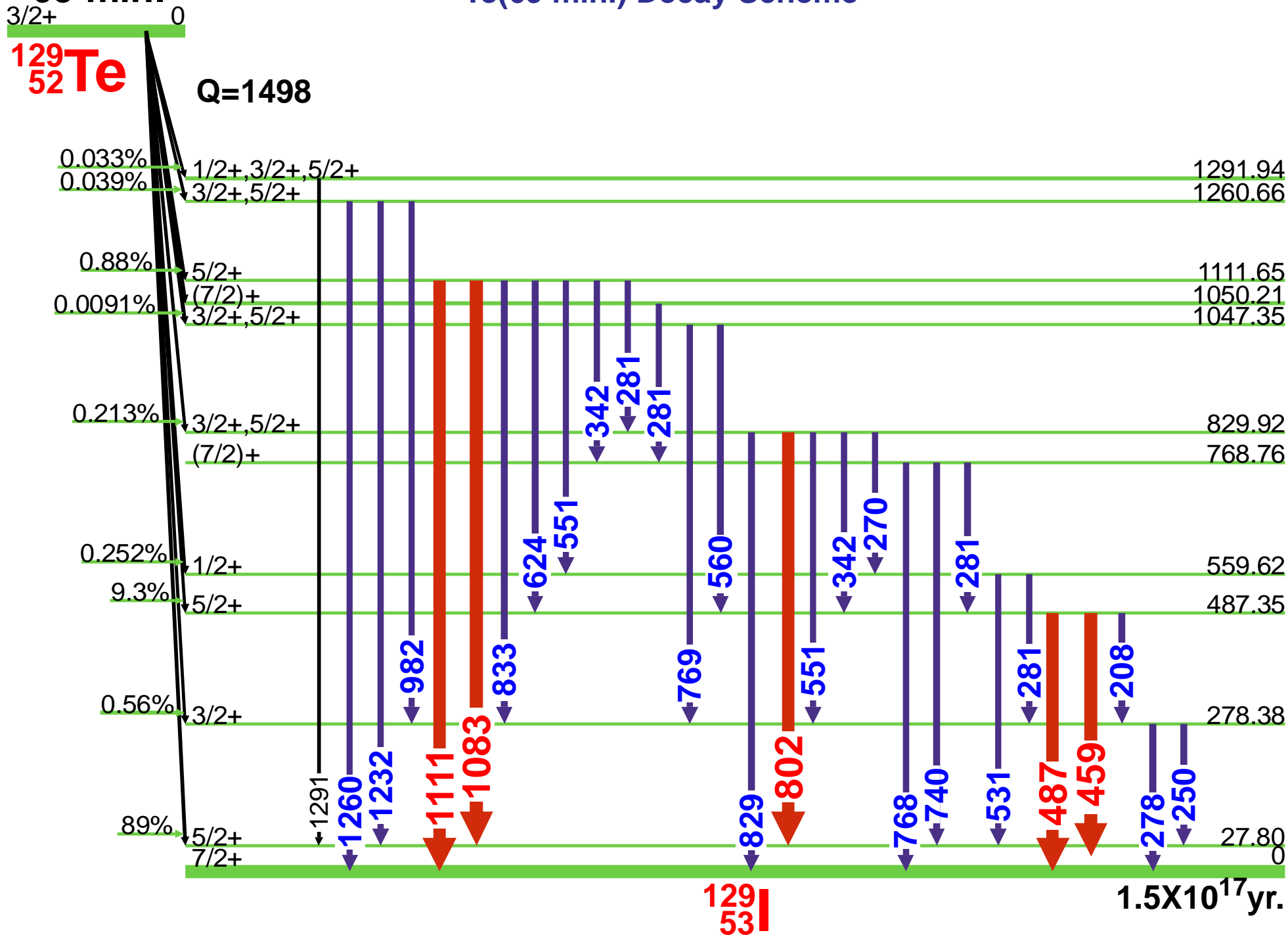
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	1013.20	0.08	4.4	2.50	0.05	4
	1013.20	0.08				
	1048.44	0.06	4.8	3.19	0.05	4
	1066.3	0.3	0.66	0.10	0.03	4
	1081.35	0.10	2.9	1.60	0.03	4
	1095.75	0.10	4.1	2.24	0.028	4
	1111.2	0.8		0.011	0.009	4
	1136.75	0.07	12.0	7.66	0.07	3
	1212.73	0.07	100	66.2	0.3	1
	1249.65	0.17		0.173	0.013	4
	1255.64	0.24		0.015	0.008	4
	1312.01	0.17		0.122	0.014	4
	1366.39	0.14	6.4	1.066	0.020	3
	1391.9			0.033	0.007	4
	1407.43	0.15		0.13	0.07	4
	1700.8			0.020	0.007	4
	1859.0	0.5		0.14	0.04	4
	1955.45	0.20		0.0265	0.0001	4
	2013.2	0.4		0.318	0.020	4
	2089.57	0.12	7.1	4.69	0.06	2
	2126.3	0.4		0.026	0.013	4
	2225.6	0.4		0.0265	0.0001	4
	2242.			0.007	0.007	4
	2360.40	0.20		0.0662	0.0003	4





69 min.

¹²⁹Te(69 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{129}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

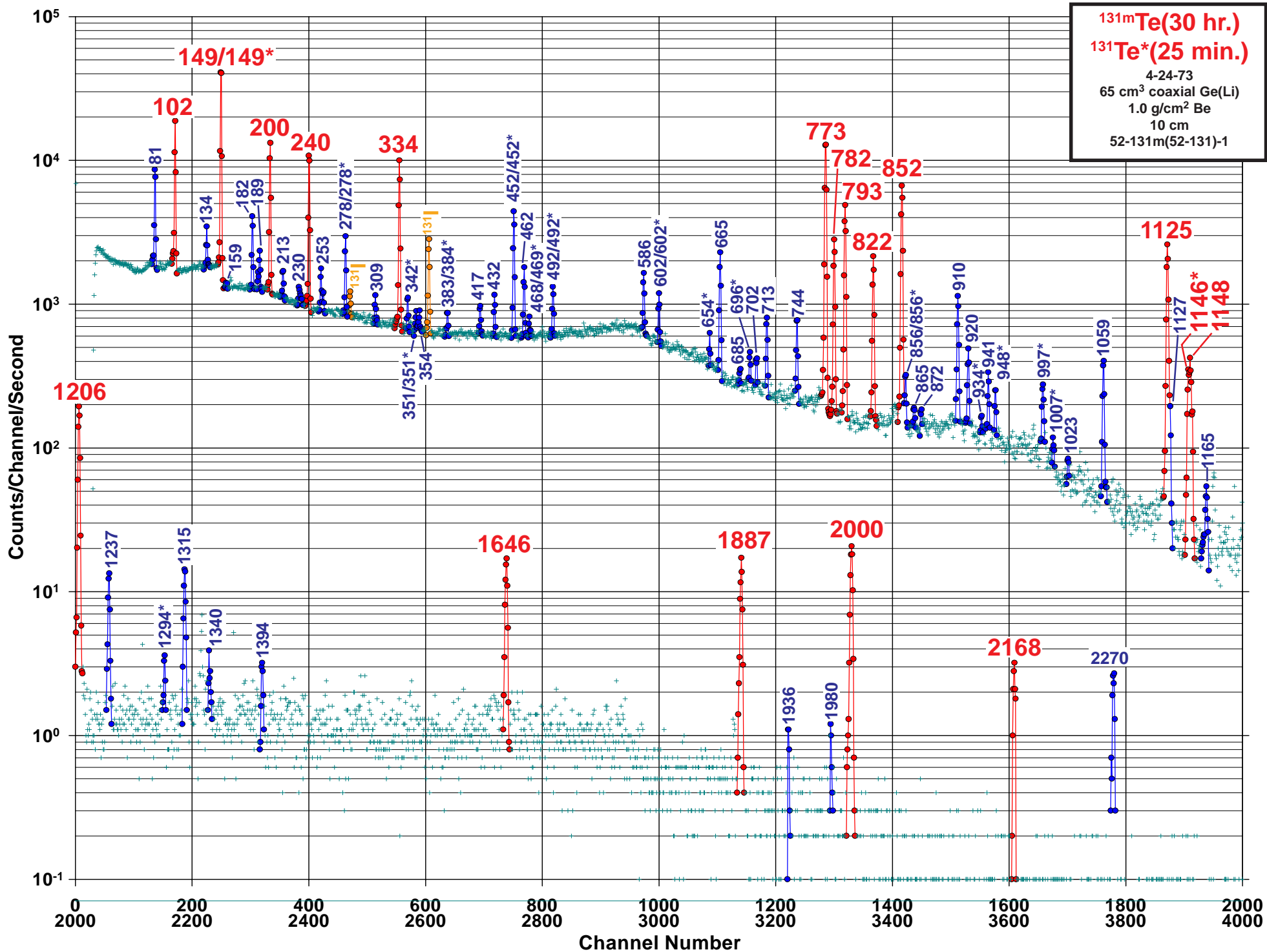
Half Life: 69.6(3) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{128}\text{Te}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	27.81	0.05		16.3	1.9	4
	208.96	0.05	2.42	0.180	0.013	3
	210.66	0.19		0.0013	0.0007	4
	242.20	0.10				4
	250.62	0.05	5.19	0.383	0.027	2
	270.37	0.06		0.0046	0.0004	4
	278.43	0.05	7.68	0.57	0.04	2
	281.26	0.05		0.165	0.012	
D	281.38	0.20	2.30	0.0002		3
	281.70	0.10		0.0015	0.0003	
D	342.54	0.05	0.81	0.0085	0.0009	3
	342.88	0.05		0.049	0.003	
	382.08	0.14		0.0006	0.0002	4
	415.88	0.14		0.0006	0.0002	4
	459.60	0.05	100.	7.7	0.6	1
	462.04	0.20		0.0002		4
	487.39	0.05	18.57	1.42	0.10	1
	491.93	0.14		0.0012	0.0002	4
	531.83	0.05	1.14	0.088	0.006	2
D	551.50	0.05	0.12	0.0035	0.0004	4
	551.98	0.05		0.0014	0.0002	
	560.05	0.06	0.12	0.0061	0.0006	4
	624.34	0.05	1.32	0.097	0.007	2
D	701.10	0.16		0.0013	0.0003	4
	701.76	0.05				
	722.50	0.20		0.0002		4

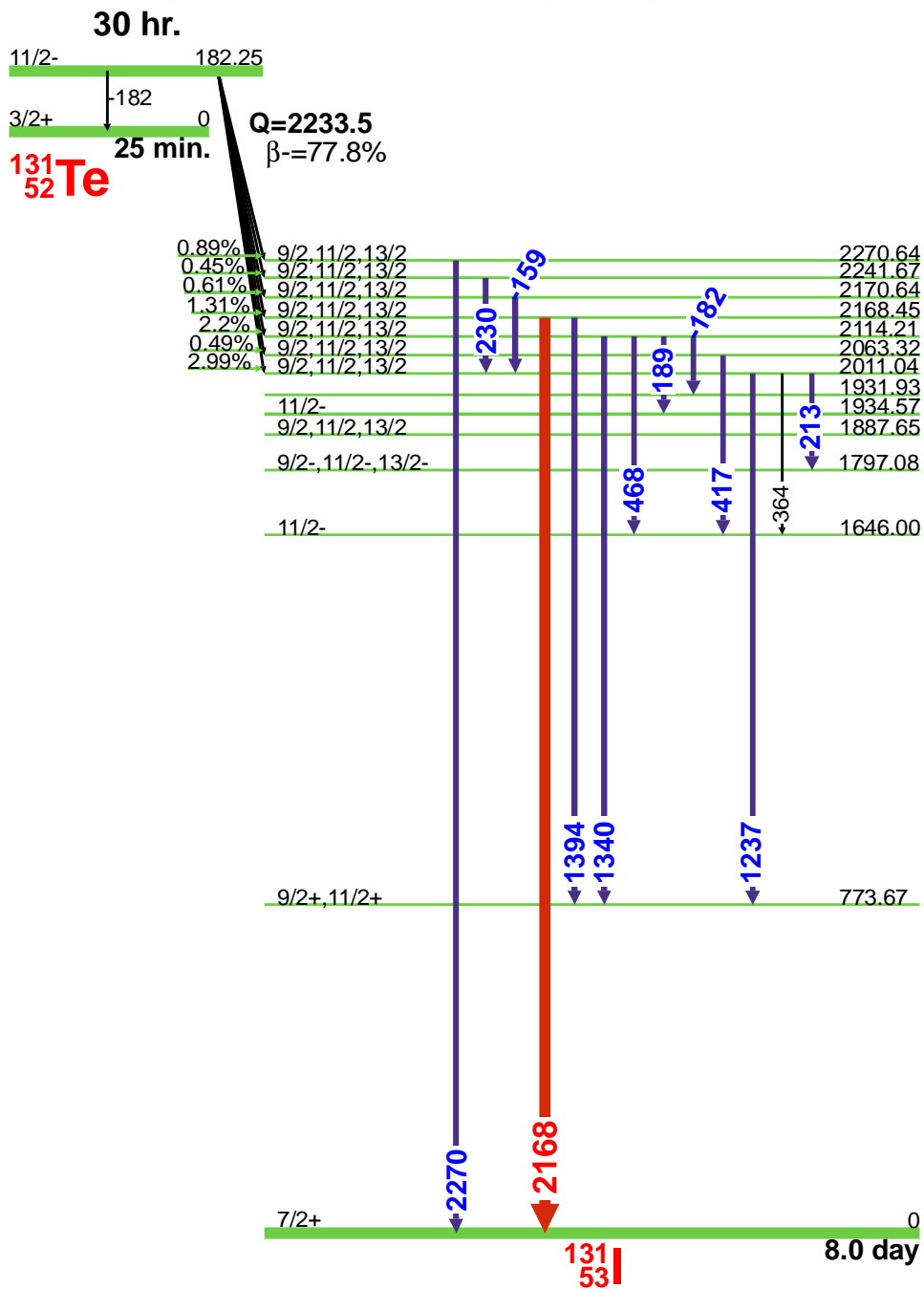
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	729.57	0.05		0.0012	0.0003	4
	732.62	0.16		0.0013	0.0002	4
	740.96	0.05	0.54	0.0374	0.0028	3
D	768.77	0.05	0.075	0.0042	0.0005	4
	769.01	0.05		0.0007	0.0001	
	773.54	0.17		0.0002	0.0002	4
	802.10	0.05	2.75	0.192	0.014	1
	804.60	0.13		0.0216	0.0027	4
	817.00	0.20		0.0001		4
	829.93	0.05	0.08	0.0064	0.0005	4
	833.28	0.05	0.63	0.045	0.003	3
	918.29	0.15		0.0006	0.0002	4
	931.57	0.25		0.0002	0.0001	4
	982.27	0.05	0.24	0.0160	0.0012	3
	1013.57	0.08		0.0013	0.0003	4
	1019.43	0.06		0.0022	0.0006	4
	1022.43	0.05		0.0007	0.0001	4
	1050.21	0.05		0.0007	0.0001	4
	1083.85	0.05	7.96	0.49	0.04	1
	1111.64	0.05	3.16	0.191	0.015	1
	1168.80	0.20				4
	1181.96	0.11		0.0001		4
	1232.82	0.05	0.14	0.0075	0.0006	3
	1260.63	0.05	0.205	0.0112	0.0009	2
	1264.16	0.05	0.150	0.0082	0.0006	2
	1291.50	0.13		0.0003		4





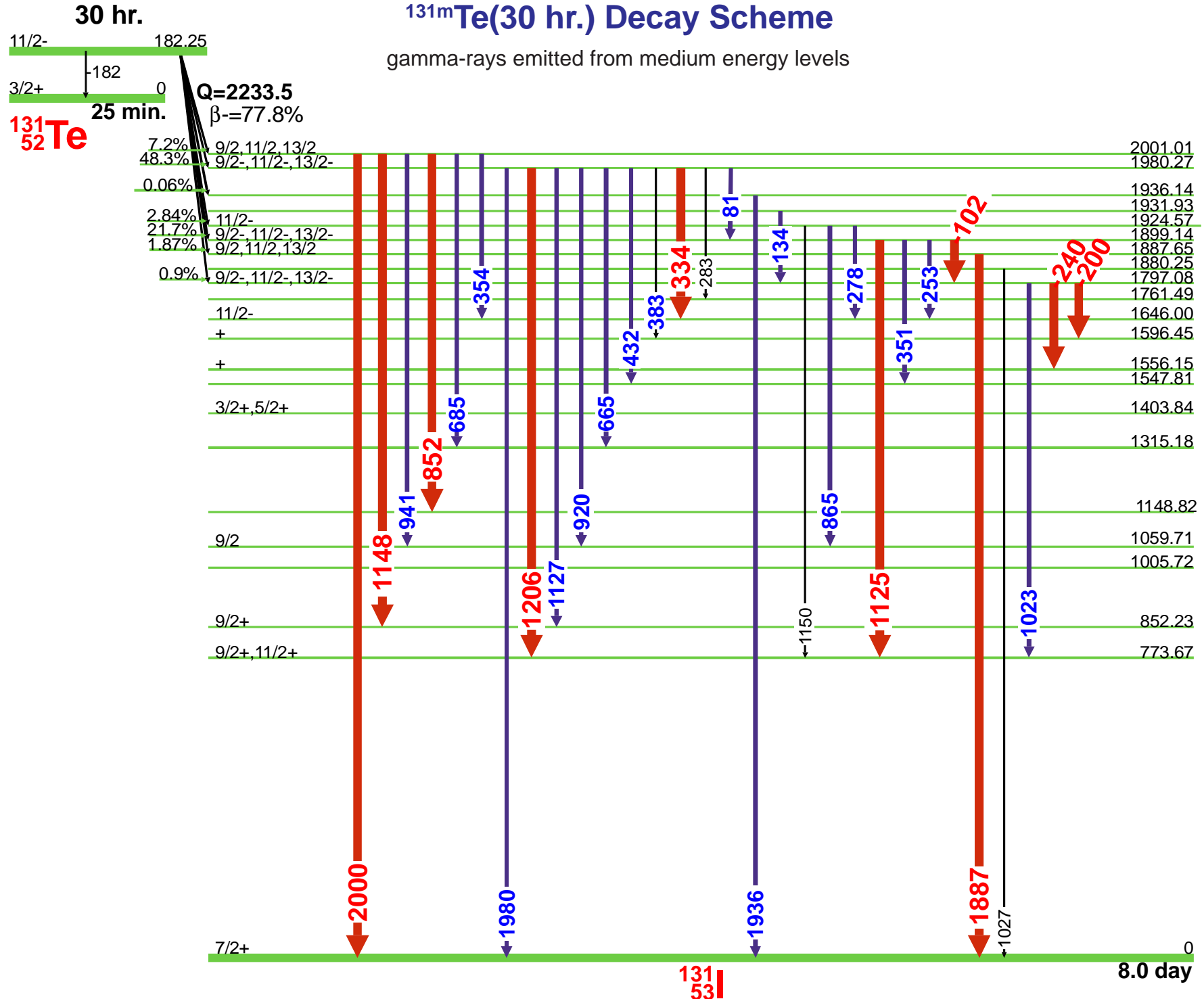
^{131m}Te(30 hr.) Decay Scheme

gamma-rays emitted from high energy levels



^{131m}Te(30 hr.) Decay Scheme

gamma-rays emitted from medium energy levels



30 hr.

^{131m}Te(30 hr.) Decay Scheme

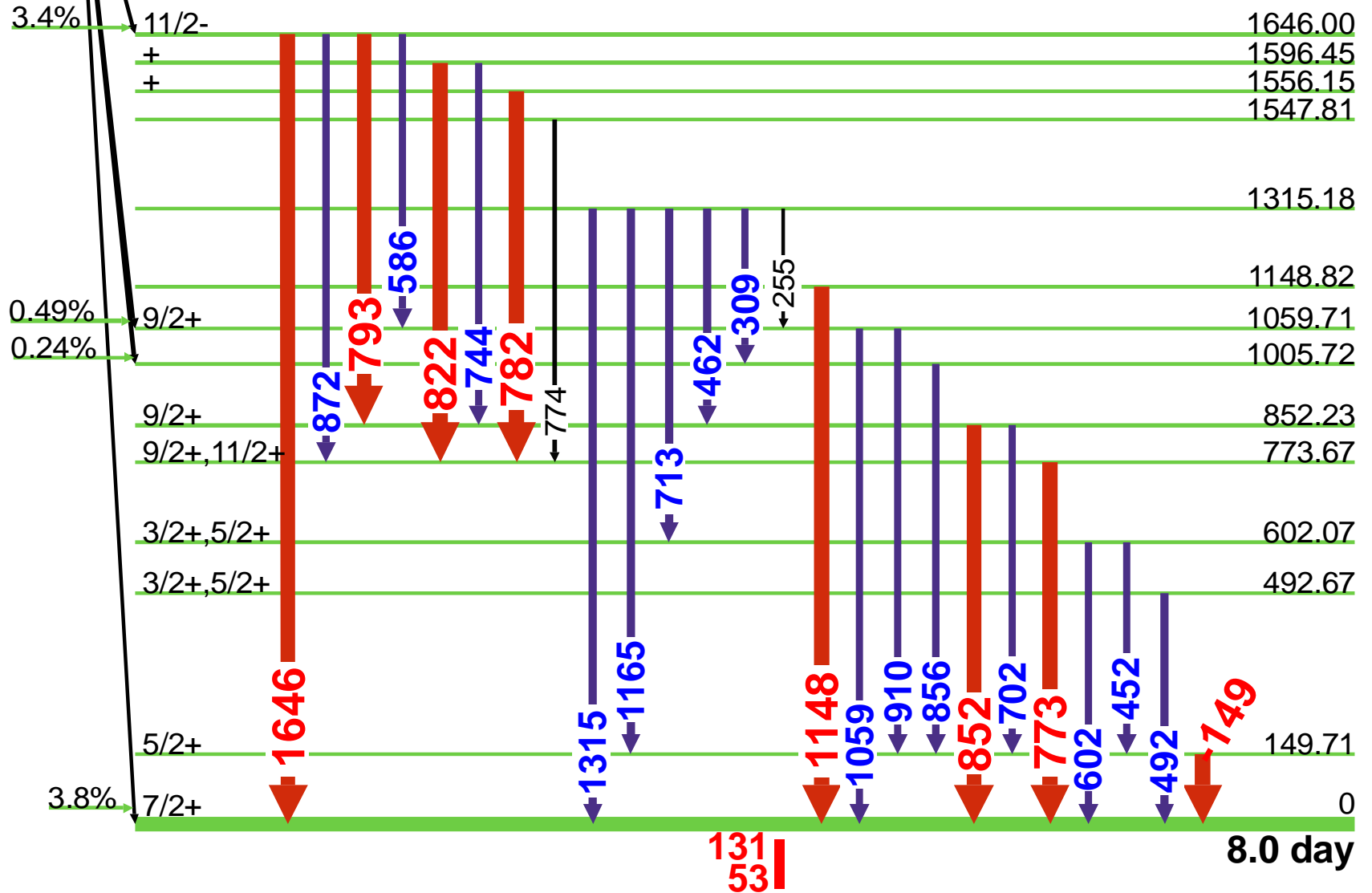
gamma-rays emitted from low energy levels

11/2- 182.25

3/2+ 0
182
25 min.

Q=2233.5
β⁻=77.8%

¹³¹₅₂Te



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{131m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 30(2) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{130}\text{Te}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
36.83	0.03		0.0157	0.0020	4
51.00	0.05		0.0081	0.0020	4
52.59	0.06		0.0071	0.0020	4
54.10	0.10		0.0015	0.0010	4
55.80	0.10		0.0036	0.0015	4
60.84	0.07		0.0076	0.0020	4
62.380	0.020		0.048	0.003	4
63.20	0.10		0.0056	0.0020	4
65.05	0.08		0.0107	0.0025	4
66.95	0.05		0.030	0.005	4
73.32	0.05		0.035	0.004	4
78.57	0.08		0.020	0.004	4
79.19	0.03		0.167	0.006	4
81.140	0.020	10.35	5.33	0.13	2
86.430	0.020		0.193	0.006	4
95.00	0.12		0.0051	0.0025	4
96.40	0.20		0.008	0.003	4
98.30	0.10		0.018	0.004	4
100.00	0.10		0.096	0.005	4
101.6	0.3		0.223	0.021	4
102.060	0.010	18.56	10.40	0.26	1
103.3	0.3		0.061	0.010	4
105.00	0.20		0.036	0.005	4
109.40	0.20		0.046	0.010	4
111.90	0.20		0.041	0.010	4
113.50	0.10		0.015	0.005	4
123.7	0.5		0.0051	0.0025	4
125.2	0.3		0.011	0.004	4
126.1	0.3		0.008	0.004	4
127.4	0.4		0.030	0.010	4
130.50	0.10		0.091	0.010	4
132.20	0.10		0.006	0.004	4
134.860	0.020	1.87	0.93	0.03	4
137.60	0.20		0.10	0.05	4
149.3	0.3		0.102	0.025	4
149.710	0.010	53.18	6.6	0.9	1

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
151.20	0.20		0.10	0.04	4
155.90	0.20		0.05	0.03	4
159.66	0.04	0.33	0.167	0.020	4
169.70	0.20		0.041	0.010	4
172.00	0.20		0.015	0.005	4
177.20	0.20		0.086	0.015	4
182.250	0.020	3.93	0.96	0.25	3
183.11	0.08		0.203	0.026	4
188.13	0.05		0.279	0.016	4
189.76	0.04	1.58	0.66	0.05	4
190.52	0.06		0.152	0.020	4
200.630	0.020	18.26	9.89	0.21	1
203.4	0.4		0.025	0.010	4
207.50	0.10		0.051	0.015	4
210.3	0.3		0.020	0.005	4
211.9	0.4		0.015	0.005	4
213.98	0.03	1.38	0.558	0.027	4
227.7	0.4		0.020	0.015	4
230.65	0.05	0.68	0.254	0.016	4
232.30	0.10		0.122	0.015	4
235.00	0.20		0.020	0.015	4
240.930	0.010	19.25	9.94	0.18	1
253.170	0.020	1.70	0.852	0.020	4
255.44	0.07	0.80	0.406	0.016	4
261.40	0.20		0.020	0.005	4
267.2	0.3		0.020	0.015	4
269.2	0.3		0.1420	0.0021	4
269.2	0.3		0.1420	0.0021	4
278.560	0.020	4.58	2.33	0.06	3
281.4	0.3		0.046	0.025	4
283.20	0.20		0.51	0.05	4
290.30	0.20		0.102	0.015	4
296.8	0.3		0.066	0.010	4
302.70	0.20		0.051	0.015	4
303.90	0.20		0.051	0.010	4
309.47	0.06	1.12	0.49	0.05	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{131m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 30(2) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{130}\text{Te}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
323.7	0.4		0.020	0.010	4
331.2	0.6		0.041	0.015	4
334.270	0.010	24.75	12.53	0.24	1
335.44	0.07		0.18	0.03	4
342.92	0.05		0.0	2.0	4
342.92	0.05		0.51	0.15	4
345.9	0.3		0.13	0.04	4
351.30	0.10	0.70	0.274	0.026	4
353.5	0.3		0.10	0.05	4
354.70	0.10	0.85	0.299	0.016	4
357.4	0.3		0.025	0.010	4
362.3	0.4		0.10	0.05	4
364.98	0.10		1.57	0.20	4
375.8	0.3		0.015	0.005	4
377.8	0.3		0.0507	0.0008	4
377.8	0.3		0.0507	0.0008	4
379.3	0.3		0.025	0.010	4
383.90	0.07		0.26	0.04	4
403.3	0.4		0.041	0.015	4
408.2	0.3		0.08	0.04	4
417.40	0.20	1.42	0.365	0.026	4
432.40	0.07	1.92	0.87	0.04	3
452.30	0.04	(14.80)	2.0	0.5	2
462.92	0.05	4.87	2.38	0.06	3
468.16	0.09	0.74	0.41	0.04	4
492.65	0.05	(3.23)	0.10	0.20	3
506.80	0.20		0.117	0.020	4
524.80	0.10		0.178	0.020	4
530.70	0.10		0.137	0.025	4
541.40	0.10		0.15	0.03	4
546.70	0.20		0.051	0.010	4
558.10	0.20		0.030	0.010	4
572.70	0.20		0.06	0.03	4
579.8	0.3		0.10	0.03	4
586.30	0.03	6.29	2.59	0.11	3
597.00	0.20		0.066	0.025	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
602.09	0.04	4.11	0.41	0.15	3
609.40	0.10		0.183	0.020	4
637.3			0.0406	0.0006	4
657.20	0.20		0.041	0.020	4
665.05	0.03	12.01	5.68	0.13	2
681.9	0.3		0.041	0.010	4
685.90	0.10	0.72	0.203	0.016	4
695.62	0.08		0.52	0.04	4
702.50	0.07	1.41	0.512	0.026	4
713.10	0.04	4.10	1.88	0.20	3
738.80	0.20		0.086	0.015	4
744.20	0.04	4.39	2.08	0.06	3
749.0	0.8		0.020	0.010	4
773.67	0.03	100	50.0	0.9	1
774.10	0.10		0.71	0.10	
782.49	0.04	20.0	10.20	0.22	1
793.75	0.03	35.92	18.2	0.4	1
801.60	0.20		0.025	0.010	4
822.78	0.04	16.25	8.02	0.16	1
844.90	0.20		0.20	0.05	4
848.90	0.20		0.051	0.015	4
852.21	0.03	54.95	0.51	0.25	1
852.21	0.03		27.0	0.7	
856.05	0.06	1.50	0.81	0.05	3
865.10	0.20	0.52	0.25	0.05	4
872.3	0.3	0.34	0.132	0.015	4
881.6	0.3		0.046	0.015	4
910.00	0.03	9.44	4.31	0.12	2
920.62	0.05	3.83	1.57	0.10	3
923.40	0.20		0.15	0.03	4
930.0	0.4		0.025	0.015	4
941.27	0.05	2.48	1.02	0.04	3
987.80	0.10		0.203	0.016	4
995.1	0.3		0.117	0.020	4
999.20	0.10		0.223	0.026	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{131m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 30(2) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{130}\text{Te}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1003.60	0.20		0.036	0.020	4
1005.70	0.20		0.096	0.020	4
1023.60	0.20	0.54	0.081	0.010	4
1027.8	0.4		0.010	0.005	4
1035.40	0.20		0.137	0.010	4
1059.69	0.04	4.29	2.03	0.06	3
1072.30	0.20		0.030	0.005	4
1108.3	0.3		0.030	0.010	4
1114.1	0.3		0.015	0.005	4
1125.46	0.04	31.08	15.0	0.4	1
1127.96	0.06	1.83	1.27	0.10	3
1134.2	0.4		0.010	0.005	4
1148.89	0.07	5.73	0.660	0.010	2
1148.89	0.07		2.0	0.4	
1150.90	0.09	0.69	0.86	0.10	3
1162.70	0.20		0.036	0.010	4
1165.50	0.10	0.62	0.183	0.016	3
1181.4	0.4		0.015	0.010	4
1206.60	0.04	26.23	12.78	0.28	1
1211.00	0.20		0.081	0.015	4
1227.8	0.5		0.0101	0.0002	4
1227.8	0.5		0.0101	0.0002	4
1237.32	0.05	1.78	0.86	0.04	2
1254.2	0.4		0.036	0.005	4

D

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1315.16	0.08	2.34	0.91	0.10	2
1316.20	0.20		0.13	0.05	4
1318.30	0.20		0.051	0.010	4
1333.8	0.3		0.071	0.010	4
1340.60	0.10	0.62	0.132	0.015	3
1376.8	0.4		0.056	0.010	4
1389.6	0.3		0.020	0.005	4
1394.83	0.09	0.36	0.142	0.010	4
1403.6	0.6		0.015	0.010	4
1496.5	0.4		0.076	0.010	4
1547.75	0.09		0.091	0.010	4
1646.01	0.05	3.53	1.62	0.06	1
1696.8	0.5		0.020	0.005	4
1830.6	0.4		0.010	0.005	4
1880.1	0.3		0.081	0.010	4
1887.70	0.07	3.93	1.78	0.06	1
1924.1	0.3		0.0051	0.0025	4
1936.15	0.09	0.20	0.096	0.010	4
1980.3	0.3	0.25	0.041	0.010	4
2000.94	0.06	5.89	2.64	0.06	1
2168.54	0.09	0.92	0.457	0.026	1
2270.65	0.09	0.86	0.502	0.026	2
2332.7	0.4		0.0036	0.0005	4



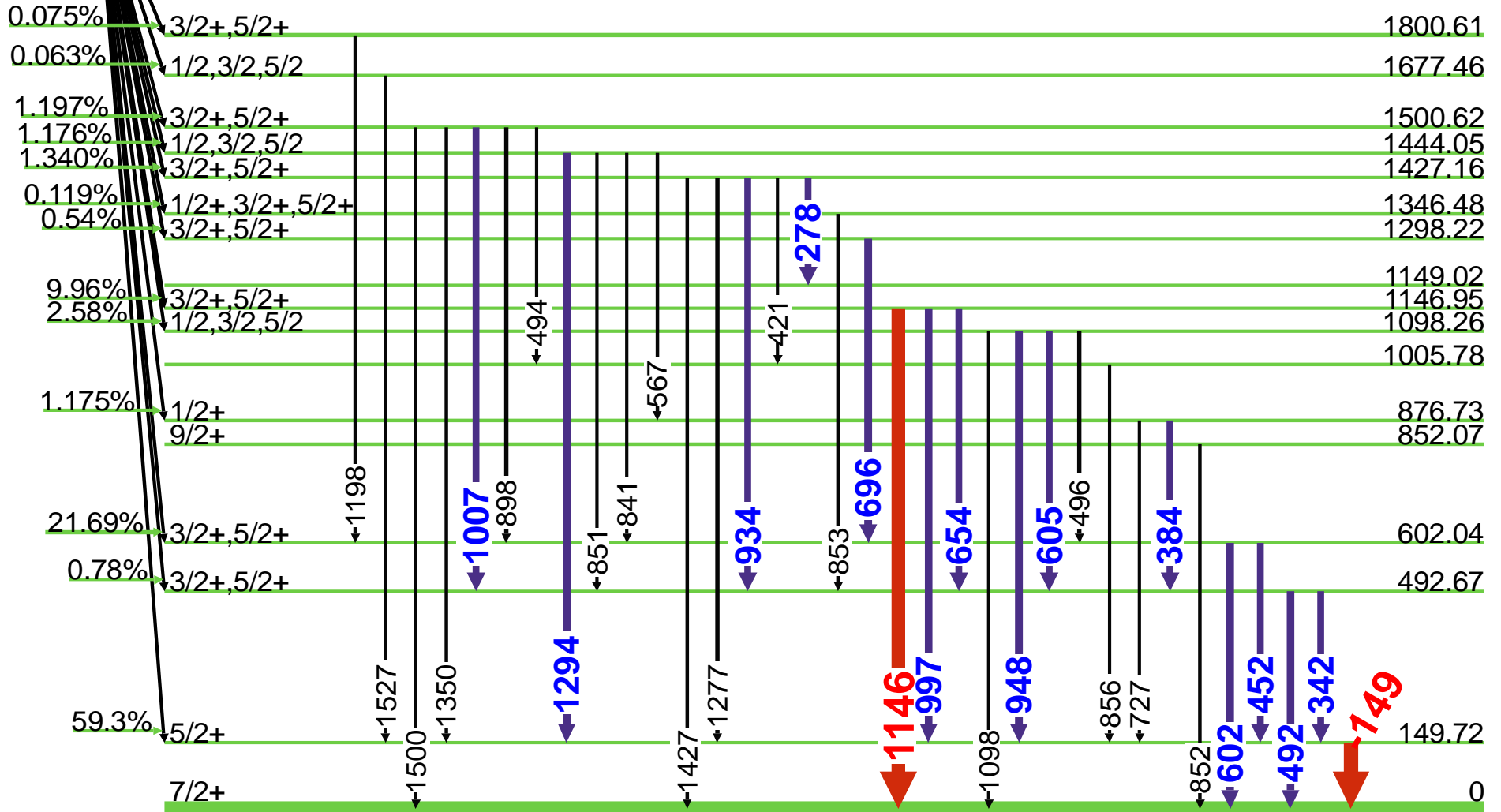
25 min.

¹³¹Te(25 min.) Decay Scheme

3/2+ 0

¹³¹₅₂Te

Q=2233.5



¹³¹₅₃I

8.0 day



¹GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)Nuclide: ¹³¹Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 25.0(1) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: ¹³⁰Te(n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
109.40	0.04		0.062	0.007	4
141.20	0.04		0.028	0.005	4
149.716	0.005	100	68.8	0.4	1
151.10	0.10		0.17	0.06	4
221.57	0.05		0.033	0.005	4
267.5	0.3		0.004	0.003	4
274.68	0.15		0.0069		4
278.170	0.020	0.29	0.098	0.005	4
280.17	0.12		0.017	0.005	4
294.75	0.15		0.0048		4
297.09	0.05		0.007	0.005	4
297.09	0.05		0.043	0.005	4
299.94	0.06		0.039	0.005	4
342.945	0.004	1.15	0.702	0.008	3
345.60	0.10		0.014	0.004	4
351.48	0.07		0.023	0.004	4
353.58	0.09		0.019	0.004	4
384.059	0.003	1.45	0.894	0.009	2
402.36	0.14		0.007	0.003	4
403.3	1.0		0.007	0.003	4
421.32	0.07	0.12	0.042	0.008	4
438.30	0.20		0.007	0.003	4
452.323	0.002	29.0	18.20	0.12	2
469.70	0.10		0.015	0.006	4
492.660	0.010	7.72	4.83	0.03	3
494.85	0.05	0.24	0.076	0.007	4
496.23	0.08		0.034	0.007	
544.880	0.010	0.68	0.427	0.014	4
550.40	0.10		0.028	0.007	4
567.33	0.04	0.18	0.102	0.006	4
574.90	0.10		0.031	0.005	4
602.039	0.003	6.81	4.19	0.03	3
605.550	0.020	0.22	0.117	0.007	4
654.260	0.010	2.43	1.527	0.016	4
696.190	0.020	0.37	0.179	0.014	3

D

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
702.7	0.3		0.008	0.006	4
727.000	0.020	0.82	0.468	0.007	4
744.4	0.3		0.008	0.004	4
805.57	0.20		0.014	0.006	4
825.00	0.20		0.028	0.007	4
841.990	0.020	0.31	0.200	0.007	4
852.21	0.06		0.044	0.005	4
853.83	0.05		0.096	0.005	4
856.08	0.03		0.131	0.007	4
881.15	0.09		0.026	0.004	4
898.54	0.03	0.26	0.138	0.007	4
934.483	0.005	1.54	0.874	0.015	4
948.542	0.004	3.86	2.26	0.03	3
951.390	0.020	0.59	0.330	0.007	4
997.250	0.010	5.68	3.337	0.024	2
999.26	0.15		0.028	0.007	4
1005.76	0.15		0.014	0.007	4
1007.960	0.010	1.49	0.798	0.008	3
1035.5	0.5		0.0028	0.0021	4
1066.8	0.3		0.006	0.003	4
1098.250	0.020	0.31	0.172	0.007	4
1146.960	0.010	8.49	4.95	0.04	1
1148.51	0.06		0.110	0.007	4
1148.9	1.0		0.062	0.007	4
1155.80	0.20		0.0041	0.0021	4
1184.70	0.20		0.0055	0.0021	4
1198.30	0.20		0.0055	0.0014	4
1265.20	0.20		0.0048	0.0014	4
1277.440	0.010	0.20	0.118	0.005	4
1294.340	0.020	0.80	0.482	0.007	3
1297.98	0.16		0.0048	0.0021	4
1308.10	0.20		0.0069	0.0007	4
1350.91	0.04	0.093	0.060	0.004	4
1427.140	0.020	0.19	0.105	0.004	4
1500.62	0.03	0.21	0.115	0.004	4



¹GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)Nuclide: ¹³¹Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

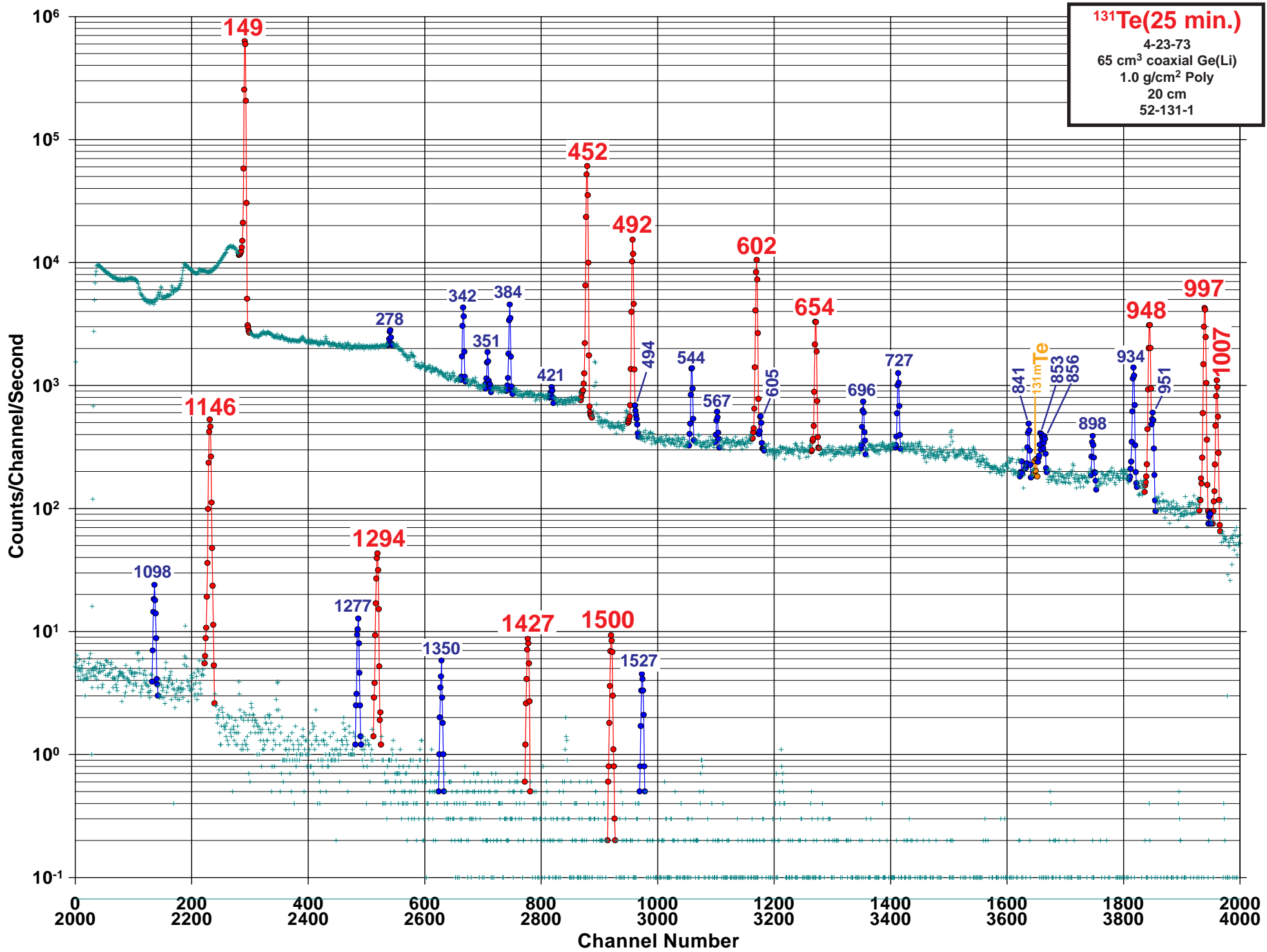
Half Life: 25.0(1) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: ¹³⁰Te(n, γ)

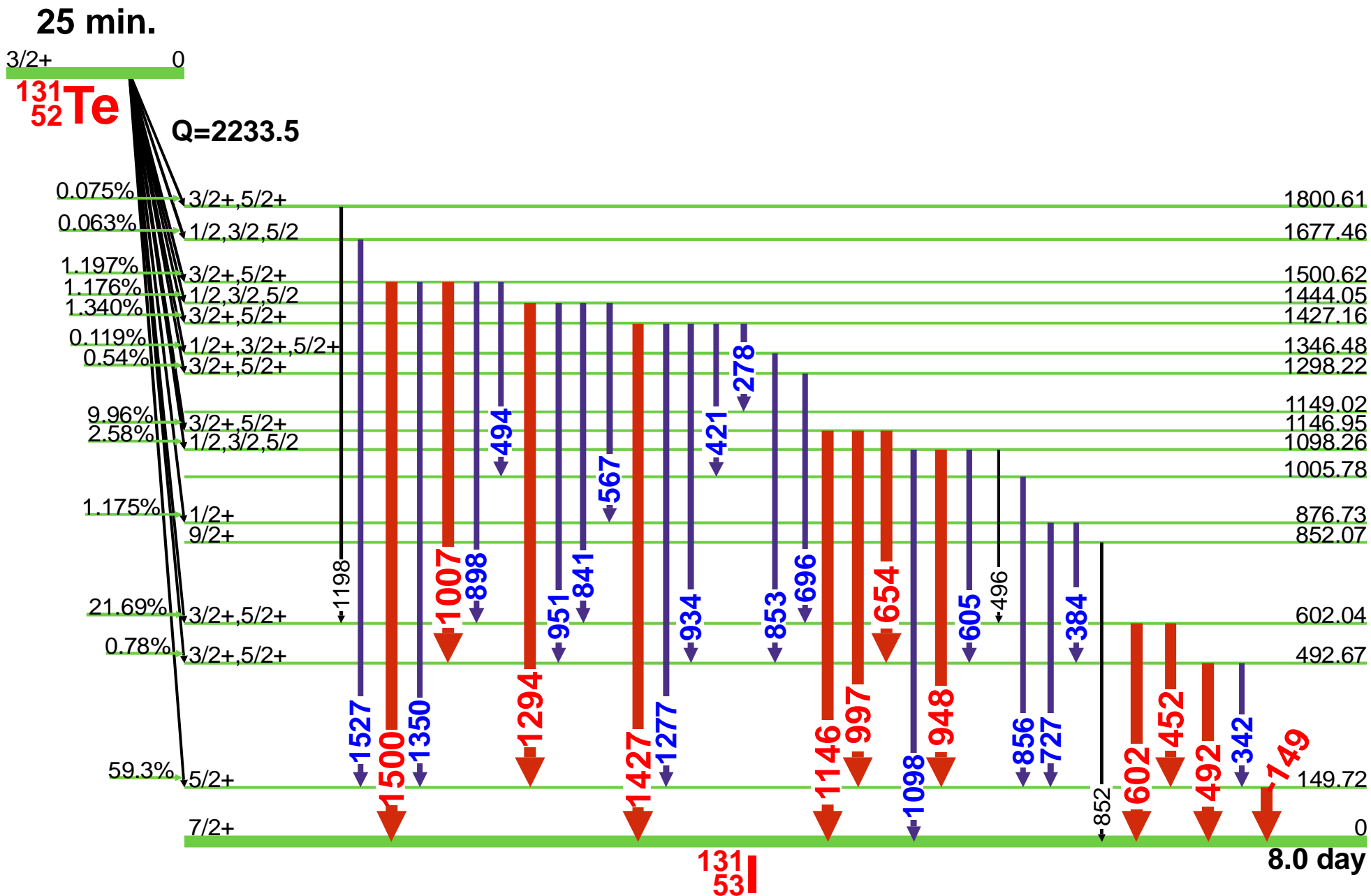
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1527.730	0.020	0.11	0.0571	0.0028	4
1548.0	0.5		0.0009	0.0005	4
1579.94	0.09		0.0083	0.0007	4
1650.97	0.09		0.0124	0.0007	4
1765.2	0.5		0.0062		4
1800.68	0.20		0.0034	0.0007	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1891.1	0.3		0.0028	0.0014	4
1923.60	0.20		0.0034	0.0007	4
1973.1	0.4		0.0021	0.0007	4
2040.80	0.10		0.0069	0.0007	4
2072.8	0.3		0.0062	0.0014	4





¹³¹Te(25 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{131}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 25.0(1) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{130}\text{Te}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
109.40	0.04		0.062	0.007	4
141.20	0.04		0.028	0.005	4
149.716	0.005	100	68.8	0.4	1
151.10	0.10		0.17	0.06	4
221.57	0.05		0.033	0.005	4
267.5	0.3		0.004	0.003	4
274.68	0.15		0.0069		4
278.170	0.020	0.29	0.098	0.005	4
280.17	0.12		0.017	0.005	4
294.75	0.15		0.0048		4
297.09	0.05		0.007	0.005	4
297.09	0.05		0.043	0.005	4
299.94	0.06		0.039	0.005	4
342.945	0.004	1.15	0.702	0.008	3
345.60	0.10		0.014	0.004	4
351.48	0.07		0.023	0.004	4
353.58	0.09		0.019	0.004	4
384.059	0.003	1.45	0.894	0.009	2
402.36	0.14		0.007	0.003	4
403.3	1.0		0.007	0.003	4
421.32	0.07	0.12	0.042	0.008	4
438.30	0.20		0.007	0.003	4
452.323	0.002	29.0	18.20	0.12	1
469.70	0.10		0.015	0.006	4
492.660	0.010	7.72	4.83	0.03	1
494.85	0.05	0.24	0.076	0.007	4
496.23	0.08		0.034	0.007	
544.880	0.010	0.68	0.427	0.014	3
550.40	0.10		0.028	0.007	4
567.33	0.04	0.18	0.102	0.006	4
574.90	0.10		0.031	0.005	4
602.039	0.003	6.81	4.19	0.03	1
605.550	0.020	0.22	0.117	0.007	3
654.260	0.010	2.43	1.527	0.016	1
696.190	0.020	0.37	0.179	0.014	3

D

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
702.7	0.3		0.008	0.006	4
727.000	0.020	0.82	0.468	0.007	3
744.4	0.3		0.008	0.004	4
805.57	0.20		0.014	0.006	4
825.00	0.20		0.028	0.007	4
841.990	0.020	0.31	0.200	0.007	3
852.21	0.06		0.044	0.005	4
853.83	0.05		0.096	0.005	4
856.08	0.03		0.131	0.007	4
881.15	0.09		0.026	0.004	4
898.54	0.03	0.26	0.138	0.007	3
934.483	0.005	1.54	0.874	0.015	2
948.542	0.004	3.86	2.26	0.03	1
951.390	0.020	0.59	0.330	0.007	3
997.250	0.010	5.68	3.337	0.024	1
999.26	0.15		0.028	0.007	4
1005.76	0.15		0.014	0.007	4
1007.960	0.010	1.49	0.798	0.008	1
1035.5	0.5		0.0028	0.0021	4
1066.8	0.3		0.006	0.003	4
1098.250	0.020	0.31	0.172	0.007	2
1146.960	0.010	8.49	4.95	0.04	1
1148.51	0.06		0.110	0.007	4
1148.9	1.0		0.062	0.007	4
1155.80	0.20		0.0041	0.0021	4
1184.70	0.20		0.0055	0.0021	4
1198.30	0.20		0.0055	0.0014	4
1265.20	0.20		0.0048	0.0014	4
1277.440	0.010	0.20	0.118	0.005	2
1294.340	0.020	0.80	0.482	0.007	1
1297.98	0.16		0.0048	0.0021	4
1308.10	0.20		0.0069	0.0007	4
1350.91	0.04	0.093	0.060	0.004	2
1427.140	0.020	0.19	0.105	0.004	1
1500.62	0.03	0.21	0.115	0.004	1



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{131}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

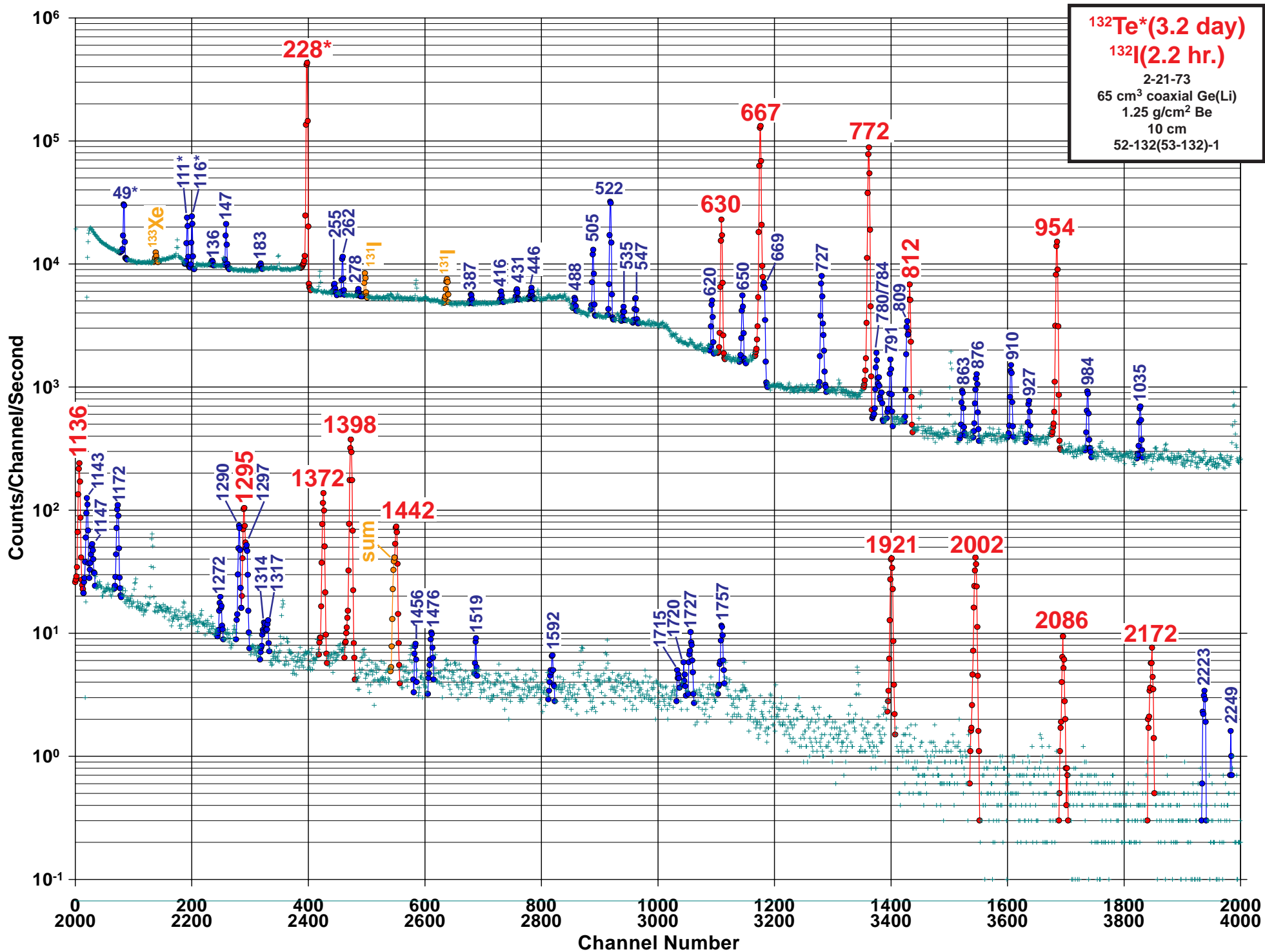
Half Life: 25.0(1) min.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{130}\text{Te}(n,\gamma)$

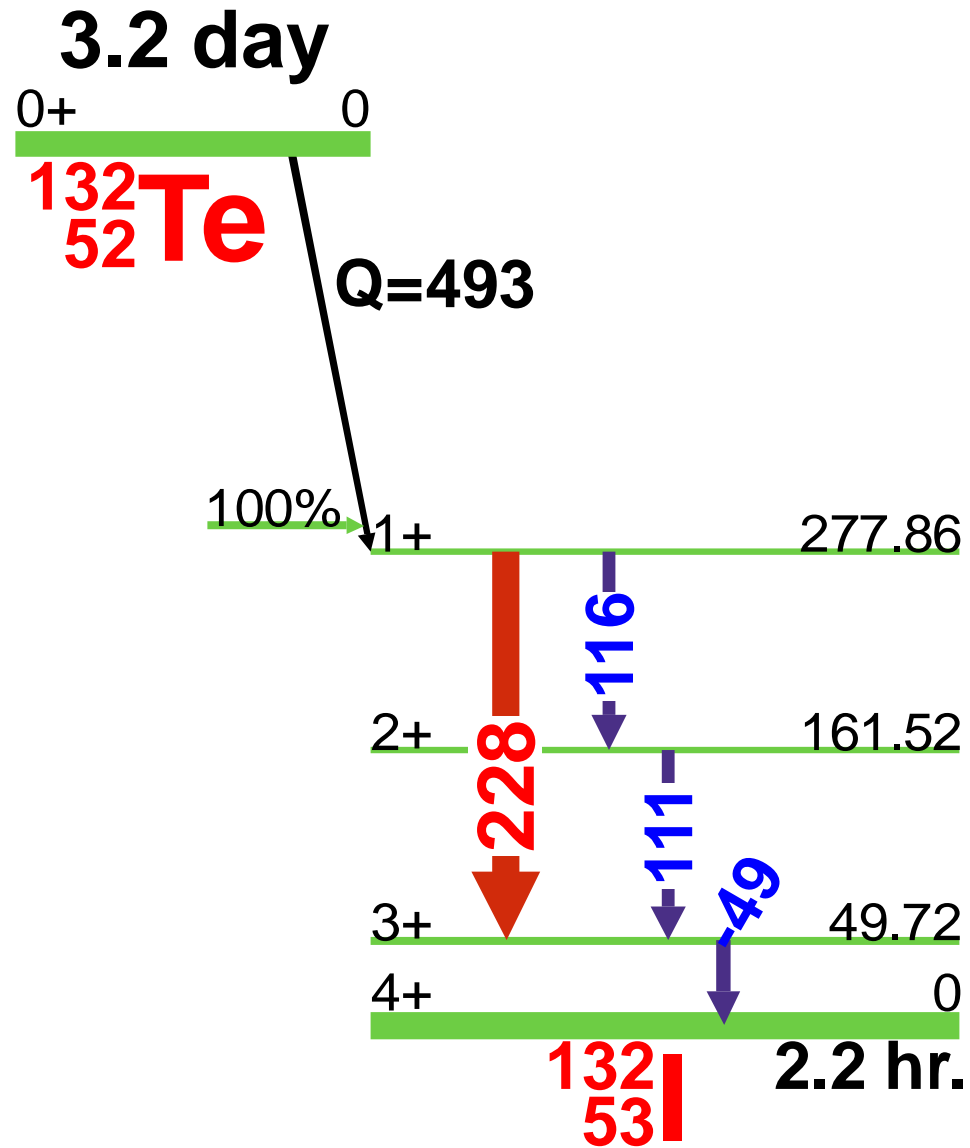
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1527.730	0.020	0.11	0.0571	0.0028	2
1548.0	0.5		0.0009	0.0005	4
1579.94	0.09		0.0083	0.0007	4
1650.97	0.09		0.0124	0.0007	4
1765.2	0.5		0.0062		4
1800.68	0.20		0.0034	0.0007	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1891.1	0.3		0.0028	0.0014	4
1923.60	0.20		0.0034	0.0007	4
1973.1	0.4		0.0021	0.0007	4
2040.80	0.10		0.0069	0.0007	4
2072.8	0.3		0.0062	0.0014	4



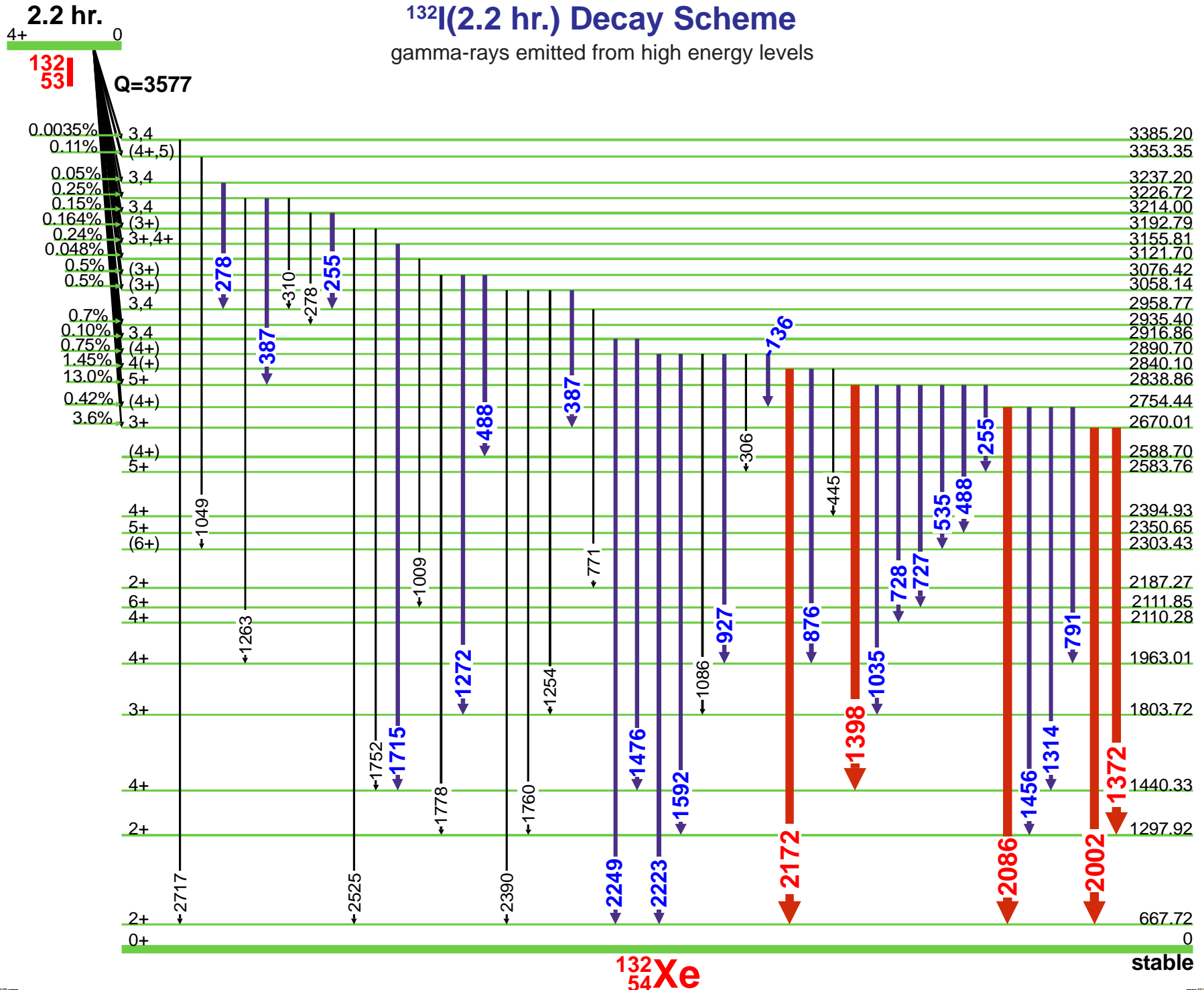


^{132}Te (3.2 day) Decay Scheme



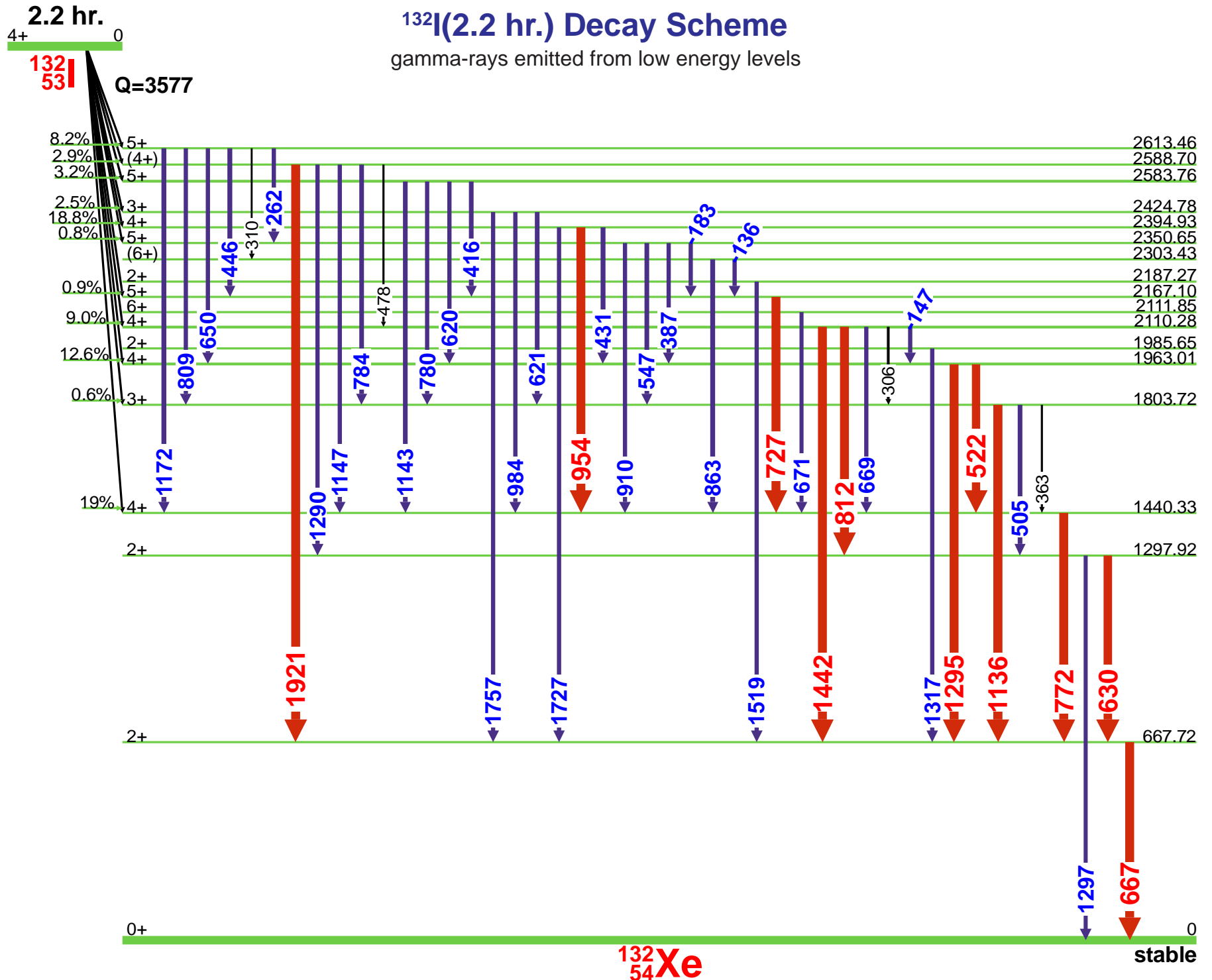
¹³²I(2.2 hr.) Decay Scheme

gamma-rays emitted from high energy levels



¹³²I(2.2 hr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: $^{132}\text{Te}^* - ^{132}\text{I}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 3.204(13) day* - 2.295(13) hr.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S			
*	49.720	0.010	18.1	15.0	0.6	2			
*	111.76	0.08	1.61	1.74	0.07	3			
*	116.30	0.08	1.60	1.96	0.09	3			
D	136.7	0.4	0.10	0.079	0.010	4			
	136.7	0.4							
	147.40	0.20	0.24	0.237	0.020	4			
	183.6	0.3	0.18	0.138	0.020	4			
*	228.16	0.06	100.	88.	3.	1			
	234.3	0.6		0.030	0.010	4			
D	250.8	0.6		0.018	0.005	4			
	250.8	0.6							
D	255.1	0.3	0.25	0.0197		4			
	255.10	0.20			0.237		0.020		
	262.90	0.10	1.47	1.28	0.10	3			
D	278.4	0.4		0.040	0.010	4			
	278.4	0.4							
	284.90	0.20		0.71	0.07	4			
	302.0	0.7		0.0197		4			
D	306.7	0.4	0.14	0.099	0.020	4			
	306.7	0.4							
D	310.1	0.4	0.10	0.089	0.020	4			
	310.4	0.4							
	316.7	0.4		0.128	0.020	4			
	343.7	0.4		0.089	0.020	4			
	351.8	0.4		0.079	0.020	4			
	363.34	0.05		0.49	0.10	4			
D	387.9	0.3	0.20	0.30	0.05	4			
	387.9	0.3							
	387.9	0.3							
	416.8	0.3	0.46	0.47	0.05	4			
	431.8	0.3	0.50	0.47	0.05	4			
D	445.0	0.6	0.53	0.0987		4			
	446.2	0.3			0.60		0.05		
	473.6	0.4		0.17	0.04	4			
	478.2	0.4		0.17	0.04	4			

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	488.0	0.4	0.92	0.41	0.05	4
	488.0	0.4				
	505.79	0.03	4.97	4.94	0.20	3
	522.65	0.09	16.18	16.0	0.5	2
	535.4	0.3	0.58	0.51	0.05	4
	547.20	0.20	1.38	1.14	0.08	3
	559.7	0.4		0.089	0.020	4
	572.5	0.4		0.059	0.020	4
D	591.1	0.6		0.07	0.03	4
	591.1	0.6				
D	600.0	0.6		0.13	0.03	4
	600.0	0.6				
	609.8	0.5		0.040	0.010	4
D	620.90	0.20	2.15	0.39	0.20	3
	621.2	0.3			1.58	0.20
	630.190	0.020	13.90	13.3	0.4	1
	642.2	0.4		0.0395		4
	650.50	0.20	2.74	2.57	0.20	2
	667.718	0.003	100.	98.7		1
D	669.80	0.20	9.47	4.6	0.6	2
	671.40	0.20			3.5	
	684.40	0.20		0.04	0.04	4
	687.8	0.5		0.040	0.020	4
	706.4	0.7		0.0197		4
D	727.0	0.3	5.65	2.2	0.6	2
	727.2	0.3			3.2	
	728.40	0.20	1.39	1.6	0.4	3
D	771.70		76.99	0.020	0.020	1
	772.600	0.010			75.6	
	780.00	0.20	1.28	1.18	0.04	3
	784.4	0.4	0.42	0.38	0.04	4
	791.2	0.4	0.13	0.099	0.020	4
	809.50	0.20	3.03	2.6	0.3	2
	812.00	0.20	5.74	5.5	0.4	1
	831.3	0.5		0.025	0.010	4
	847.9	0.5		0.017	0.005	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: $^{132}\text{Te}^* - ^{132}\text{I}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 3.204(13) day* - 2.295(13) hr.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	847.9	0.5		0.017	0.005	4
	863.00	0.20	0.63	0.56	0.05	3
D	866.0	0.6		0.036	0.014	4
	866.0	0.6				
	876.60	0.20	0.80	1.04	0.04	3
	886.1	0.5		0.025	0.008	4
D	888.7	0.5		0.034	0.008	4
	888.7	0.5				
	904.4	0.5		0.013	0.004	4
	910.10	0.20	1.04	0.93	0.03	3
	927.4	0.3	0.47	0.41	0.04	3
	947.2	0.6		0.044	0.014	4
	954.55	0.09	17.60	17.6	0.5	1
	965.8	0.5	0.06	0.034	0.008	4
	984.20	0.20	0.80	0.59	0.04	3
	995.8	0.5		0.030	0.010	4
D	1002.5	0.6		0.026	0.007	4
	1002.5	0.6				
	1005.4	0.6		0.016	0.005	4
	1009.0	0.4		0.046	0.007	4
	1035.00	0.20	0.57	0.51	0.05	3
	1049.6	0.4	0.10	0.046	0.012	4
	1081.8	0.4		0.034	0.008	4
	1086.2	0.4	0.09	0.079	0.020	4
	1096.9	0.4		0.044	0.008	4
	1112.4	0.4		0.065	0.015	4
D	1126.5	0.4		0.049	0.020	4
	1126.5	0.4				
	1136.000	0.020	3.23	3.01	0.14	1
	1143.30	0.20	1.57	1.35	0.06	2
	1147.8	0.5	0.40	0.27	0.05	4
	1172.90	0.20	1.29	1.09	0.07	3
	1212.3	0.4		0.012	0.003	4
	1242.6	0.7		0.0089		4
	1254.1	0.4	0.05	0.059	0.007	4
	1263.6	0.5	0.03	0.027	0.006	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1272.8	0.4	0.21	0.168	0.020	3
	1290.80	0.20	1.21	1.13	0.05	2
	1295.10	0.20	1.85	1.88	0.07	1
	1297.910	0.020	0.71	0.89	0.07	2
	1314.0	0.5	0.08	0.059	0.009	4
	1317.927	0.007	0.11	0.118	0.015	3
	1360.0	0.5		0.0059	0.0020	4
	1372.07	0.13	2.52	2.47	0.10	1
	1390.7	0.7		0.015	0.010	4
	1398.57	0.10	7.42	7.01	0.20	1
	1410.6	0.3		0.043	0.007	4
	1442.56	0.10	1.44	1.40	0.05	1
	1450.0	0.5		0.0079	0.0020	4
	1456.50	0.20	0.12	0.049	0.007	3
	1476.70	0.20	0.15	0.130	0.009	3
	1519.60	0.20	0.10	0.079	0.005	3
	1531.9	0.5		0.0059	0.0020	4
	1542.3	0.6		0.0158	0.0020	4
	1559.0	0.4		0.0089	0.0020	4
	1592.9	0.3	0.07	0.047	0.004	4
	1617.90	0.20		0.010	0.005	4
	1618.9	0.3		0.007	0.005	4
	1636.5	0.6		0.012	0.004	4
	1636.5	0.6		0.012	0.004	4
	1639.1	0.5		0.0079	0.0020	4
	1644.0	0.6		0.013	0.004	4
	1661.4	0.5		0.0158	0.0030	4
	1671.3	0.4		0.022	0.004	4
	1679.3	0.6		0.0059	0.0020	4
	1715.4	0.4		0.055	0.004	4
	1720.6	0.5		0.054	0.004	4
	1727.2	0.4	0.11	0.067	0.006	4
	1752.3	0.7		0.025	0.008	4
	1757.4	0.2	0.35	0.30	0.03	3
	1760.4	0.6		0.059	0.020	4
	1768.5	0.8		0.025	0.008	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: $^{132}\text{Te}^* - ^{132}\text{I}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 3.204(13) day* - 2.295(13) hr.

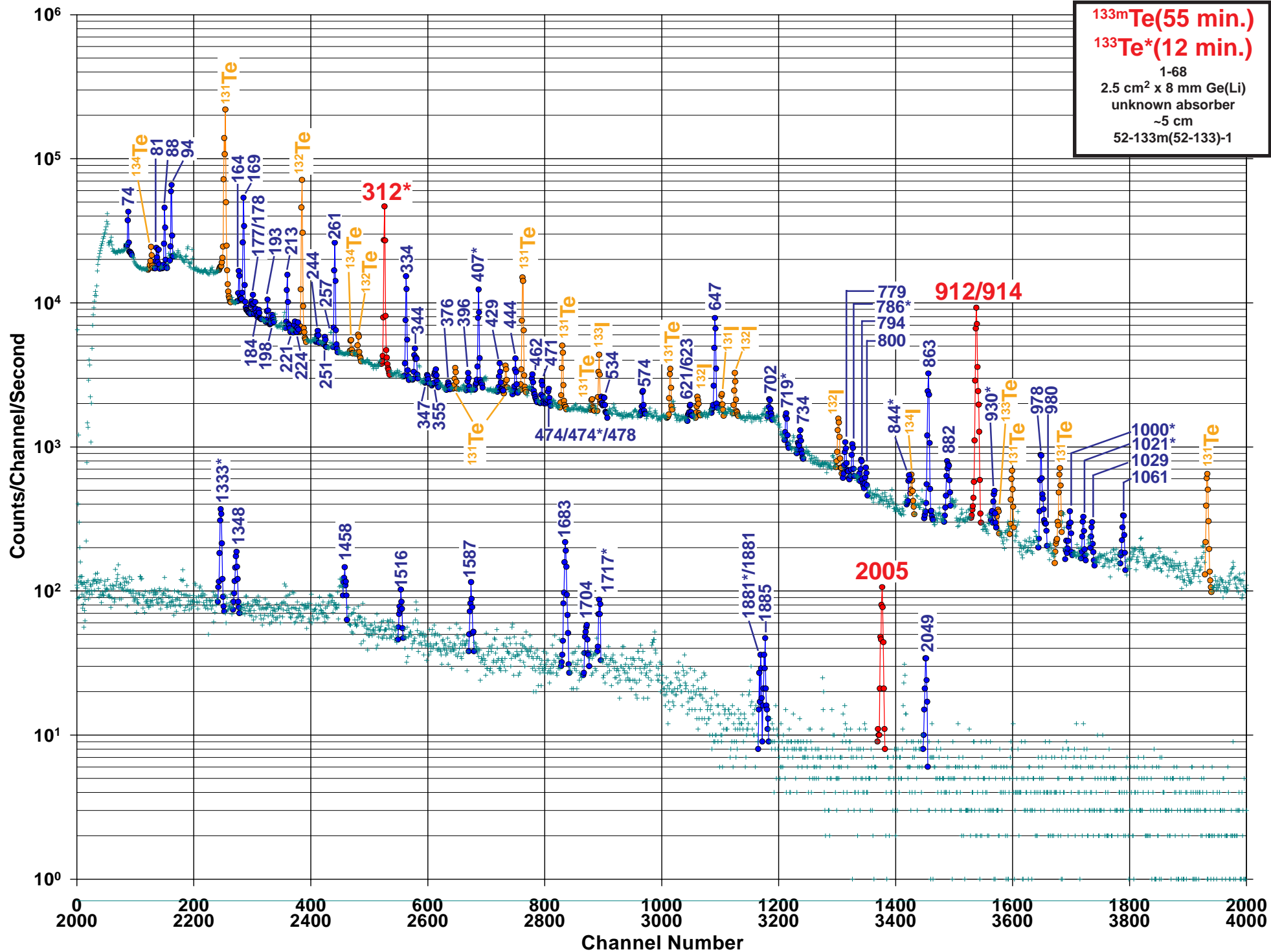
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1768.5	0.8		0.025	0.008	4
1778.5	0.4	0.10	0.079	0.008	4
1786.5	0.6		0.0109	0.0020	4
1786.5	0.6		0.0109	0.0020	4
1814.0	0.5		0.016	0.004	4
1830.1	0.5		0.028	0.005	4
1879.2	0.5		0.014	0.003	4
1913.7	0.5		0.030	0.010	4
1921.08	0.12	1.24	1.23	0.06	1
1925.7	1.0		0.0020	0.0010	4
1939.5	0.7		0.0049	0.0020	4
1985.638	0.008		0.0118	0.0020	4
2002.2	0.5	1.22	1.14	0.08	1
2086.82	0.15	0.28	0.257	0.020	1
2172.68	0.15	0.25	0.207	0.020	1
2187.0	0.6		0.007	0.003	4
2204.2	0.6		0.0030	0.0020	4
2223.17	0.15	0.126	0.118	0.020	2

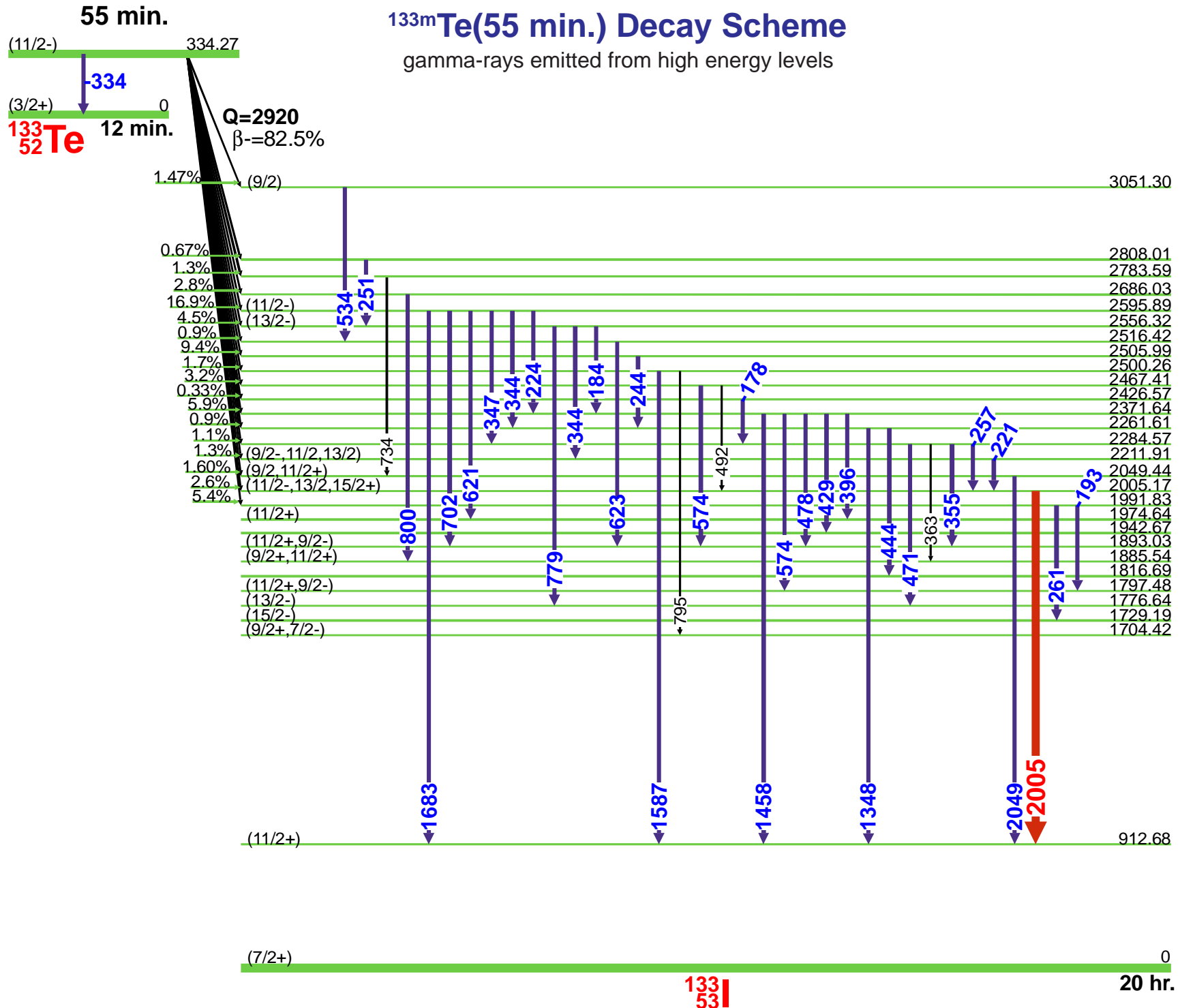
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2249.1	0.3	0.04	0.0336	0.0020	3
2290.6	0.6		0.0036	0.0008	4
2390.48	0.15	0.20	0.188	0.020	3
2408.6	0.4		0.0094	0.0008	4
2416.9	0.4		0.0014	0.0006	4
2444.0	0.6		0.0056	0.0008	4
2454.8	0.4		0.0021	0.0005	4
2487.8	0.6		0.0008	0.0002	4
2525.14	0.15	0.04	0.040	0.004	3
2546.5	0.6		0.0016	0.0005	4
2569.8	0.4		0.0049	0.0010	4
2593.8	0.8		0.0012	0.0003	4
2603.2	0.5		0.0015	0.0003	4
2607.2	0.6		0.0010	0.0003	4
2614.5	0.4		0.0036	0.0012	4
2653.8	0.6		0.0010	0.0003	4
2690.8	0.7		0.0010	0.0003	4
2717.5	0.6	0.003	0.0035	0.0005	3
2757.8	0.7		0.0013	0.0006	4

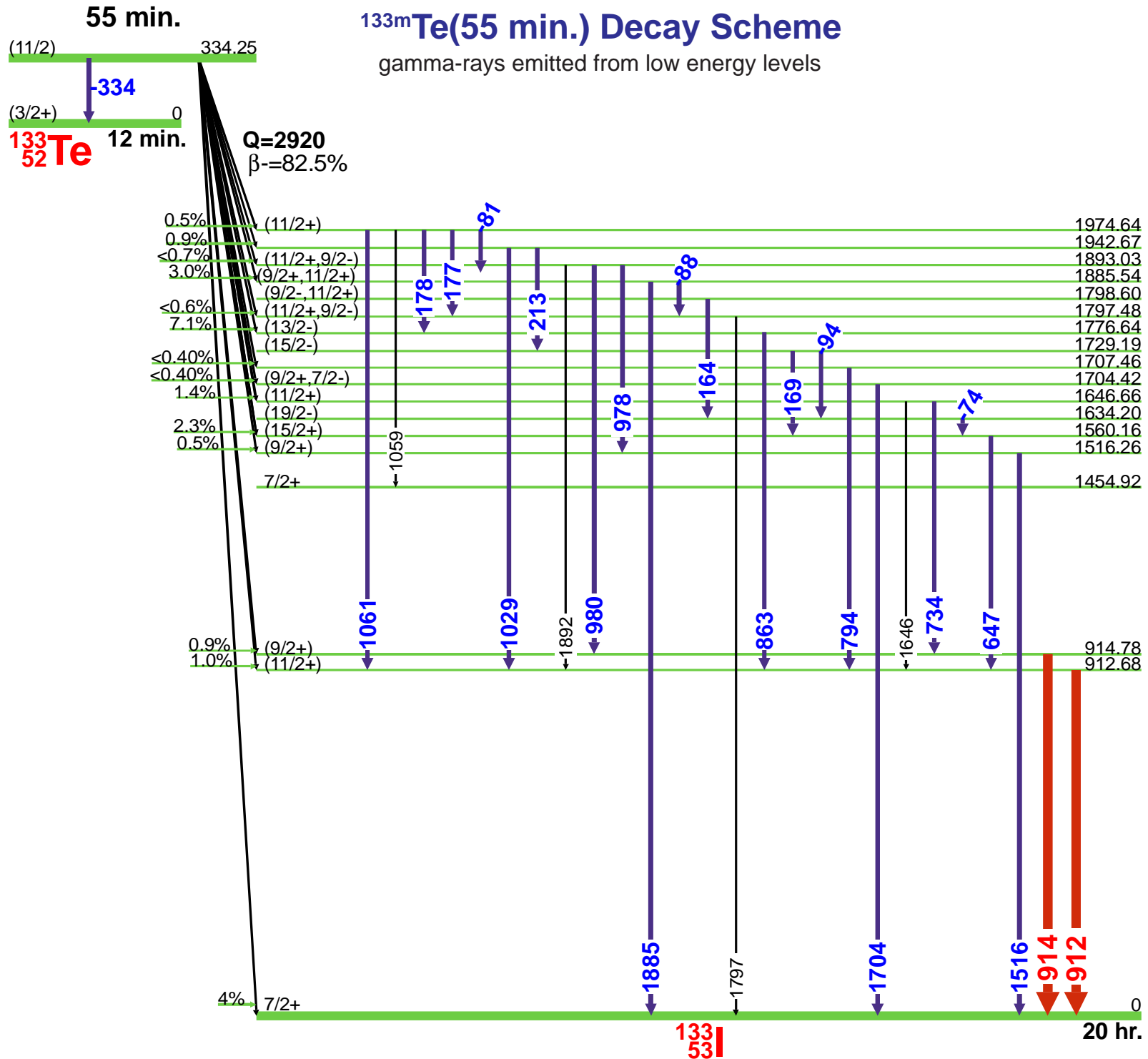




^{133m}Te(55 min.) Decay Scheme

gamma-rays emitted from high energy levels





GAMMA-RAY ENERGIES AND INTENSITIES (Page 1 of 3)

Nuclide: ^{133m}TeE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 55.4(4) min.

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
18.090					4
20.860	0.010		0.49	0.03	4
39.90	0.10		0.36	0.03	4
47.470	0.010		0.268	0.022	4
50.00	0.20		0.10	0.07	4
52.5	0.3		0.020	0.013	4
74.050	0.010		0.46	0.04	4
81.610	0.010		0.389	0.023	4
86.850	0.020		0.054	0.007	4
88.064	0.003		1.61	0.08	3
92.33	0.03		0.24	0.05	4
94.989	0.002		3.48	0.12	3
97.80	0.10		0.161	0.027	4
110.23	0.07		0.100	0.027	4
112.26	0.15		0.13	0.05	4
116.44	0.09		0.34	0.13	4
119.58	0.15		0.13	0.07	4
136.64	0.05		0.19	0.05	4
150.800	0.020		0.80	0.07	4
150.800	0.020		0.40	0.13	4
157.60	0.10		0.13	0.03	4
164.400	0.010		1.17	0.07	4
169.025	0.005		6.37	0.23	2
176.9	0.5		0.27	0.13	4
177.20	0.20		0.27	0.07	4
178.00	0.20		0.40	0.13	4
184.77	0.10		0.20	0.07	4
193.390	0.020		0.72	0.04	4
198.18	0.08		0.20	0.13	4
200.65	0.08		0.54	0.14	4
201.00	0.10		0.20	0.07	4
213.480	0.010		2.61	0.10	3
214.00	0.10		0.27	0.07	4
221.10	0.10		0.29	0.06	4
224.21	0.07		0.20	0.07	4
230.10	0.20		0.34	0.13	4
235.00	0.10		0.20	0.07	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
240.90	0.20		0.40	0.13	4
244.41	0.06		0.40	0.07	4
248.9	0.5		0.040	0.014	4
251.38	0.13		0.34	0.07	4
257.82	0.04		0.54	0.07	4
261.626	0.007		9.5	0.3	2
278.00	0.11		0.67	0.14	4
281.2	0.5		0.13	0.07	4
284.5	0.3		0.27	0.13	4
294.82	0.13		0.27	0.07	4
307.90	0.10		0.34	0.07	4
312.072	0.003		2.68	0.22	4
314.24	0.16		0.47	0.07	4
318.8	0.5		0.27	0.13	4
322.40	0.20		0.13	0.07	4
326.0	0.4		0.34	0.13	4
334.245	0.005		4.02	0.18	2
334.27	0.04		41.0		2
342.8	0.3		0.60	0.07	4
344.39	0.05		0.87	0.14	4
345.6	0.4		0.27	0.20	4
347.31	0.04		0.80	0.07	4
355.40	0.10		0.78	0.05	4
360.8	0.6		0.05	0.04	4
363.06	0.07		0.60	0.07	4
367.90	0.20		0.27	0.07	4
368.50	0.20		0.13	0.07	4
369.30	0.20		0.13	0.07	4
376.80	0.10		0.27	0.07	4
384.0	0.7		0.20	0.13	4
392.00	0.20		0.13	0.07	4
396.97	0.04		0.87	0.07	4
406.00	0.10		0.47	0.07	4
413.20	0.20		0.80	0.07	4
415.00			0.13	0.07	4
429.03	0.05		2.68	0.16	4
435.28	0.05		1.47	0.21	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 2 of 3)

Nuclide: ^{133m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 55.4(4) min.

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
444.940	0.020		2.48	0.15	4		702.91	0.04		2.95	0.22	4
458.0	0.7		0.13	0.07	4		710.40	0.10		0.87	0.20	4
462.23	0.03		1.88	0.27	4		718.90	0.20		1.00	0.27	4
464.0	0.5		0.34	0.20	4		723.500	0.2		0.34	0.13	4
471.87	0.04		1.00	0.14	4		724.0	1.0		0.13	0.07	4
474.7	0.4		0.13	0.07	4		731.880	0.010		0.74	0.14	4
478.62	0.06		1.14	0.20	4		734.00	0.04		2.14	0.15	4
487.40	0.06		0.67	0.14	4		734.10	0.10		0.09	0.05	4
492.96	0.15		0.94	0.14	4		739.79	0.15		0.74	0.20	4
495.00	0.10		0.234	0.028	4		742.90	0.20		0.47	0.13	4
507.2	0.3		0.54	0.14	4		753.30	0.20		0.40	0.13	4
519.70	0.10		0.34	0.13	4		756.8	0.4		0.40	0.13	4
525.63	0.14		0.34	0.13	4		779.67	0.04		2.14	0.21	4
532.40	0.05		1.07	0.07	4		782.11	0.13		0.40	0.07	4
534.88	0.04		1.27	0.14	4		789.7	0.3		0.54	0.14	4
540.30	0.20		0.34	0.13	4		791.7	0.9		0.13	0.13	4
555.00	0.20		0.13	0.07	4		792.6	0.9		0.13	0.13	4
565.3	0.5		0.08	0.03	4		792.9	0.9		0.13	0.13	4
574.110			0.87	0.14	4		794.7	0.9		1.3	0.3	4
574.11	0.03		1.47	0.08	4		795.9	0.9		0.13	0.13	4
581.38	0.15		0.60	0.14	4		800.54	0.05		1.3	0.3	4
586.4	0.3		0.34	0.13	4		805.1	0.3		0.20	0.07	4
601.50	0.20		0.154	0.021	4		816.34	0.08		0.94	0.07	4
602.10	0.20		0.020	0.007	4		819.3	0.3		0.20	0.13	4
605.11	0.04		1.54	0.08	4		827.05	0.09		0.67	0.14	4
607.3	0.8		0.20	0.13	4		851.7	0.5		0.13	0.07	4
621.3	0.5		0.60	0.27	4		859.0	1.0		0.13	0.07	4
623.30	0.20		0.34	0.13	4		863.955	0.009		19.0	0.7	2
629.00	0.10		0.40	0.13	4		882.70	0.05		2.68	0.22	4
632.0	0.4		0.34	0.13	4		884.80	0.06		1.21	0.20	4
636.5	0.4		0.27	0.13	4		884.80	0.06		1.21	0.20	4
642.33	0.09		1.07	0.14	4		888.53	0.15		1.00	0.20	4
647.510	0.020		23.5	0.8	3		889.9	0.3		0.34	0.07	4
653.3	0.6		0.74	0.27	4		891.40	0.10		1.27	0.20	4
663.20	0.20		0.13	0.05	4		912.671	0.004		67.0	2.0	1
681.00	0.10		0.13	0.07	4		914.774	0.012		13.3	0.5	1
698.10	0.10		1.14	0.20	4							

GAMMA-RAY ENERGIES AND INTENSITIES (Page 3 of 3)

Nuclide: ^{133m}Te E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 55.4(4) min.

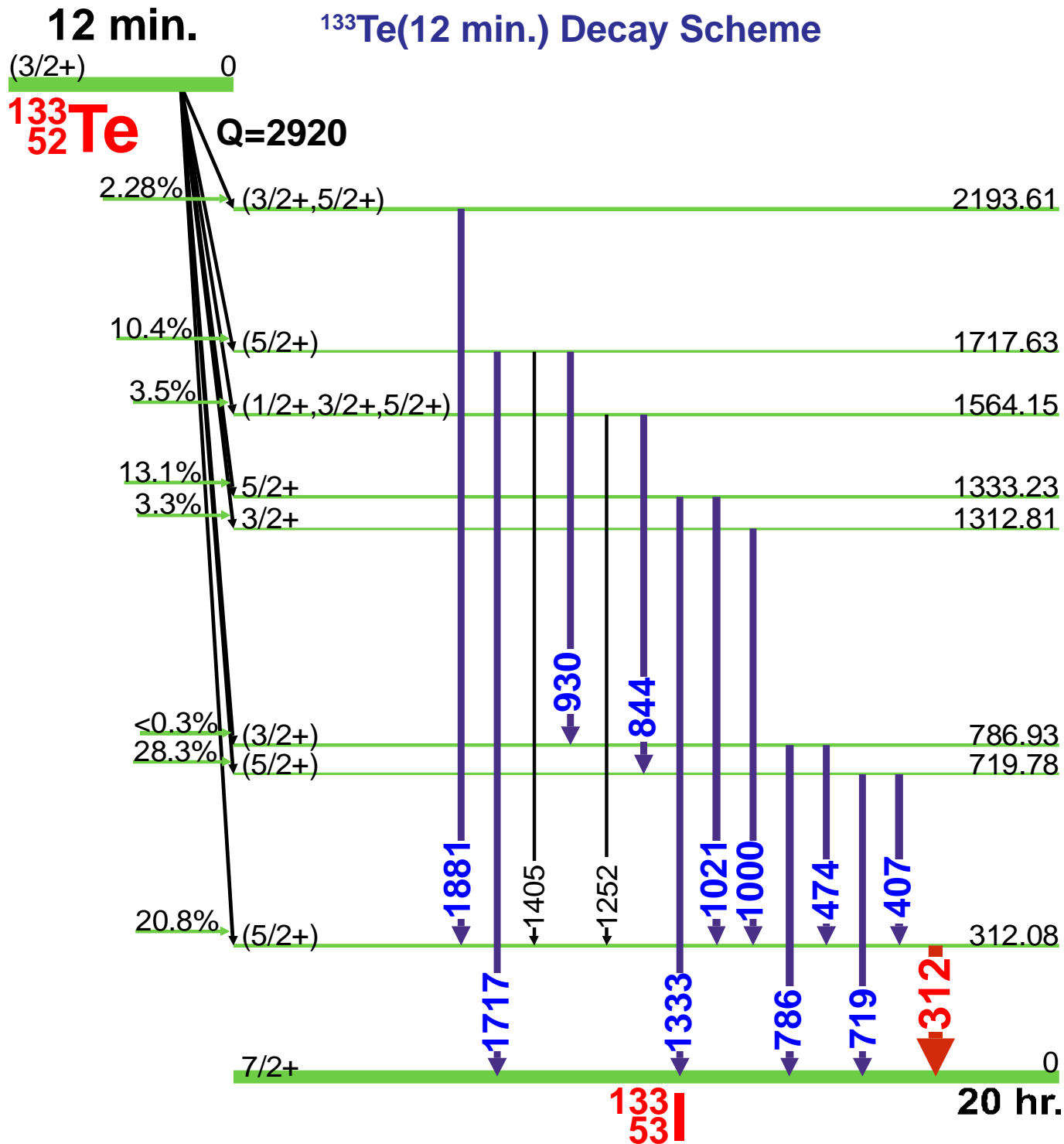
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
945.20	0.20		0.74	0.14	4
949.2	0.3		0.80	0.20	4
970.50	0.20		0.40	0.20	4
972.64	0.11		0.67	0.20	4
978.30	0.04		5.90	0.27	3
980.26	0.05		1.81	0.21	4
995.090	0.020		0.60	0.20	4
996.1	0.3		0.5	0.3	4
1007.50	0.20		0.80	0.20	4
1015.1	0.3		0.13	0.07	4
1029.88	0.06		1.47	0.21	4
1035.50	0.10		0.13	0.07	4
1053.7	0.3		0.20	0.07	4
1059.8	0.5		0.07	0.07	4
1061.89	0.06		2.01	0.21	4
1078.13	0.15		0.20	0.13	4
1079.63	0.14		0.67	0.14	4
1090.50	0.20		0.13	0.07	4
1098.40	0.20		1.07	0.27	4
1103.9	0.3		0.13	0.07	4
1134.88	0.15		0.40	0.13	4
1137.3	0.5		0.34	0.20	4
1142.74	0.09		1.61	0.27	4
1174.0	0.5		0.47	0.13	4
1198.0	1.0		0.27	0.13	4
1204.20	0.20		0.27	0.07	4
1227.5	0.8		0.20	0.13	4
1229.6	0.3		0.27	0.13	4
1252.00	0.20		0.40	0.13	4
1299.20	0.20		0.20	0.13	4
1307.20	0.20		0.47	0.07	4
1334.0	1.0		0.34	0.27	4
1348.87	0.05		1.81	0.09	3
1372.3	0.5		0.34	0.13	4
1392.3	0.5		0.13	0.07	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1405.0	0.9		0.13	0.07	4
1455.00	0.10		0.87	0.20	4
1456.0			0.13	0.13	4
1458.90	0.20		0.20	0.07	4
1506.2	0.8		0.34	0.13	4
1516.26	0.08		1.54	0.21	4
1537.0	0.8		0.11	0.03	4
1552.0	1.0		0.20	0.13	4
1570.0	0.3		0.13	0.07	4
1573.50	0.20		0.34	0.13	4
1581.0	0.8		0.20	0.13	4
1587.66	0.06		1.74	0.21	3
1643.6	0.5		0.40	0.13	4
1646.2	0.3		0.34	0.13	4
1683.230	0.020		5.02	0.20	2
1693.3	0.3		0.013	0.007	4
1704.40	0.10		0.87	0.07	4
1773.20	0.10		0.80	0.07	4
1797.50	0.20		0.21	0.05	4
1870.80	0.10		0.67	0.14	4
1881.20	0.20		0.27	0.07	4
1885.62	0.07		1.21	0.14	3
1892.98	0.08		0.19	0.05	4
1914.0	1.0		0.07	0.05	4
1967.80	0.20		0.20	0.07	4
1974.60	0.20		0.047	0.014	4
2005.33	0.09		4.1	0.3	1
2016.0	1.0		0.054	0.027	4
2049.66	0.06		1.47	0.14	3
2062.0	1.0		0.12	0.03	4
2144.4	0.5		0.0804	0.020	4
2482.5	0.4		0.080	0.027	4
2826.3	0.4		0.17	0.04	4
2968.1	0.4		0.134	0.020	4
3051.3	0.4		0.389	0.029	4





GAMMA-RAY ENERGIES AND INTENSITIES (Page 1 of 3)

Nuclide: $^{133}\text{Te}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.5(3) min.

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
67.220			0.11	0.03	4
170.91	0.13		0.09	0.03	4
183.3	0.4		0.019	0.012	4
190.50	0.10		0.056	0.025	4
199.6	0.3		0.037	0.012	4
207.40	0.10		0.025	0.012	4
230.90	0.20		0.019	0.006	4
242.00	0.10		0.031	0.012	4
251.4	0.3		0.031	0.012	4
302.0	1.0		0.031	0.019	4
312.08	0.03	100	62.4	1.8	1
324.30	0.20		0.050	0.013	4
331.50	0.20		0.12	0.04	4
338.220	0.020		0.268	0.015	4
341.0	1.0		0.031	0.012	4
343.90	0.10		0.062	0.025	4
358.70	0.20		0.087	0.013	4
368.90	0.20		0.09	0.04	4
384.25	0.05		0.27	0.03	4
392.44	0.03		0.250	0.026	4
394.0	1.0		0.031	0.012	4
404.85	0.07		0.26	0.06	4
407.63	0.03	45.0	27.1	0.8	2
410.40	0.06		0.94	0.07	4
418.40	0.20		0.025	0.006	4
431.61	0.13		0.12	0.03	4
452.90	0.10		0.12	0.06	4
461.30	0.04		0.62	0.13	4
474.850	0.010	1.5	0.88	0.04	4
477.77	0.06		0.38	0.03	4
484.500			0.056	0.025	4
485.00	0.20		0.56	0.03	4
488.0	2.0		0.09	0.03	4
507.30	0.10		0.137	0.019	4
520.10	0.10		0.044	0.012	4
520.40	0.20		0.019	0.012	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
525.84	0.03		0.231	0.026	4
543.5	0.5		0.12	0.06	4
546.29	0.03		0.51	0.03	4
553.70	0.20		0.062	0.025	4
569.6	0.8		0.056	0.013	4
572.0	1.0		0.025	0.012	4
586.71	0.04		0.618	0.026	4
587.6	0.4		0.100	0.019	4
593.00	0.20		0.17	0.03	4
613.52	0.03		0.32	0.04	4
620.0	1.0		0.031	0.012	4
635.80	0.20		0.069	0.025	4
645.60	0.10		0.39	0.05	4
653.98	0.08		0.31	0.04	4
667.0	1.0		0.19	0.06	4
679.8	0.7		0.06	0.03	4
690.80	0.10		0.14	0.03	4
696.0	1.0		0.08	0.04	4
702.0	1.0		0.044	0.025	4
712.6	0.5		0.19	0.06	4
717.80	0.20		0.11	0.05	4
719.600			0.0624	0.0018	4
719.710	0.020	12.0	8.9	0.6	4
720.3	0.5		0.12	0.06	4
722.0	1.0		0.019	0.012	4
727.0	1.0		0.04	0.03	4
740.80	0.20		0.19	0.04	4
743.00	0.20		0.31	0.06	4
745.80	0.20		0.11	0.03	4
762.80	0.20		0.12	0.03	4
778.0	0.3		0.20	0.06	4
786.930	0.020	9.7	5.40	0.18	4
802.9	0.3		0.062	0.019	4
803.3	0.3		0.131	0.019	4
813.40	0.20		0.12	0.03	4
823.9	0.5		0.081	0.025	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 2 of 3)

Nuclide: $^{133}\text{Te}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.5(3) min.

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
829.2	0.3		0.094	0.025	4
844.360	0.010	6.2	3.31	0.11	4
851.37	0.07		0.31	0.04	4
854.2	0.9		0.06	0.03	4
860.2	0.7		0.06	0.03	4
880.70	0.10		0.06	0.03	4
884.29	0.03		0.72	0.06	4
886.0	0.4		0.044	0.025	4
888.9	0.4		0.031	0.025	4
896.70	0.20		0.050	0.013	4
902.50	0.10		0.19	0.03	4
910.0	0.7		0.12	0.06	4
912.3	0.6		0.062	0.019	4
912.690	0.020		0.06	0.04	4
914.740	0.020		0.69	0.07	4
922.0	1.0		0.12	0.06	4
926.0	1.0		0.19	0.06	4
927.75	0.03		0.50	0.06	4
928.0	1.0		0.12	0.06	4
930.710	0.010	7.7	3.81	0.17	4
934.0	1.0		0.12	0.06	4
942.20	0.20		0.31	0.06	4
943.0	1.0		0.06	0.04	4
951.51	0.07		0.22	0.04	4
971.0	1.0		0.05	0.03	4
978.0	1.0		0.12	0.06	4
995.090	0.020		0.69	0.05	4
997.660	0.010		1.04	0.06	4
1000.720	0.010	6.4	3.62	0.12	4
1015.3	0.3		0.12	0.04	4
1021.13	0.08	5.0	2.81	0.10	4
1026.80	0.20		0.056	0.019	4
1051.1	0.3		0.050	0.019	4
1061.610	0.010		1.19	0.13	4
1109.90	0.20		0.12	0.06	4
1123.9	0.3		0.06	0.04	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1137.0	1.0		0.12	0.06	4
1156.3	0.3		0.069	0.025	4
1208.5	0.3		0.162	0.038	4
1221.7	0.3		0.019	0.006	4
1224.0	1.0		0.006	0.003	4
1227.7	0.4		0.112	0.019	4
1238.5	0.5		0.12	0.06	4
1239.9	0.3		0.21	0.05	4
1243.90	0.20		0.075	0.025	4
1252.080	0.020	2.0	1.44	0.07	4
1254.2	0.5		0.019	0.006	4
1266.58	0.05		0.19	0.04	4
1285.0	1.0		0.025	0.012	4
1286.0	1.0		0.025	0.012	4
1290.0	1.0		0.019	0.012	4
1294.00	0.20		0.144	0.025	4
1302.0	1.0		0.044	0.025	4
1306.0	0.6		0.27	0.03	4
1307.20	0.20		0.54	0.03	4
1310.40	0.12		0.137	0.019	4
1312.80	0.23		0.85	0.05	4
1320.4	0.6		0.025	0.012	4
1333.210	0.020	16.0	10.7	0.4	2
1333.7	0.5		0.08	0.03	4
1349.63	0.13		0.10	0.03	4
1359.45	0.07		0.094	0.019	4
1371.7	0.5		0.010	0.004	4
1405.5	0.5	1.3	0.59	0.05	4
1416.90	0.07		0.131	0.025	4
1438.0	1.0		0.006	0.006	4
1455.24	0.07		0.15	0.06	4
1468.2	0.6		0.05	0.03	4
1473.74	0.08		0.32	0.03	4
1489.88	0.14		0.119	0.025	4
1493.0	1.0		0.025	0.012	4
1502.8	0.5		0.031	0.025	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 3 of 3)

Nuclide: $^{133}\text{Te}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.5(3) min.

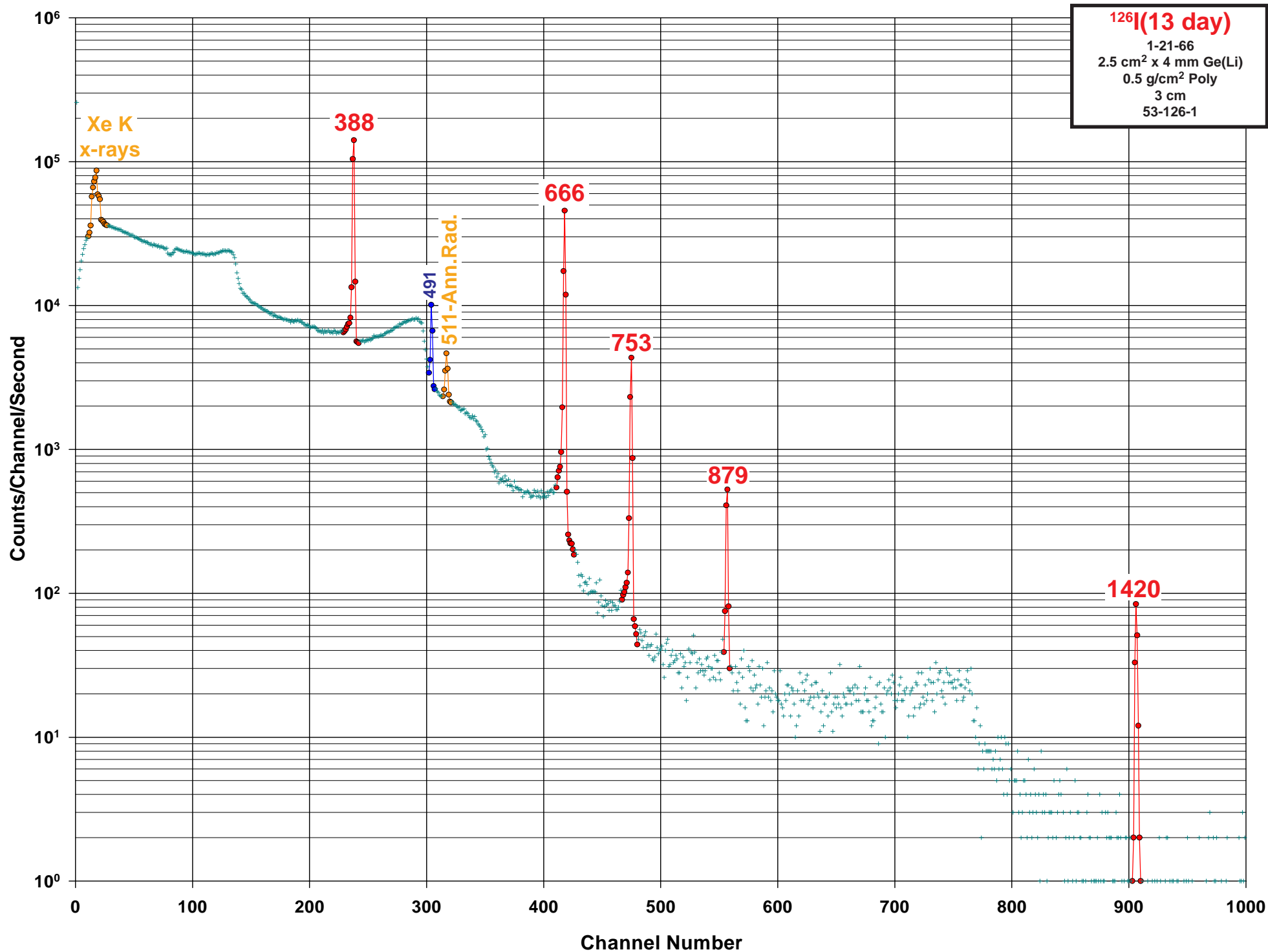
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(n,f) chem.

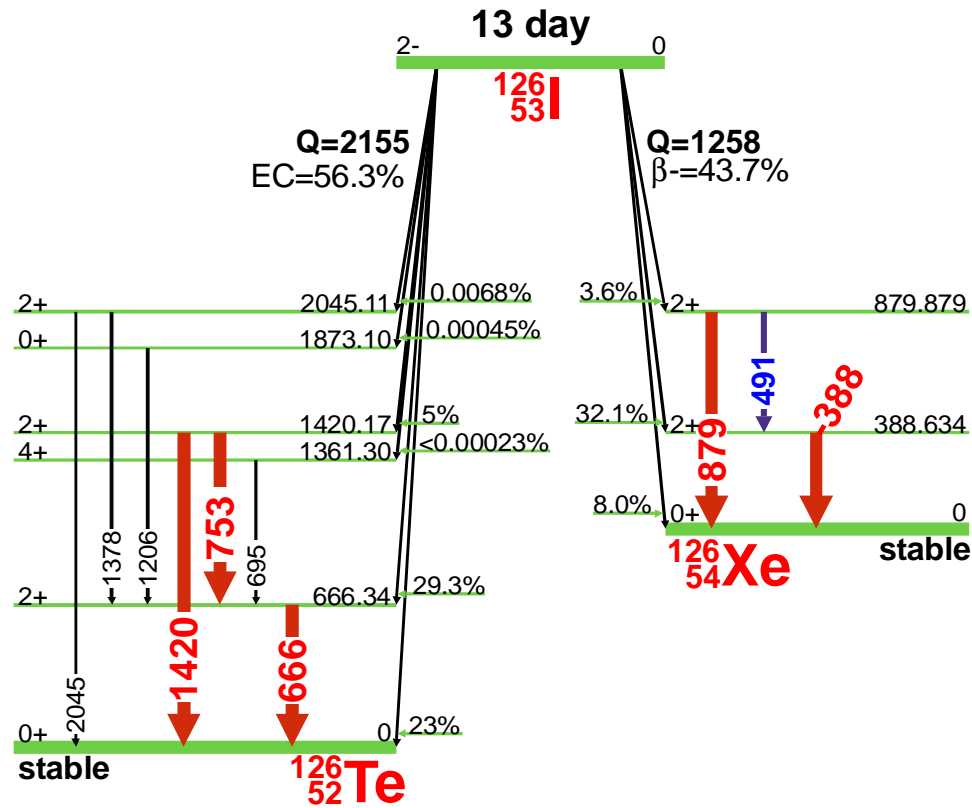
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1505.2	0.3		0.07	0.03	4
1535.10	0.10		0.21	0.03	4
1564.00	0.20		0.075	0.019	4
1630.1	0.3		0.025	0.012	4
1633.70	0.20		0.075	0.019	4
1671.19	0.07		0.162	0.025	4
1680.0	1.0		0.09	0.06	4
1682.90	0.20		0.137	0.025	4
1697.30	0.20		0.062	0.025	4
1706.0	1.0		0.06	0.04	4
1713.0	0.5		0.37	0.06	4
1717.610	0.010	4.6	3.18	0.15	3
1722.0	1.0		0.08	0.03	4
1738.0	2.0		0.050	0.025	4
1741.57	0.08		0.137	0.013	4
1754.90	0.20		0.044	0.006	4
1773.27	0.07		0.14	0.04	4
1806.90	0.10		0.256	0.026	4
1821.70	0.20		0.218	0.026	4
1824.25	0.03		0.40	0.03	4
1881.52	0.04	2.0	1.22	0.06	4
1893.21	0.22		0.056	0.019	4
1897.59	0.07		0.106	0.007	4
1912.91	0.06		0.119	0.007	4
1938.0	1.0		0.031	0.019	4
1943.80	0.10		0.081	0.013	4
1972.0	2.0		0.015	0.005	4
2025.60	0.20		0.081	0.013	4
2036.2	0.3		0.019	0.006	4
2048.5	0.4		0.037	0.012	4
2053.43	0.08		0.14	0.03	4
2079.30	0.20		0.094	0.019	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2081.3	0.3		0.056	0.019	4
2093.0	1.0		0.019	0.012	4
2105.50	0.20		0.100	0.025	4
2105.50	0.20		0.100	0.025	4
2136.51	0.08		1.25	0.07	4
2148.3	0.4		0.025	0.012	4
2155.0	1.0		0.025	0.019	4
2180.9	0.4		0.031	0.019	4
2193.65	0.05		0.57	0.05	4
2210.22	0.04		0.69	0.07	4
2213.60	0.10		0.21	0.04	4
2225.00	0.14		0.225	0.026	4
2229.64	0.03		0.87	0.07	4
2255.40	0.10		0.21	0.03	4
2266.40	0.10		0.24	0.03	4
2285.5	0.4		0.009	0.003	4
2336.0	1.0		0.014	0.006	4
2349.0	1.0		0.008	0.004	4
2363.0	1.0		0.025	0.012	4
2393.0	1.0		0.012	0.006	4
2417.70	0.10		0.19	0.06	4
2456.20	0.09		0.256	0.026	4
2467.40	0.07		0.41	0.03	4
2485.0	1.0		0.019	0.012	4
2496.35	0.12		0.193	0.026	4
2525.5	0.4		0.025	0.012	4
2541.80	0.07		0.50	0.06	4
2554.19	0.07		0.35	0.04	4
2597.7	0.3		0.056	0.019	4
2623.82	0.16		0.094	0.019	4
2661.1	0.4		0.075	0.019	4
2825.30	0.14		0.156	0.019	4





¹²⁶I(13 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹²⁶I

Half Life: 13.11(5) day

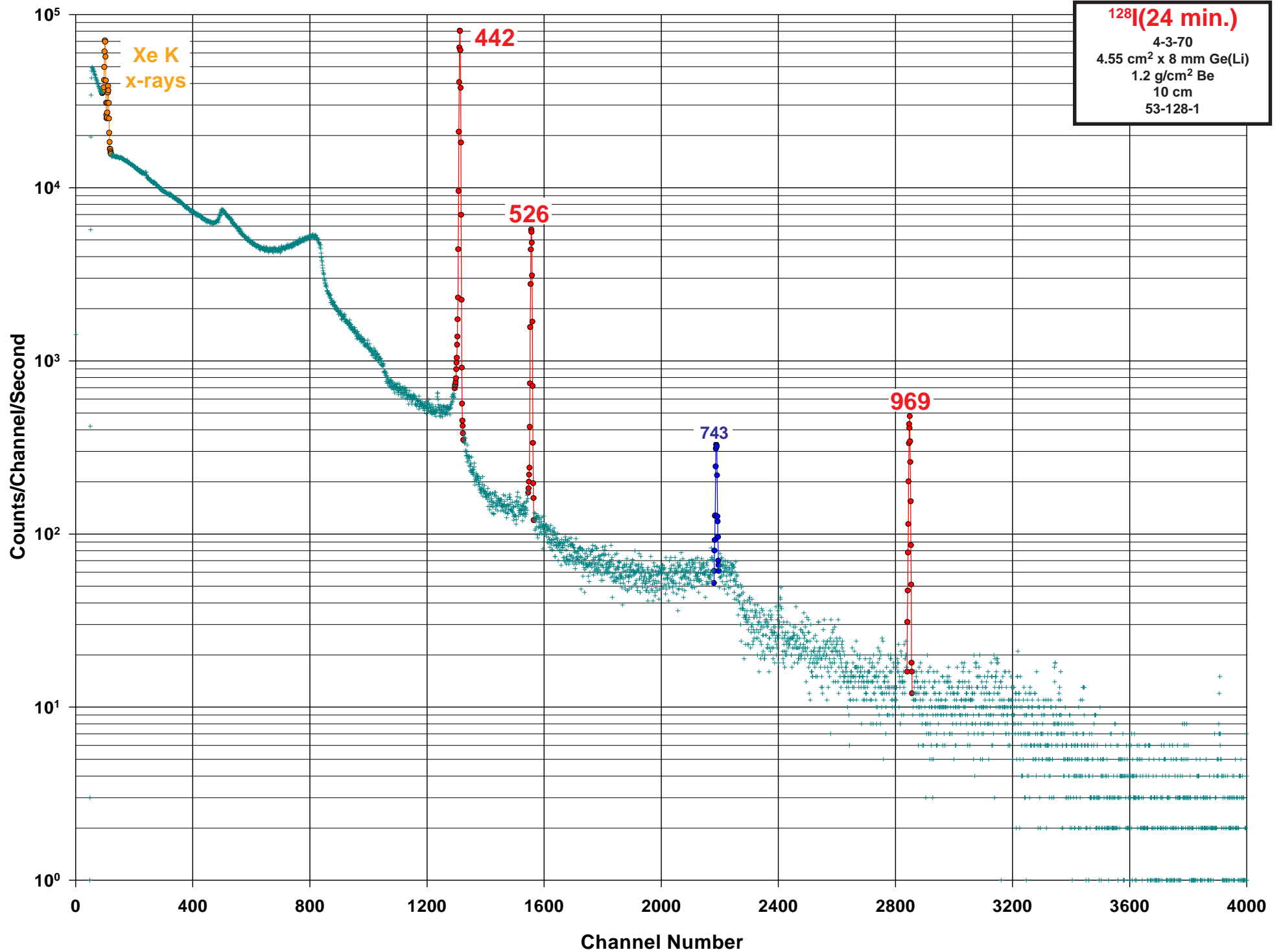
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ¹²⁷I(γ,n)

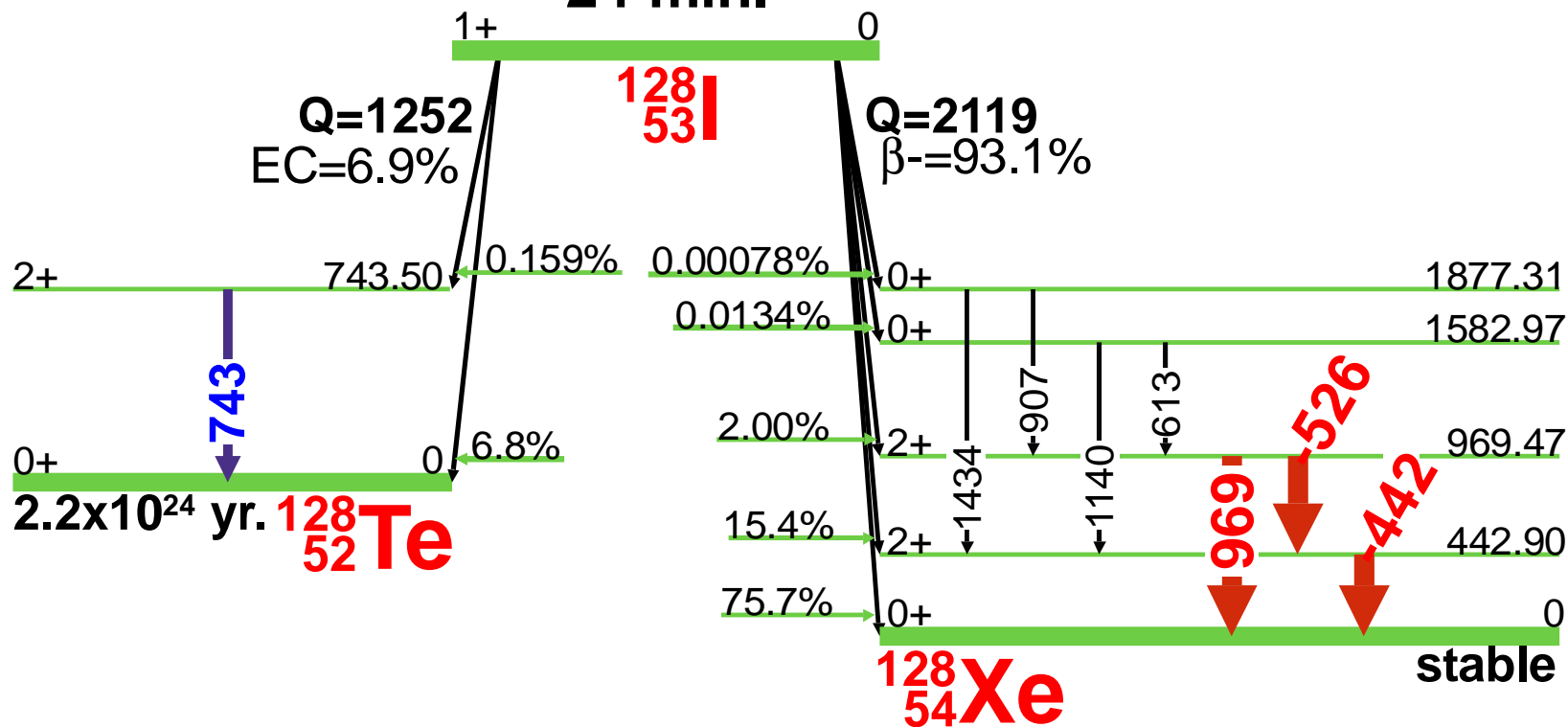
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	388.633	0.011	100.	34.	3.	1
	491.243	0.011	9.5	2.86	0.25	2
Ann.	511.006		5.8	2.3	0.3	2
	666.331	0.012	94.0	33.1	2.4	1
	695.			0.0002		4
	753.819	0.013	11.6	4.2	0.3	1
	879.876	0.013	2.5	0.76	0.07	1
	1206.8	0.3		0.0004	0.0001	4
	1378.76			0.0024	0.0002	4
	1420.19	0.03	0.85	0.29	0.02	1
	2045.09	0.05		0.0046	0.0004	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹²⁸I(24 min.) Decay Scheme 24 min.



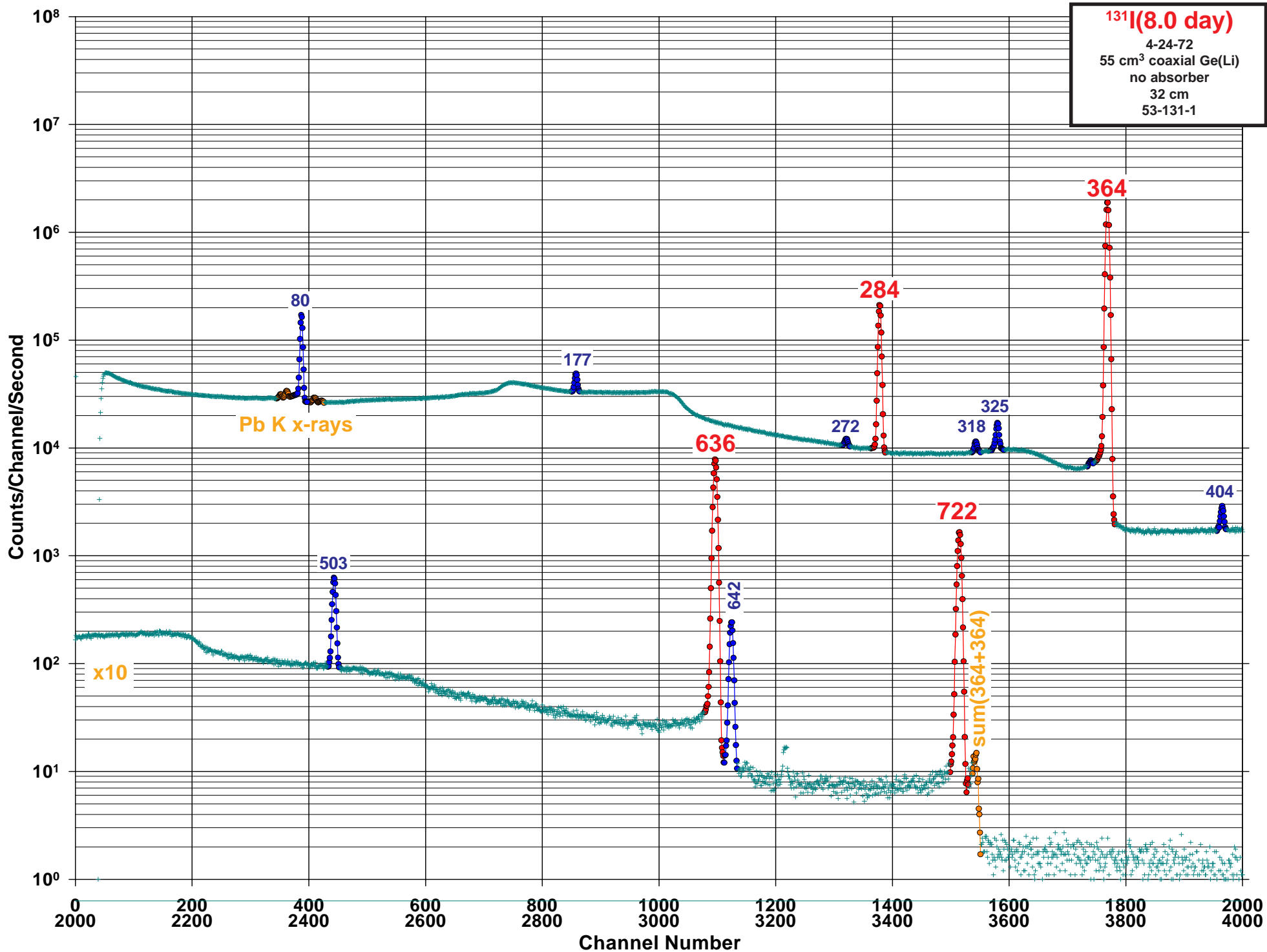
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹²⁸I Half Life: 24.99(2) min.
 Detector: 4.55 cm² x 8mm Ge (Li) Method of Production: ¹²⁷I(n,γ)

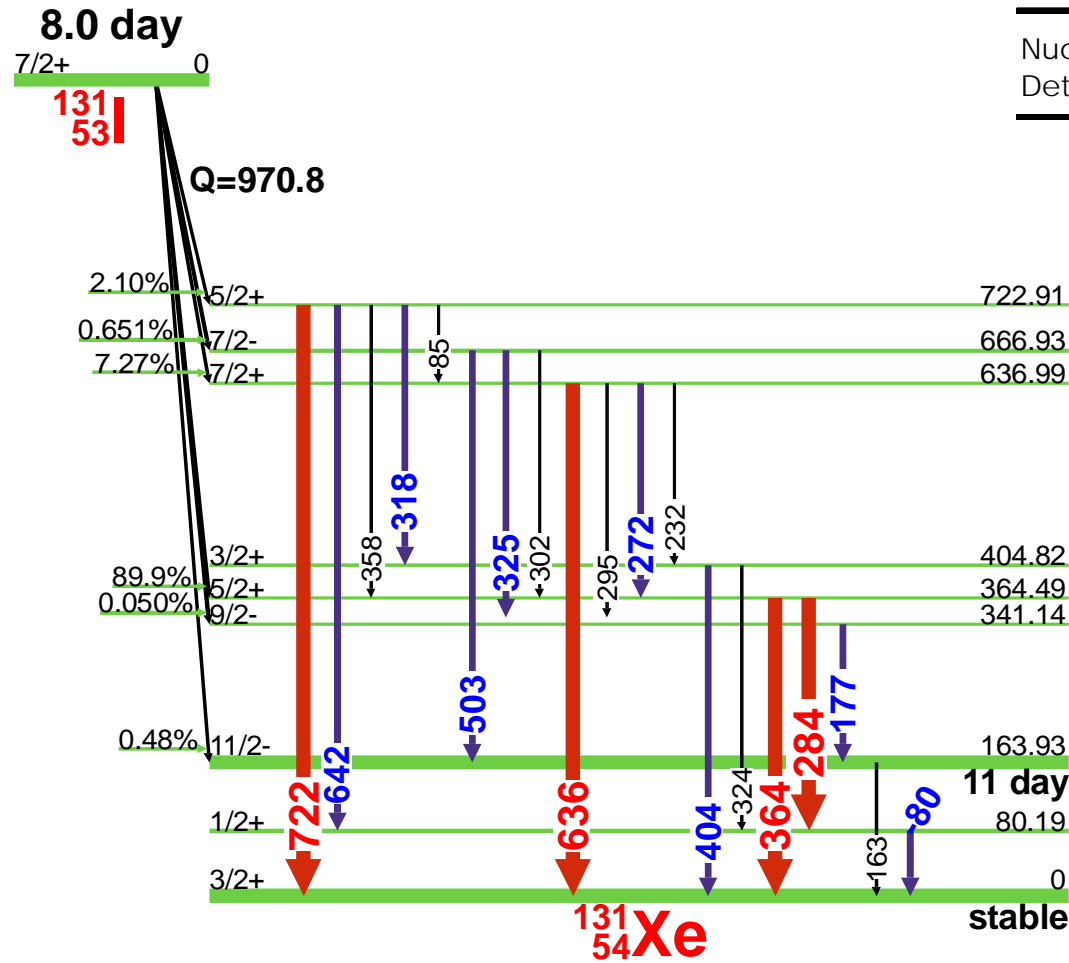
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	442.901	0.010	100.	18.1	1.8	1
Ann.	511.006			0.006		4
	526.557	0.014	9.89	1.70	0.18	1
	613.493	0.013		0.0033	0.0004	4
	743.50	0.10	1.03	0.16	0.03	2
	907.84	0.05		0.0001	0.0001	4
	969.458	0.020	2.74	0.43	0.05	1
	1140.079	0.023		0.0110	0.0012	4
	1434.40	0.08		0.0007	0.0001	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹³¹I(8.0 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³¹I

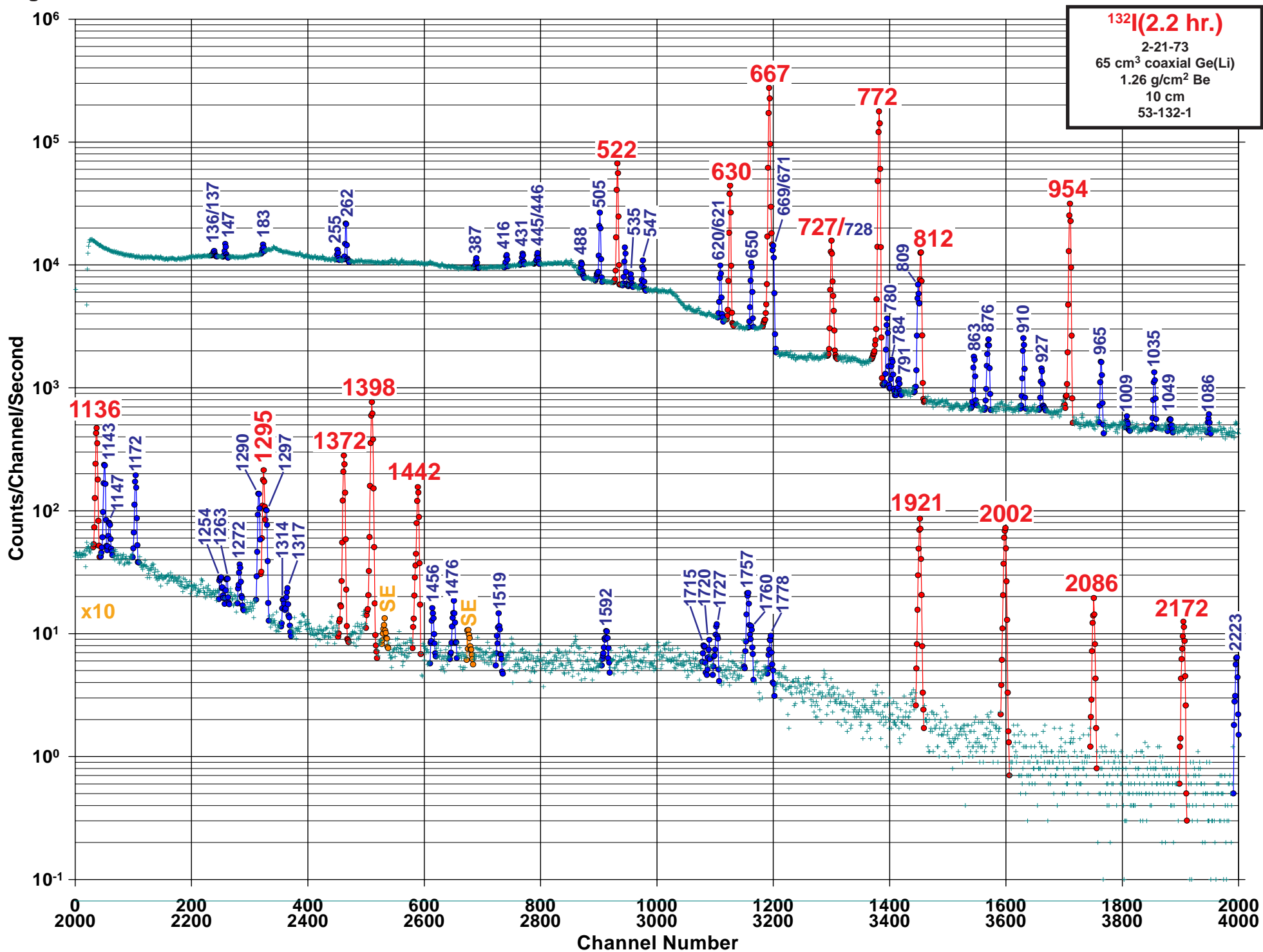
Half Life: 8.02070(11) day

Detector: 55 cm³ coaxial Ge (Li) Method of Production: U(n,f) chem.

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
80.185	0.002	2.8	2.62	0.04	2
85.90	0.20		0.0001		4
163.930	0.008				4
177.214	0.002	0.36	0.270	0.004	4
232.18	0.15		0.0032	0.0004	4
272.498	0.017	1.1	0.0578	0.0011	4
284.305	0.005	7.6	6.14	0.06	1
295.80	0.20		0.0018	0.0008	4
302.40	0.20		0.0047	0.0006	4
318.088	0.016	0.10	0.0776	0.0017	4
324.651	0.025	0.34	0.0212	0.0025	4
325.789	0.004		0.274	0.021	
358.40	0.20		0.016	0.006	4
364.489	0.005	100.	81.7	0.8	1
404.814	0.004	0.07	0.0547	0.0017	4
449.60	0.20		0.0074	0.0025	4
503.004	0.004	0.46	0.360	0.004	2
636.989	0.004	9.1	7.17	0.10	1
642.719	0.005	0.28	0.217	0.004	2
722.911	0.005	2.3	1.7729	0.0268	1

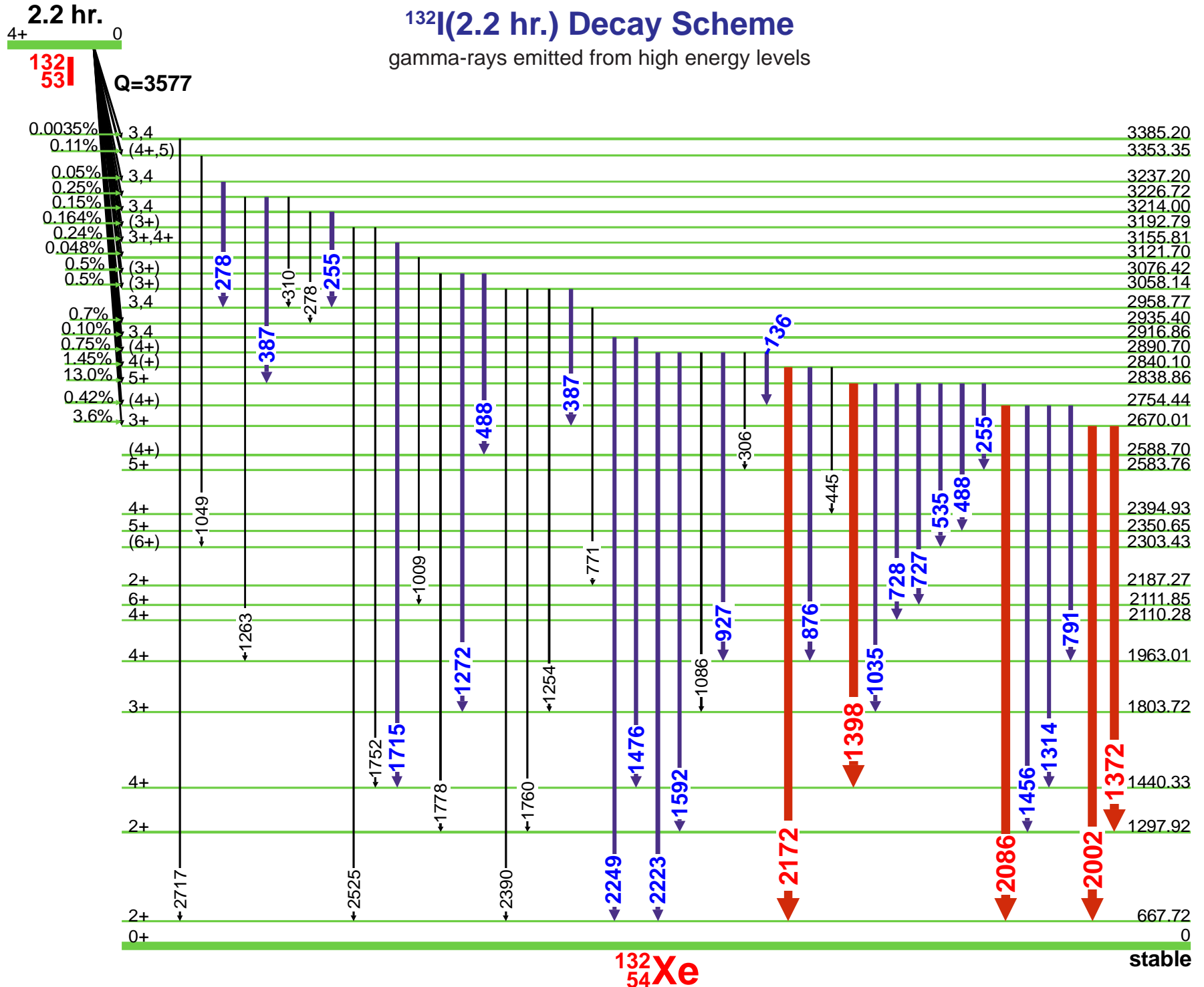
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹³²I(2.2 hr.) Decay Scheme

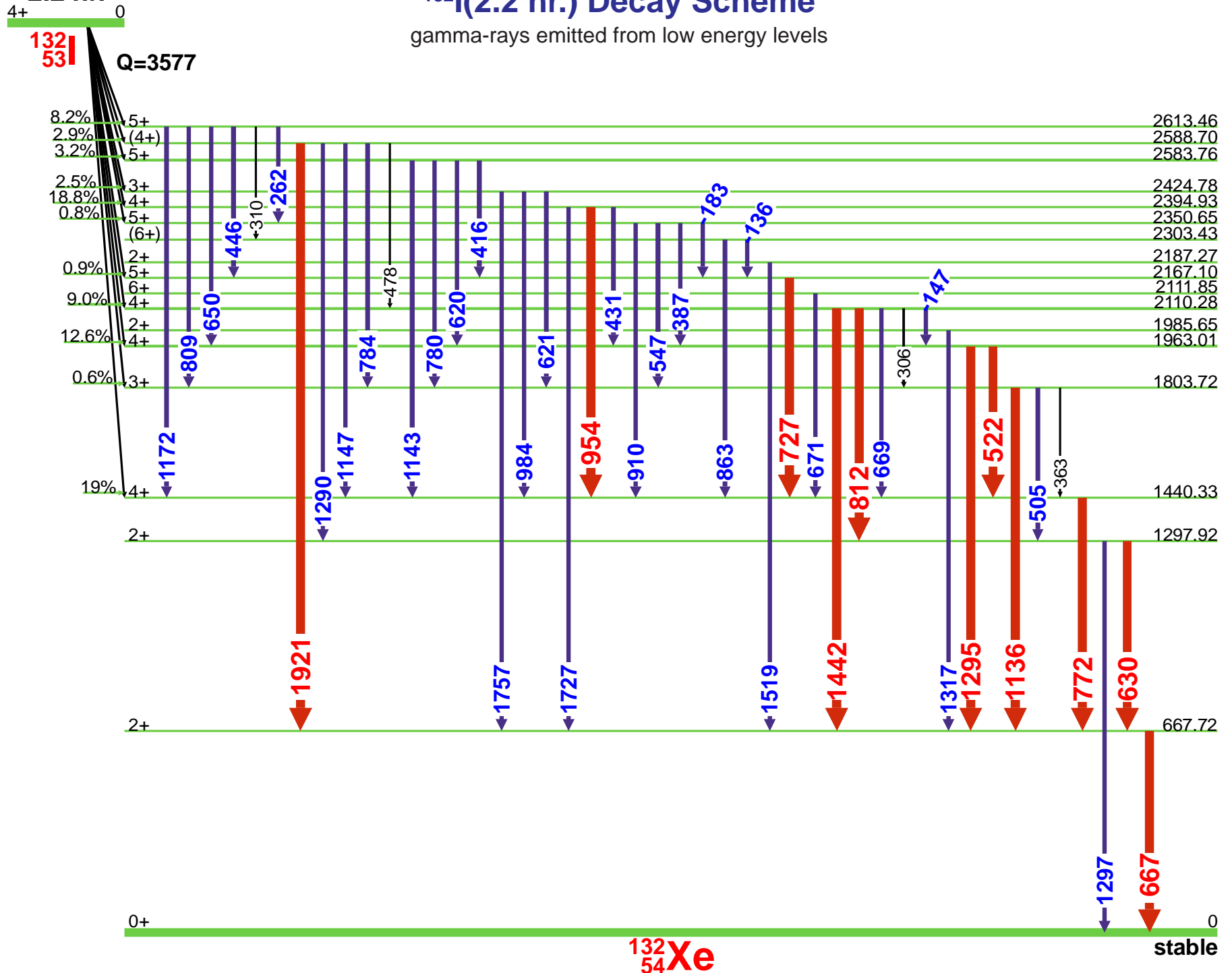
gamma-rays emitted from high energy levels



2.2 hr.

¹³²I(2.2 hr.) Decay Scheme

gamma-rays emitted from low energy levels



stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ¹³²IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 2.295(13) hr.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
D	136.7	0.4	0.10	0.079	0.010	4		547.20	0.20	1.38	1.14	0.08	3
	136.7	0.4						559.7	0.4		0.089	0.020	4
	147.40	0.20	0.24	0.237	0.020	4		572.5	0.4		0.059	0.020	4
	183.6	0.3	0.18	0.138	0.020	4		591.1	0.6		0.07	0.03	4
	234.3	0.6		0.030	0.010	4	D	591.1	0.6				
D	250.8	0.6		0.018	0.005	4		600.0	0.6		0.13	0.03	4
	250.8	0.6						D	600.0				
D	255.1	0.3	0.25	0.0197		4		609.8	0.5		0.040	0.010	4
	255.10	0.20		0.237	0.020	4		D	620.90	0.20	2.15	0.39	0.20
	262.90	0.10	1.47	1.28	0.10	3	621.2	0.3	1.58	0.20			
D	278.4	0.4		0.040	0.010	4		630.190	0.020	13.90	13.3	0.4	1
	278.4	0.4						642.2	0.4		0.0395		4
	284.90	0.20		0.71	0.07	4		650.50	0.20	2.74	2.57	0.20	2
	302.0	0.7		0.0197		4		667.718	0.003	100.	98.7		1
D	306.7	0.4	0.14	0.099	0.020	4		669.80	0.20	9.47	4.6	0.6	2
	306.7	0.4						671.40	0.20		3.5	1.0	
D	310.1	0.4	0.10	0.089	0.020	4		684.40	0.20		0.04	0.04	4
	310.4	0.4						687.8	0.5		0.040	0.020	4
	316.7	0.4		0.128	0.020	4		706.4	0.7		0.0197		4
	343.7	0.4		0.089	0.020	4	D	727.0	0.3	5.65	2.2	0.6	1
	351.8	0.4		0.079	0.020	4		727.2	0.3		3.2	0.6	
	363.34	0.05		0.49	0.10	4		728.40	0.20	1.39	1.6	0.4	3
D	387.9	0.3	0.20	0.30	0.05	4		771.70		76.99	0.020	0.020	1
	387.9	0.3						772.600	0.010		75.6	1.3	
	416.8	0.3	0.46	0.47	0.05	4		780.00	0.20	1.28	1.18	0.04	3
	431.8	0.3	0.50	0.47	0.05	4		784.4	0.4	0.42	0.38	0.04	4
D	445.0	0.6	0.53	0.0987		4		791.2	0.4	0.13	0.099	0.020	4
	446.2	0.3		0.60	0.05		4		809.50	0.20	3.03	2.6	0.3
	473.6	0.4		0.17	0.04	4		812.00	0.20	5.74	5.5	0.4	1
	478.2	0.4		0.17	0.04	4		831.3	0.5		0.025	0.010	4
D	488.0	0.4	0.92	0.41	0.05	4		847.9	0.5		0.017	0.005	4
	488.0	0.4						863.00	0.20	0.63	0.56	0.05	3
	505.79	0.03	4.97	4.94	0.20	3		866.0	0.6		0.036	0.014	4
	522.65	0.09	16.18	16.0	0.5	1	D	866.0	0.6				
	535.4	0.3	0.58	0.51	0.05	4		876.60	0.20	0.80	1.04	0.04	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ¹³²I E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.295(13) hr.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	
D	886.1	0.5		0.025	0.008	4	
	888.7	0.5		0.034	0.008	4	
	888.7	0.5					
	904.4	0.5		0.013	0.004	4	
	910.10	0.20	1.04	0.93	0.03	3	
	927.4	0.3	0.47	0.41	0.04	3	
	947.2	0.6		0.044	0.014	4	
	954.55	0.09	17.60	17.6	0.5	1	
	965.8	0.5	0.06	0.034	0.008	4	
	984.20	0.20	0.80	0.59	0.04	3	
	995.8	0.5		0.030	0.010	4	
	D	1002.5	0.6		0.026	0.007	4
		1002.5	0.6				
		1005.4	0.6		0.016	0.005	4
1009.0		0.4		0.046	0.007	4	
1035.00		0.20	0.57	0.51	0.05	3	
1049.6		0.4	0.10	0.046	0.012	4	
1081.8		0.4		0.034	0.008	4	
1086.2		0.4	0.09	0.079	0.020	4	
1096.9		0.4		0.044	0.008	4	
1112.4		0.4		0.065	0.015	4	
D		1126.5	0.4		0.049	0.020	4
		1126.5	0.4				
		1136.000	0.020	3.23	3.01	0.14	1
		1143.30	0.20	1.57	1.35	0.06	2
	1147.8	0.5	0.40	0.27	0.05	4	
	1172.90	0.20	1.29	1.09	0.07	3	
	1212.3	0.4		0.012	0.003	4	
	1242.6	0.7		0.0089		4	
	1254.1	0.4	0.05	0.059	0.007	4	
	1263.6	0.5	0.03	0.027	0.006	4	
	1272.8	0.4	0.21	0.168	0.020	3	
	1290.80	0.20	1.21	1.13	0.05	2	
	1295.10	0.20	1.85	1.88	0.07	1	
	1297.910	0.020	0.71	0.89	0.07	2	
1314.0	0.5	0.08	0.059	0.009	4		

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1317.927	0.007	0.11	0.118	0.015	3
	1360.0	0.5		0.0059	0.0020	4
	1372.07	0.13	2.52	2.47	0.10	1
	1390.7	0.7		0.015	0.010	4
	1398.57	0.10	7.42	7.01	0.20	1
	1410.6	0.3		0.043	0.007	4
	1442.56	0.10	1.44	1.40	0.05	1
	1450.0	0.5		0.0079	0.0020	4
	1456.50	0.20	0.12	0.049	0.007	3
	1476.70	0.20	0.15	0.130	0.009	3
	1519.60	0.20	0.10	0.079	0.005	3
	1531.9	0.5		0.0059	0.0020	4
	1542.3	0.6		0.0158	0.0020	4
	1559.0	0.4		0.0089	0.0020	4
	1592.9	0.3	0.07	0.047	0.004	4
	1617.90	0.20		0.010	0.005	4
	1618.9	0.3		0.007	0.005	4
	1636.5	0.6		0.012	0.004	4
	1636.5	0.6		0.012	0.004	4
	1639.1	0.5		0.0079	0.0020	4
	1644.0	0.6		0.013	0.004	4
	1661.4	0.5		0.0158	0.0030	4
	1671.3	0.4		0.022	0.004	4
	1679.3	0.6		0.0059	0.0020	4
	1715.4	0.4		0.055	0.004	4
	1720.6	0.5		0.054	0.004	4
	1727.2	0.4	0.11	0.067	0.006	4
	1752.3	0.7		0.025	0.008	4
	1757.4	0.2	0.35	0.30	0.03	3
	1760.4	0.6		0.059	0.020	4
	1768.5	0.8		0.025	0.008	4
	1778.5	0.4	0.10	0.079	0.008	4
	1786.5	0.6		0.0109	0.0020	4
	1786.5	0.6		0.0109	0.0020	4
	1814.0	0.5		0.016	0.004	4
	1830.1	0.5		0.028	0.005	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ¹³²IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 2.295(13) hr.

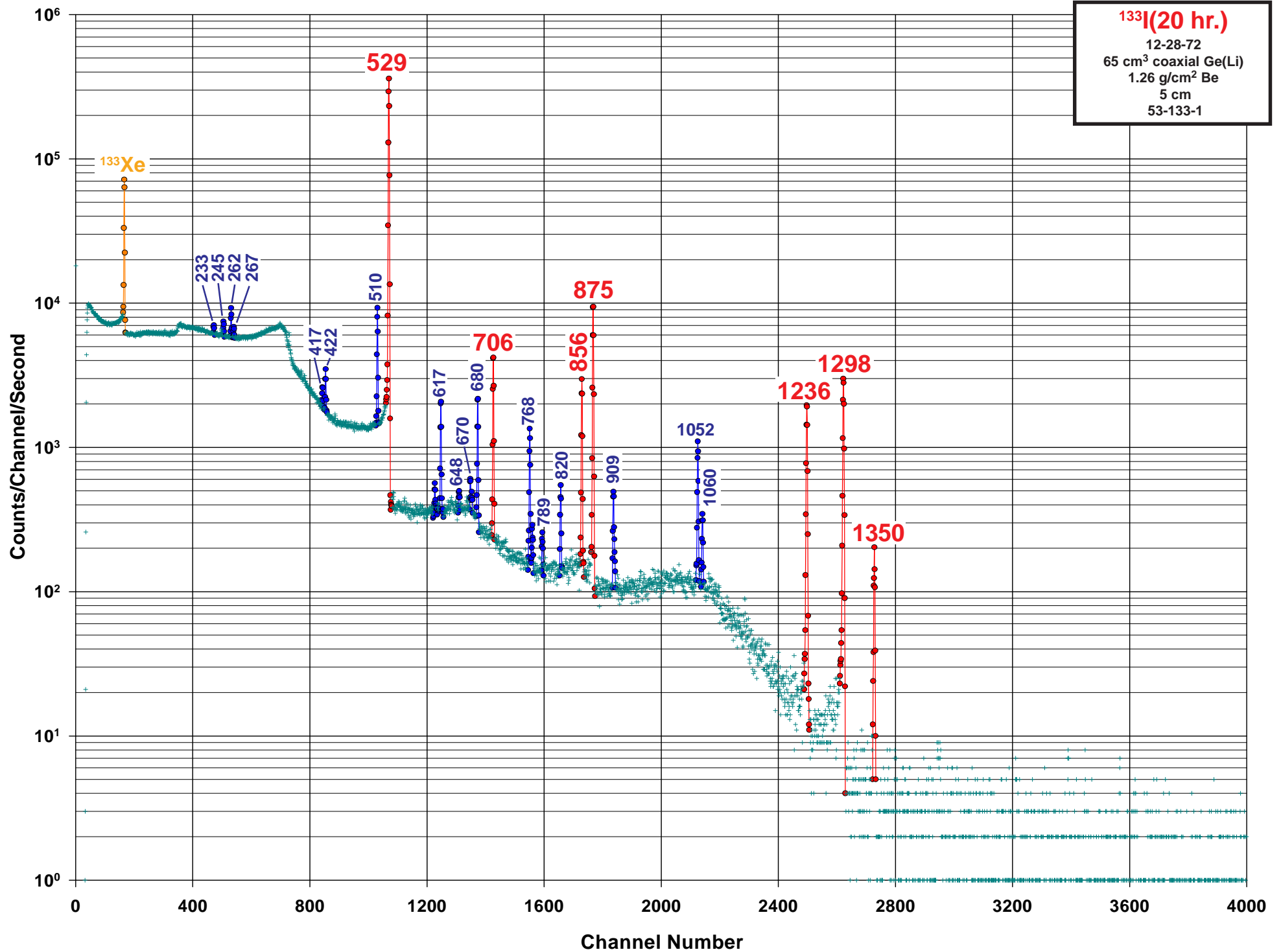
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1879.2	0.5		0.014	0.003	4
1913.7	0.5		0.030	0.010	4
1921.08	0.12	1.24	1.23	0.06	1
1925.7	1.0		0.0020	0.0010	4
1939.5	0.7		0.0049	0.0020	4
1985.638	0.008		0.0118	0.0020	4
2002.2	0.5	1.22	1.14	0.08	1
2086.82	0.15	0.28	0.257	0.020	1
2172.68	0.15	0.25	0.207	0.020	1
2187.0	0.6		0.007	0.003	4
2204.2	0.6		0.0030	0.0020	4
2223.17	0.15	0.126	0.118	0.020	2
2249.1	0.3	0.04	0.0336	0.0020	3
2290.6	0.6		0.0036	0.0008	4
2390.48	0.15	0.20	0.188	0.020	3

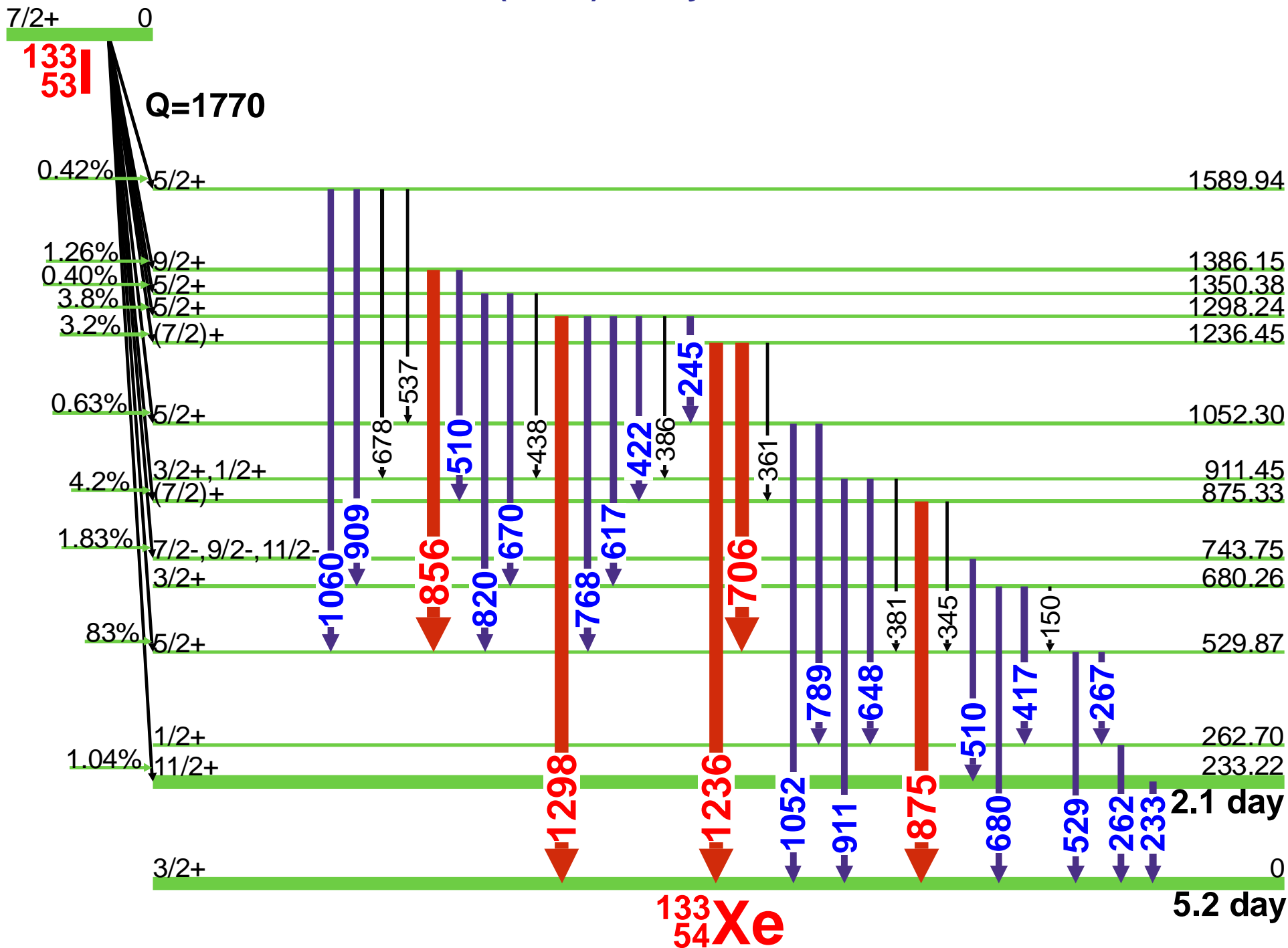
E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
2408.6	0.4		0.0094	0.0008	4
2416.9	0.4		0.0014	0.0006	4
2444.0	0.6		0.0056	0.0008	4
2454.8	0.4		0.0021	0.0005	4
2487.8	0.6		0.0008	0.0002	4
2525.14	0.15	0.04	0.040	0.004	3
2546.5	0.6		0.0016	0.0005	4
2569.8	0.4		0.0049	0.0010	4
2593.8	0.8		0.0012	0.0003	4
2603.2	0.5		0.0015	0.0003	4
2607.2	0.6		0.0010	0.0003	4
2614.5	0.4		0.0036	0.0012	4
2653.8	0.6		0.0010	0.0003	4
2690.8	0.7		0.0010	0.0003	4
2717.5	0.6	0.003	0.0035	0.0005	3
2757.8	0.7		0.0013	0.0006	4





20 hr.

¹³³I(20 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³³IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 20.8(1) hr.

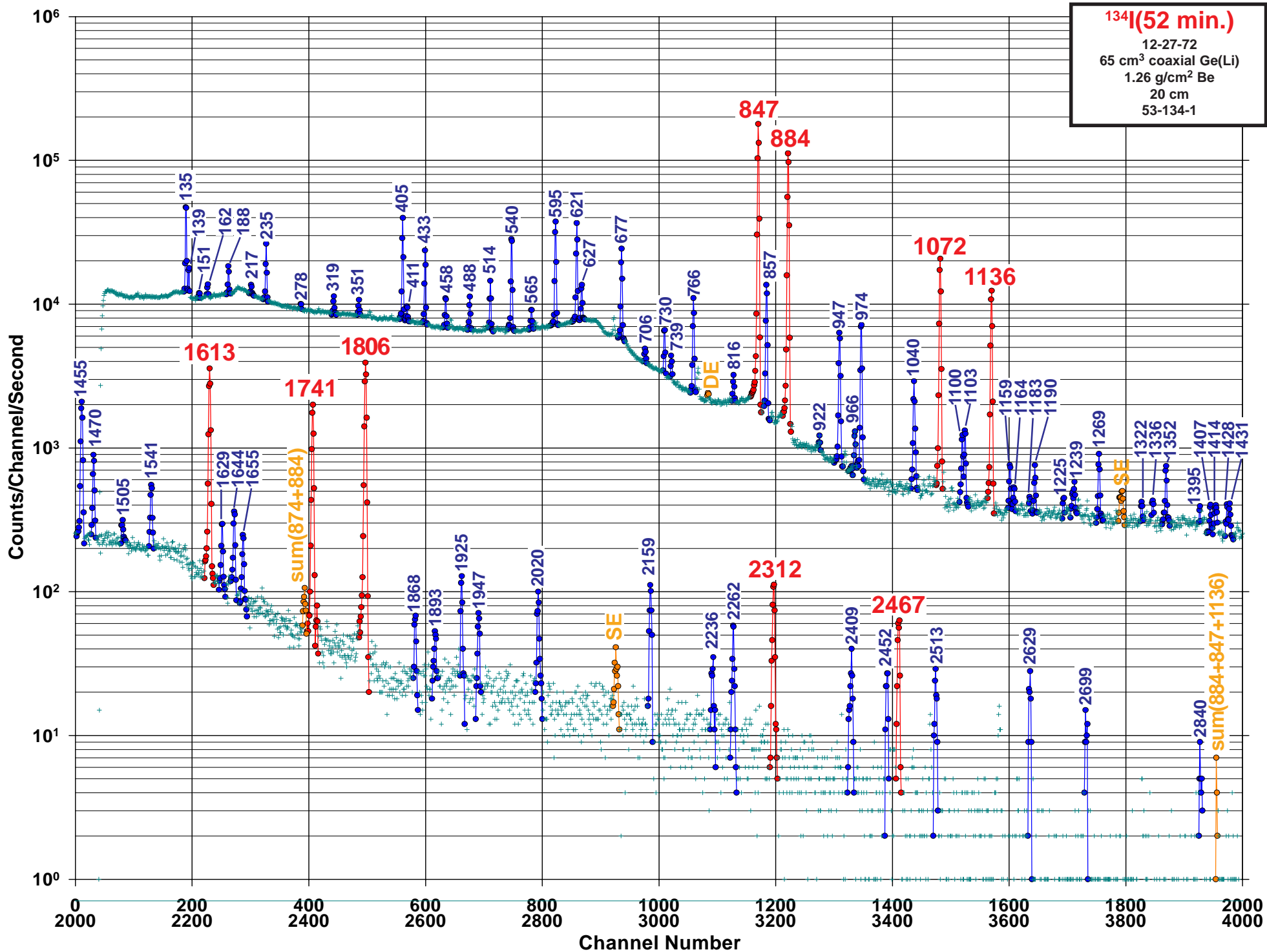
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
80.					1
150.39		0.018	0.030	0.006	4
176.97	0.07		0.078	0.018	4
203.7			0.0044	0.0001	4
233.221	0.018	0.13			4
245.95	0.08	0.099	0.0348	0.0087	4
262.702	0.012	0.46	0.359	0.013	4
267.173	0.022	0.16	0.118	0.007	4
345.43	0.05	0.49	0.104	0.018	4
361.09	0.06	0.27	0.11	0.03	4
372.05	0.15		0.010	0.005	4
381.59	0.07	0.062	0.045	0.004	4
386.85	0.05	0.079	0.059	0.005	4
417.56		0.17	0.154	0.011	4
422.910	0.016	0.36	0.312	0.011	3
438.87	0.09	0.046	0.040	0.004	4
510.530	0.011	2.09	1.83	0.06	2
510.8			0.0087	0.0002	
522.4			0.0870	0.0020	4
529.872	0.011	100.	87.0	2.7	1
537.73	0.10	0.036	0.036	0.007	4
554.5			0.0009		4
556.17	0.08		0.0200	0.0027	4
567.1	0.4		0.0035	0.0026	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
617.974	0.017	0.65	0.544	0.018	3
648.76	0.06	0.055	0.056	0.013	4
670.10	0.09	0.14	0.043	0.005	4
678.65	0.25		0.022	0.007	4
680.247	0.015	0.80	0.650	0.022	2
706.578	0.013	1.71	1.51	0.05	1
768.382	0.018	0.56	0.460	0.016	2
789.59	0.06	0.046	0.050	0.004	4
820.506	0.024	0.19	0.155	0.006	3
856.278	0.012	1.41	1.24	0.05	1
875.329	0.011	5.10	4.51	0.14	1
909.67	0.03	0.263	0.214	0.009	3
911.49	0.06		0.046	0.006	
1018.1	0.5		0.0061	0.0026	4
1035.58	0.25		0.0087	0.0018	4
1052.296	0.021	0.65	0.556	0.018	2
1060.07	0.06	0.18	0.138	0.007	3
1087.71	0.10		0.0122	0.0018	4
1236.441	0.012	1.8	1.51	0.05	1
1298.223	0.011	2.71	2.35	0.08	1
1327.2			0.0004		4
1350.38	0.03	0.167	0.150	0.006	1
1386.15	0.10		0.0087	0.0026	4
1589.94	0.25		0.0030	0.0004	4





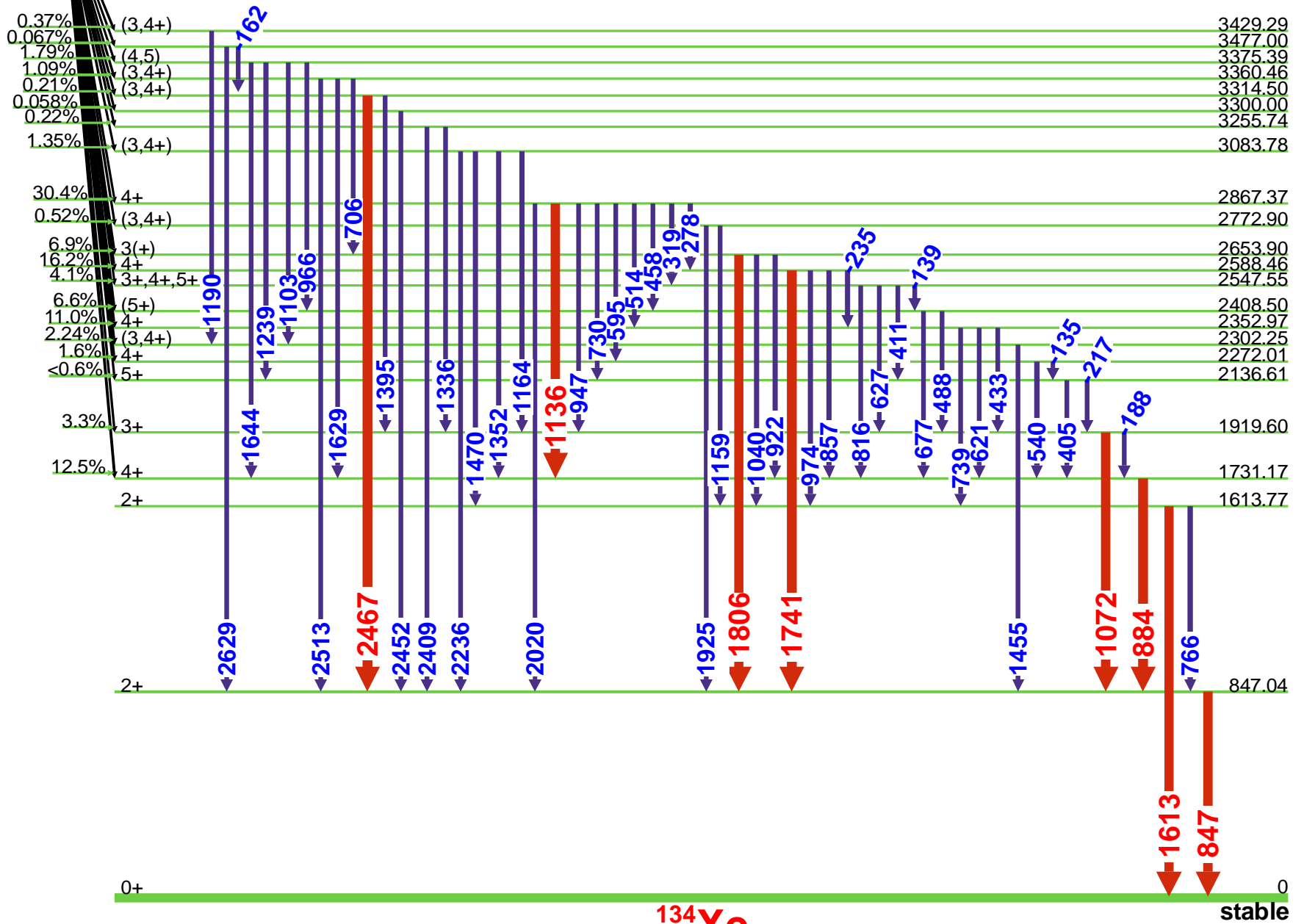
52 min.

¹³⁴I(52 min.) Decay Scheme

(4)+ 0

¹³⁴₅₃I

Q=4175



¹³⁴₅₄Xe

stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ¹³⁴LaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 52.5(2) min.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
135.399	0.022	3.94	4.29	0.29	3
139.03	0.03	0.72	0.75	0.04	4
151.98	0.15	0.11	0.106	0.012	4
162.48	0.07	0.27	0.286	0.029	4
188.47	0.04	0.73	0.76	0.06	3
217.00	0.20	0.26	0.229	0.029	4
235.471	0.026	2.08	2.13	0.15	3
278.80	0.15	0.137	0.143	0.019	4
319.81	0.06	0.54	0.458	0.029	4
351.08	0.10	0.52	0.42	0.07	4
405.451	0.020	7.7	7.35	0.19	2
411.00	0.08	0.64	0.57	0.04	4
433.35	0.03	4.39	4.14	0.14	3
458.92	0.06	1.36	1.31	0.06	3
465.50	0.10	0.38	0.36	0.04	4
488.88	0.04	1.48	1.45	0.06	3
514.40	0.03	2.45	2.23	0.09	3
540.825	0.025	8.2	7.63	0.19	2
565.52	0.04	0.92	0.94	0.07	4
570.75	0.15		0.31	0.08	4
595.362	0.020	11.9	11.1	0.4	2
621.790	0.025	11.1	10.6	0.4	2
627.96	0.03	2.48	2.21	0.13	3
677.34	0.03	8.9	7.92	0.29	3
706.65	0.10	0.87	0.83	0.06	4
730.74	0.04	2.00	1.82	0.08	3
739.18	0.08	0.80	0.69	0.05	4
766.68	0.04	4.30	4.14	0.12	3
816.38	0.07	0.55	0.62	0.07	4
847.025	0.025	100.	95.4	1.9	1
857.29	0.03	7.3	6.68	0.19	2
864.0	0.3	0.20	0.191	0.029	4
884.090	0.025	68.4	64.9	1.9	1
922.6	0.3	0.15	0.143	0.029	4
947.86	0.04	4.23	4.00	0.12	2
966.90	0.05	0.37	0.39	0.04	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
974.67	0.04	4.88	4.77	0.19	2
1040.25	0.10	2.01	2.02	0.14	3
1052.2	0.3	0.07	0.067	0.019	4
1058.8	0.3	0.10	0.095	0.029	4
1072.55	0.03	16.0	14.9	0.5	1
1087.00	0.20	0.09	0.086	0.019	4
1100.07	0.12	0.72	0.69	0.06	3
1103.18	0.12	0.76	0.80	0.06	3
1136.16	0.04	10.2	9.1	0.6	1
1159.10	0.08	0.32	0.343	0.029	3
1164.0	0.3	0.14	0.134	0.029	4
1183.2	0.5	0.06	0.06	0.07	4
1190.03	0.08	0.37	0.353	0.029	3
1225.5	0.3	0.07	0.067	0.019	4
1239.0	0.3	0.22	0.21	0.06	4
1243.8	0.3	0.08	0.076	0.019	4
1269.49	0.05	0.59	0.56	0.04	3
1322.4	0.3	0.11	0.10	0.04	4
1336.00	0.20	0.15	0.143	0.029	4
1352.62	0.08	0.47	0.410	0.029	3
1395.0	1.0	0.08	0.076	0.019	4
1407.40	0.20	0.10	0.095	0.019	4
1414.3	0.5	0.23	0.22	0.06	4
1428.2	0.3	0.18	0.17	0.04	4
1431.35	0.25	0.18	0.17	0.04	4
1455.24	0.05	2.40	2.29	0.19	2
1470.00	0.07	0.81	0.75	0.04	3
1505.5	0.4	0.12	0.11	0.04	4
1541.51	0.07	0.53	0.51	0.04	3
1613.80	0.04	4.57	4.29	0.19	1
1629.24	0.08	0.27	0.19	0.04	3
1644.25	0.07	0.43	0.39	0.04	3
1655.19	0.10	0.24	0.229	0.029	3
1741.49	0.05	2.8	2.56	0.15	1
1806.84	0.04	5.95	5.53	0.19	1



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ¹³⁴IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 52.5(2) min.

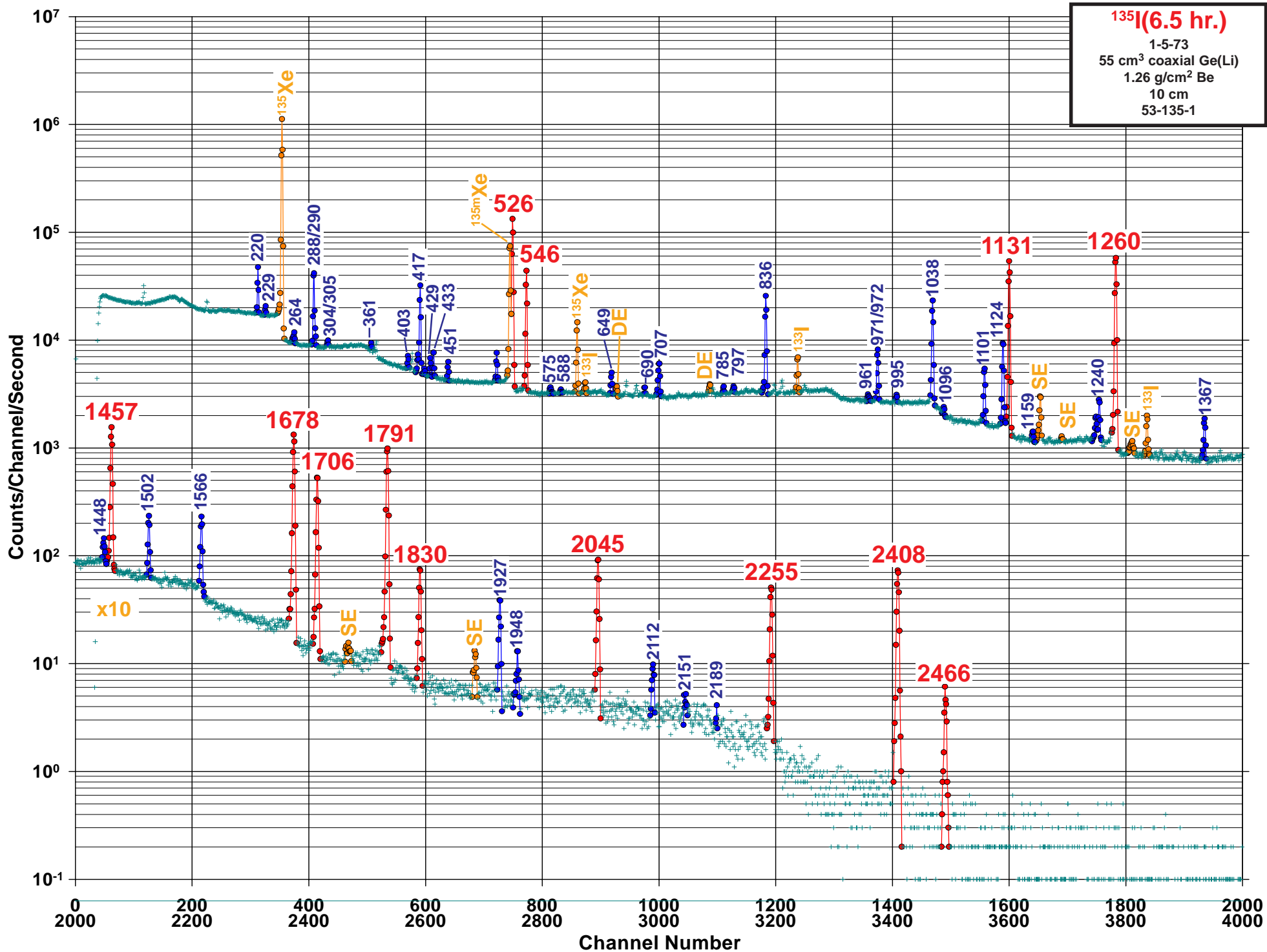
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1868.50	0.20	0.07	0.067	0.019	3
1893.2	0.3	0.06	0.057	0.010	4
1925.88	0.10	0.19	0.181	0.029	3
1947.3	0.3	0.10	0.095	0.019	3
2020.6	0.3	0.18	0.191	0.029	3
2159.9	0.3	0.22	0.210	0.029	2
2236.7	0.5	0.056	0.053	0.014	3
2262.5	0.3	0.10	0.095	0.019	3
2312.40	0.20	0.25	0.238	0.029	1

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
2409.0	0.3	0.079	0.078	0.010	3
2452.9	0.3	0.067	0.058	0.011	3
2467.4	0.3	0.16	0.134	0.019	1
2513.3	0.3	0.073	0.067	0.008	3
2629.9	0.3	0.070	0.067	0.007	3
2646.0	2.0		0.0191	0.0001	4
2699.5	0.5	0.034	0.032	0.008	3
2840.0	4.0	0.02	0.019	0.010	4



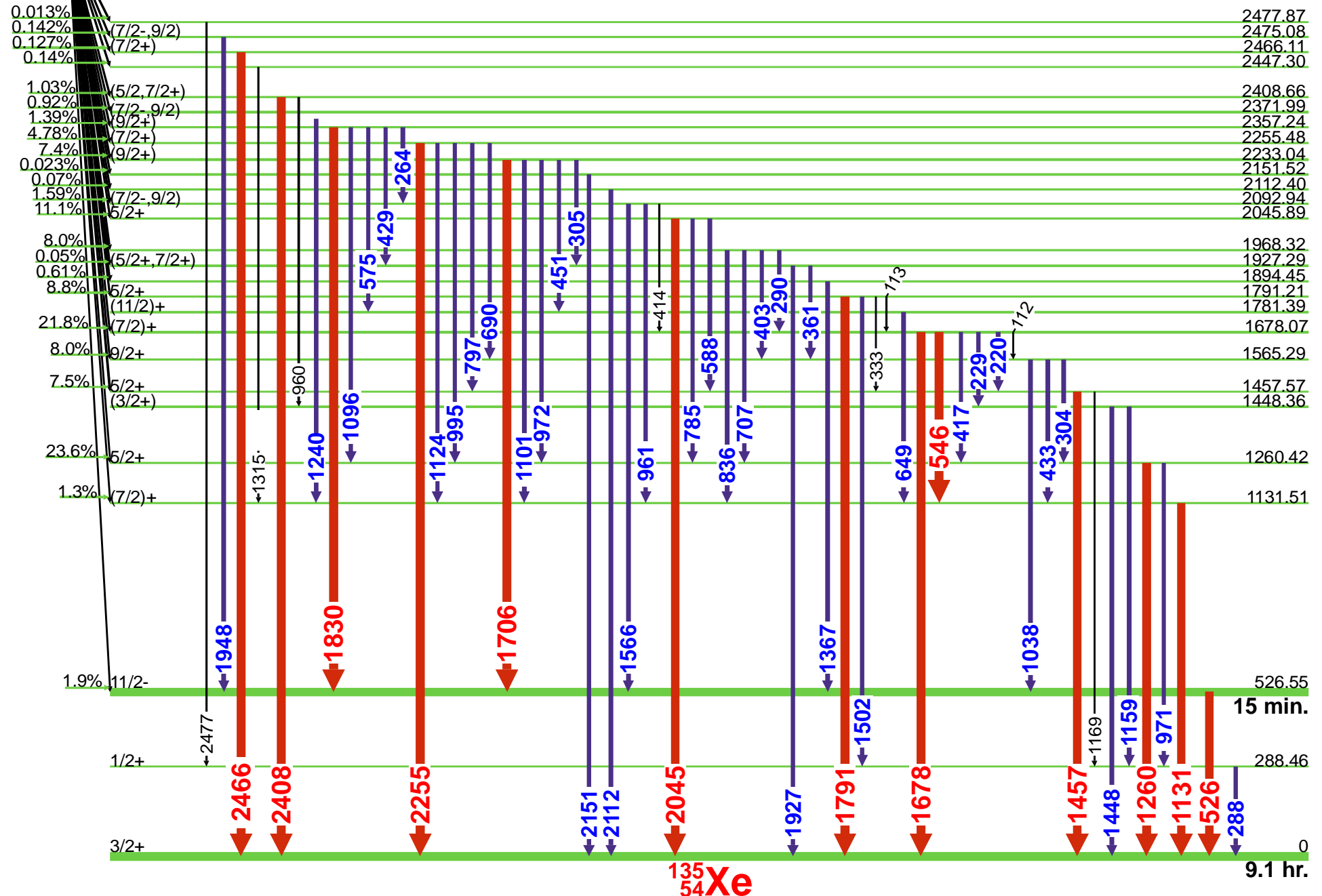


6.5 hr.

¹³⁵I(6.5 hr.) Decay Scheme

7/2+ 0

¹³⁵₅₃I Q=2648



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ¹³⁵IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 6.57(2) hr.

Detector: 55 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
D	112.78		0.097	0.0127		4		707.92	0.04	2.8	0.665	0.029	3
	113.15			0.0069					785.48	0.05	0.48	0.153	0.017
	162.65	0.11		0.0098	0.0026	4		795.5	0.4		0.023	0.023	4
	165.74	0.06		0.0315	0.0026	4		797.71	0.08	0.53	0.173	0.026	4
	184.49	0.08	0.19	0.0237	0.0023	4		807.2	0.3		0.046	0.017	4
	197.19	0.07	0.16	0.0329	0.0026	4		836.804	0.016	22.5	6.73	0.09	2
	220.502	0.015	6.4	1.763	0.029	3		960.29		0.63	0.035	0.026	4
	229.72	0.03	0.74	0.2428	0.0023	4		961.43			0.147	0.026	4
	247.5	0.3		0.029	0.009	4		971.96		7.6	0.896	0.029	3
	254.74	0.13		0.021	0.009	4	D	972.62			1.214	0.029	
	264.26	0.09	1.1	0.1850	0.0029	4		995.09	0.10	0.76	0.156	0.026	4
D	288.451	0.016	11.7	3.12	0.06	3		1038.760	0.021	28.2	8.01	0.09	2
	290.27	0.04		0.306	0.017				1096.86	0.10		0.090	0.014
D	304.91	0.13	0.47	0.0318	0.0029	4		1101.58	0.03	5.6	1.618	0.026	3
	305.83	0.09		0.0957	0.0026				1124.00	0.03	12.7	3.641	0.029
	326.00	0.20		0.0023	0.0017	4		1131.511	0.018	76.4	22.74	0.14	1
	333.60	0.20	0.163	0.0376	0.0029	4		1151.51			0.0029		4
	342.52	0.12		0.0009	0.0006	4		1159.90	0.20	0.53	0.104	0.023	4
	361.85	0.13	0.43	0.188	0.023	4		1169.04	0.04	3.22	0.881	0.023	3
	403.03	0.04	1.05	0.2341	0.0029	4		1180.46	0.09	0.19	0.064	0.009	4
	414.83	0.03	1.1	0.303	0.014	4		1225.6	0.3		0.043	0.017	4
	417.633	0.022	12.5	3.555	0.029	2		1240.47	0.03	3.00	0.910	0.026	3
	429.93	0.03	1.10	0.306	0.020	4		1254.8	1.0		0.0058	0.0029	4
	433.741	0.019	1.81	0.558	0.014	4	D	1254.8	1.0		0.0058	0.0029	
	451.63	0.03	1.03	0.318	0.014	4		1260.409	0.017	100.	28.90	0.17	1
	526.561	0.017	45.0			1		1277.83	0.12		0.0578	0.0029	4
	530.8	0.4		0.032	0.014	4		1308.70	0.15		0.035	0.009	4
	546.557	0.016	24.8	7.20	0.09	1		1315.77	0.11	0.40	0.066	0.017	4
	575.97	0.08	0.31	0.130	0.023	4		1334.80	0.20		0.032	0.009	4
	588.28	0.06	0.09	0.052	0.014	4		1343.66	0.09	0.31	0.078	0.012	4
	616.90	0.20		0.038	0.017	4		1367.89	0.04	2.30	0.613	0.023	3
	649.85	0.04	1.56	0.460	0.026	4		1416.3	0.4		0.032	0.009	4
	656.09	0.10		0.075	0.014	4		1441.8	0.5		0.017	0.012	4
	679.22	0.15		0.055	0.014	4		1448.35	0.10	1.5	0.318	0.026	4
	684.60	0.20		0.023	0.009	4		1457.56	0.03	30.4	8.73	0.06	1
	690.13	0.05	0.58	0.130	0.014	4		1502.79	0.04	3.9	1.084	0.026	2



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ¹³⁵IE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 6.57(2) hr.

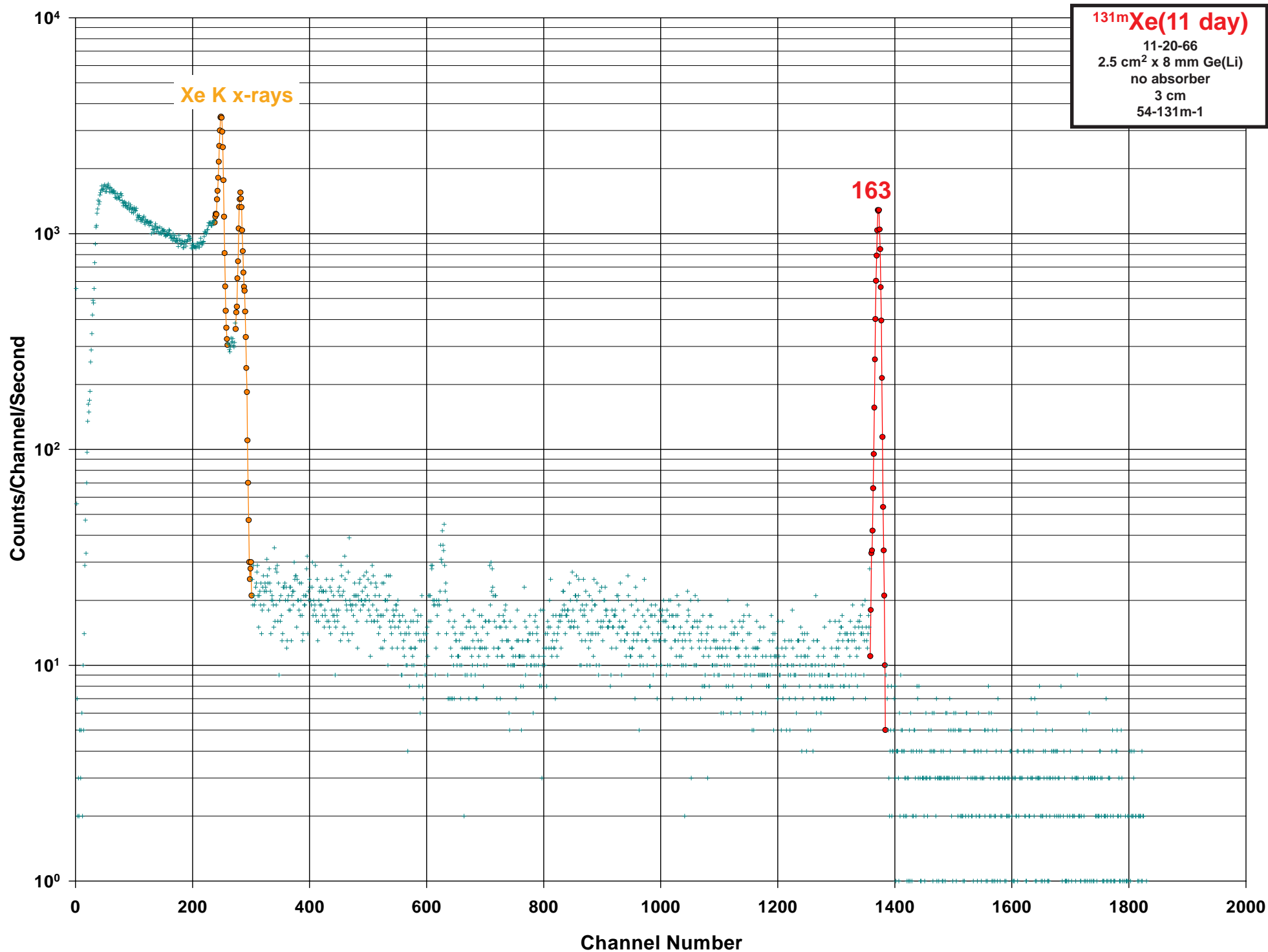
Detector: 55 cm³ coaxial Ge (Li)

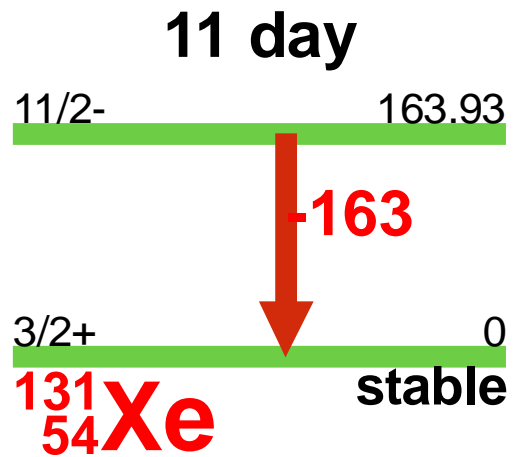
Method of Production: U(n,f) chem.

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1521.99	0.13		0.038	0.017	4
1543.70	0.20		0.026	0.009	4
1566.41	0.03	4.9	1.300	0.029	2
1613.75	0.14		0.026	0.006	4
1678.027	0.021	34.1	9.62	0.20	1
1706.459	0.021	14.5	4.13	0.12	1
1791.196	0.021	28.1	7.774	0.029	1
1830.69	0.04	2.11	0.584	0.017	1
1845.3	0.4		0.0058	0.0026	4
1927.30	0.03	1.12	0.298	0.012	2
1948.49	0.05	0.278	0.064	0.006	3

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
2045.88	0.03	3.13	0.879	0.026	1
2112.4	0.5	0.27	0.069	0.029	3
2151.50	0.10	0.11	0.0225	0.0026	4
2179.7	0.5		0.0040	0.0017	4
2189.40	0.20		0.0130	0.0026	4
2255.457	0.022	2.16	0.618	0.020	1
2408.65	0.03	3.22	0.962	0.026	1
2452.8	0.8		0.009	0.006	4
2466.07	0.10	0.24	0.0723	0.0029	1
2477.1	0.4		0.0014	0.0003	4





$^{131\text{m}}\text{Xe}$ (11 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: $^{131\text{m}}\text{Xe}$

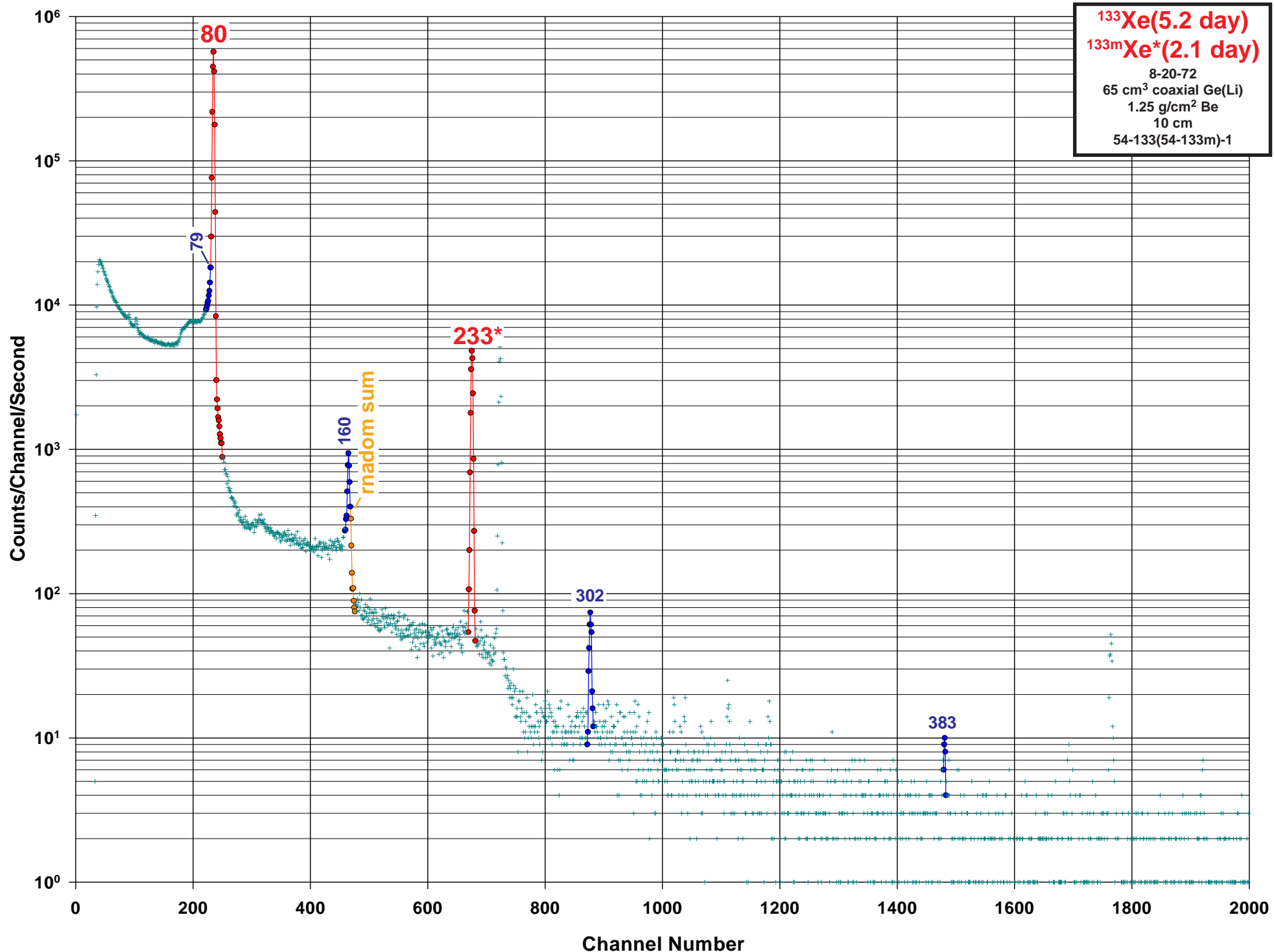
Half Life: 11.84(7) day

Detector: 2.5 cm² x 8mm Ge (Li)

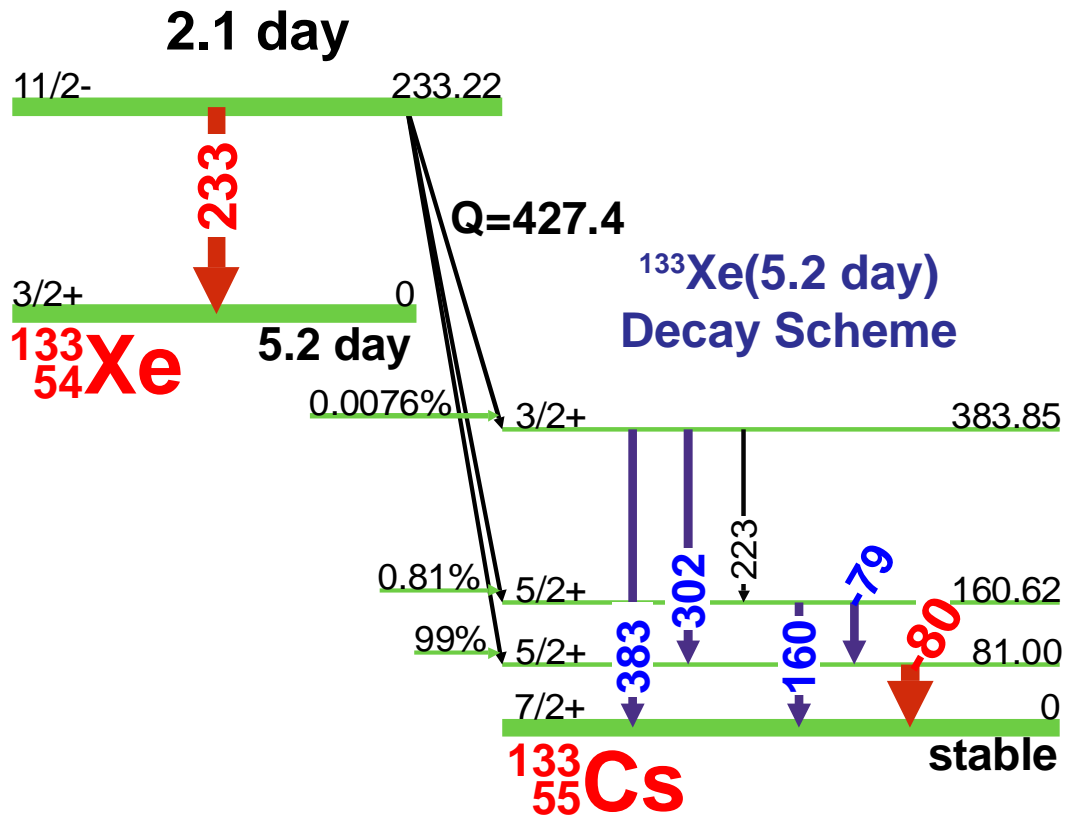
Method of Production: U(n,f) chem

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
163.93	0.008	100	1.95	0.06	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



^{133m}Xe(2.1 day) Decay Scheme



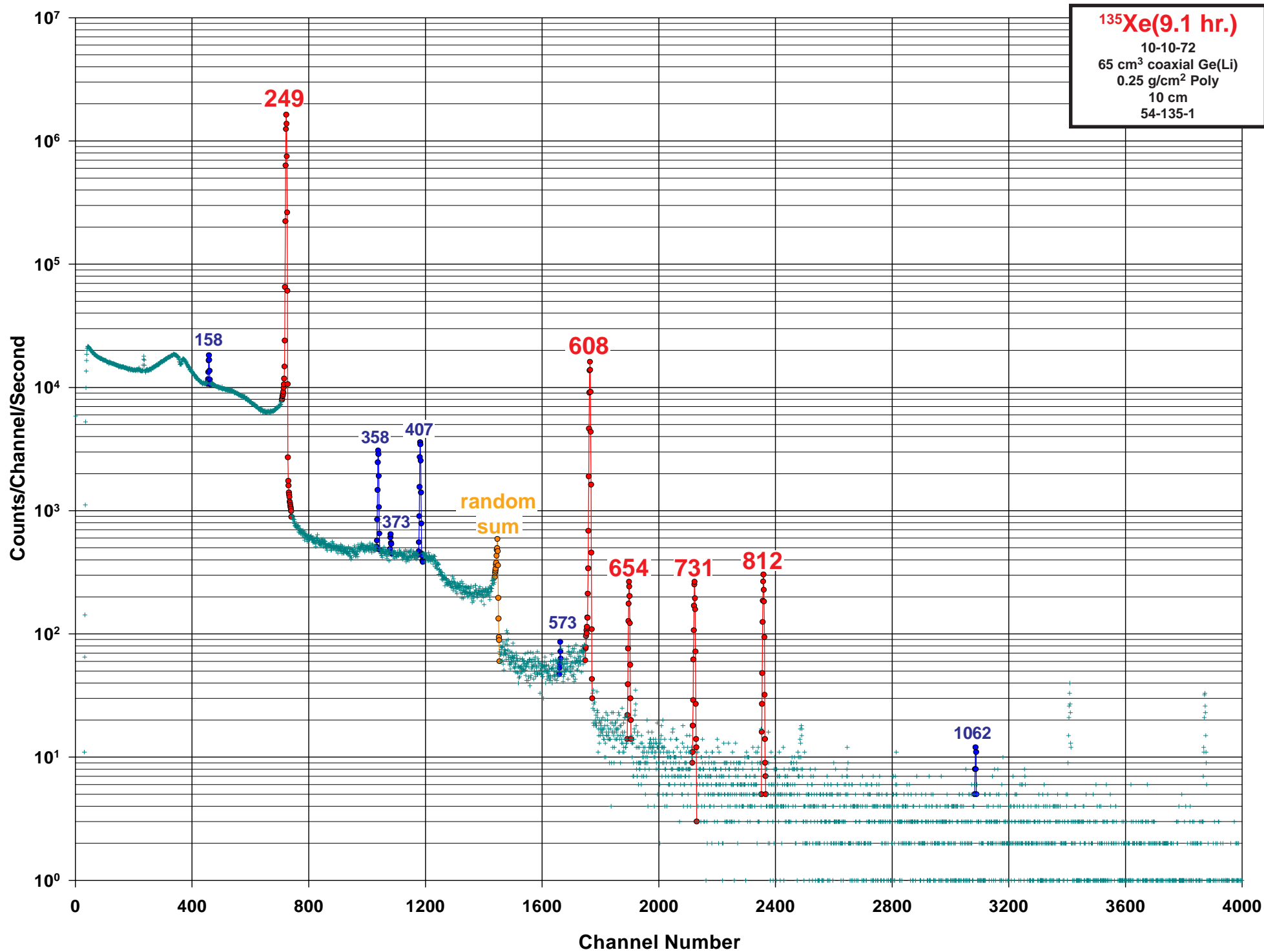
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{133m}Xe* - ¹³³Xe Half Life: 2.19(1) day* - 5.243(1) day
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: U(n,f) chem.

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
79.623	0.01	0.8	0.27	0.03	4
80.997	0.003	100	38	0.7	1
160.613	0.008	0.09	0.066	0.005	3
223.234	0.012		0.00011	0.00001	4
* 233.221	0.018		10	0.3	1
302.853	0.001	0.02	0.0048	0.0003	3
383.851	0.003	0.01	0.0024	0.0002	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





GAMMA-RAY ENERGIES AND INTENSITIES

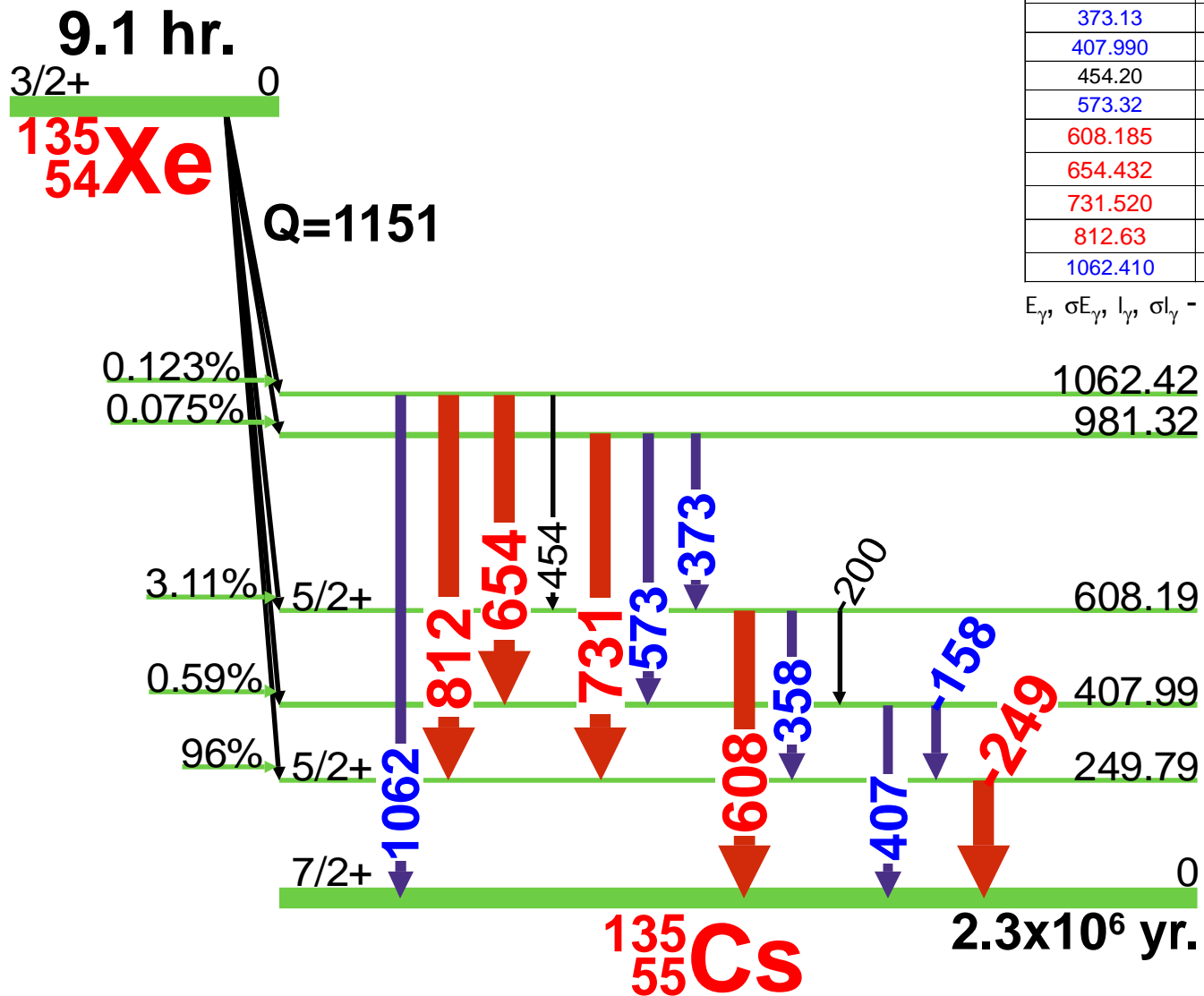
Nuclide: ^{135}Xe

Half Life: 9.14(2) hr.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

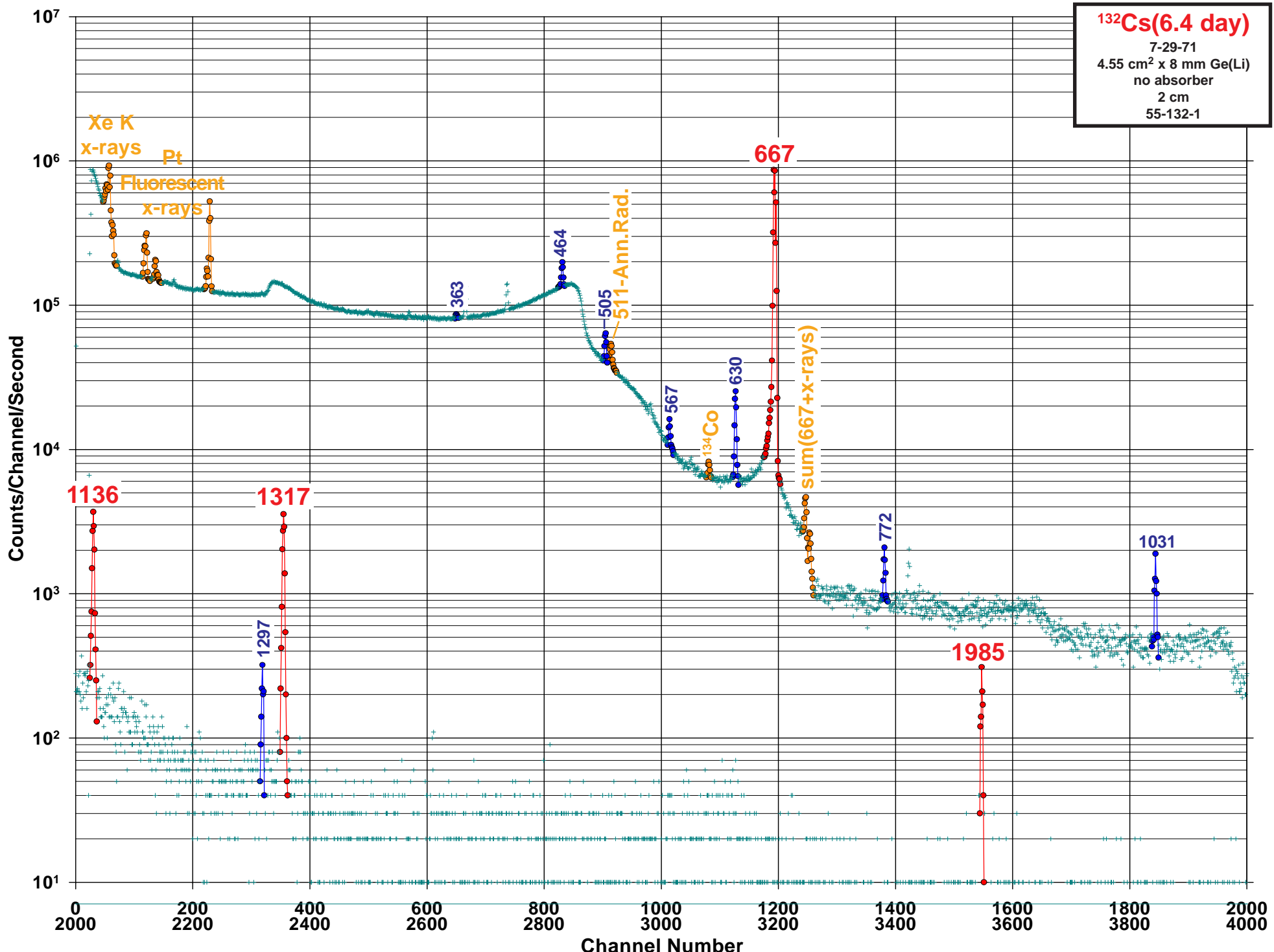
^{135}Xe (9.1 hr.) Decay Scheme



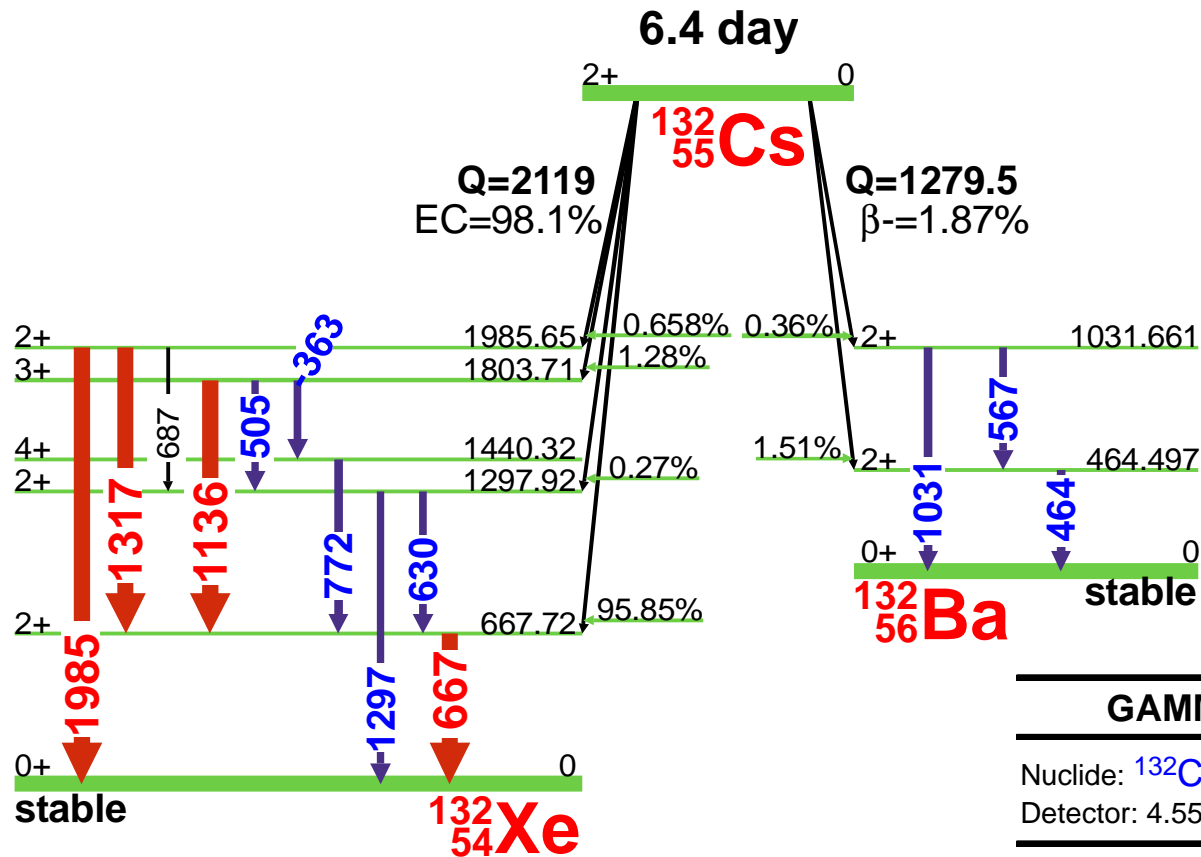
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
158.197	0.018	0.28	0.2895	0.010	4
200.19	0.10		0.012	0.004	4
249.794	0.015	100.	90.20	0.20	1
358.39	0.03	0.26	0.221	0.008	2
373.13	0.10	0.016	0.0153	0.0027	4
407.990	0.020	0.39	0.359	0.012	2
454.20	0.20		0.0036	0.0007	4
573.32	0.09	0.003	0.0048	0.0007	4
608.185	0.015	3.33	2.90	0.09	1
654.432	0.016	0.061	0.0451	0.0018	1
731.520	0.020	0.067	0.0550	0.0027	1
812.63	0.03	0.086	0.0704	0.0018	1
1062.410	0.020	0.003	0.0041	0.0008	4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





¹³²Cs(6.4 day) Decay Scheme



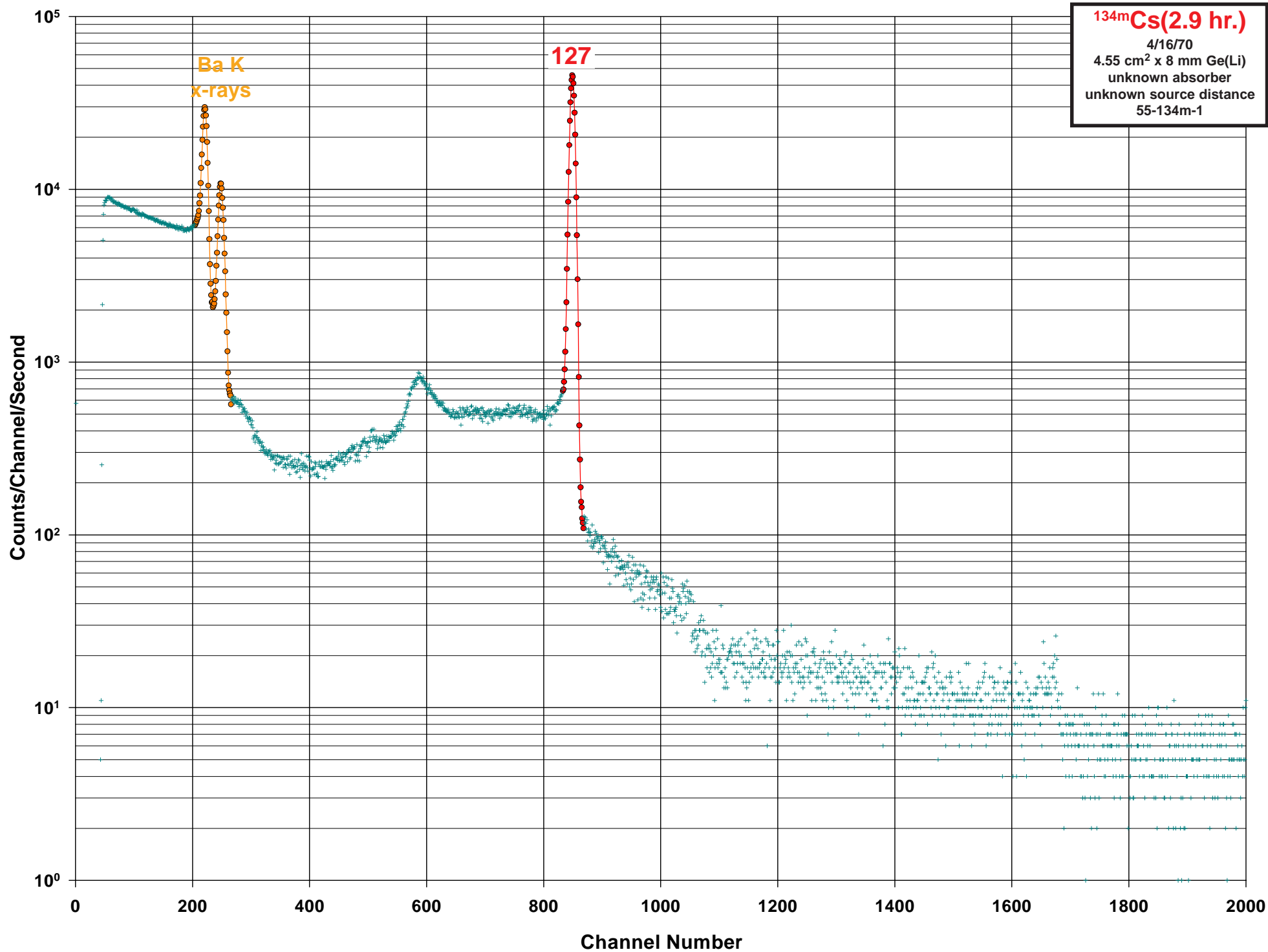
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³²Cs Half Life: 6.479(7) day
 Detector: 4.55 cm² x 8 mm Ge (Li) Method of Production: ¹³³Cs(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	363.34	0.05	0.06	0.0696	0.0020	4
	464.47	0.03	1.6	1.74	0.08	4
	505.79	0.03	1.0	0.75	0.05	4
Ann.	511.006			0.85	0.10	4
	567.16	0.01	0.40	0.235	0.09	4
	630.190	0.020	1.0	0.96	0.03	2
	667.718	0.003	100.	99.38		1
	687.74	0.17		0.0022	0.0005	4
	772.600	0.010	0.10	0.074	0.003	3
	1031.66	0.01	0.14	0.125	0.005	2
	1136.000	0.020	0.48	0.485	0.013	1
	1297.910	0.020	0.065	0.056	0.004	2
	1317.927	0.007	0.56	0.596	0.020	1
	1985.638	0.008	0.070	0.072	0.003	1

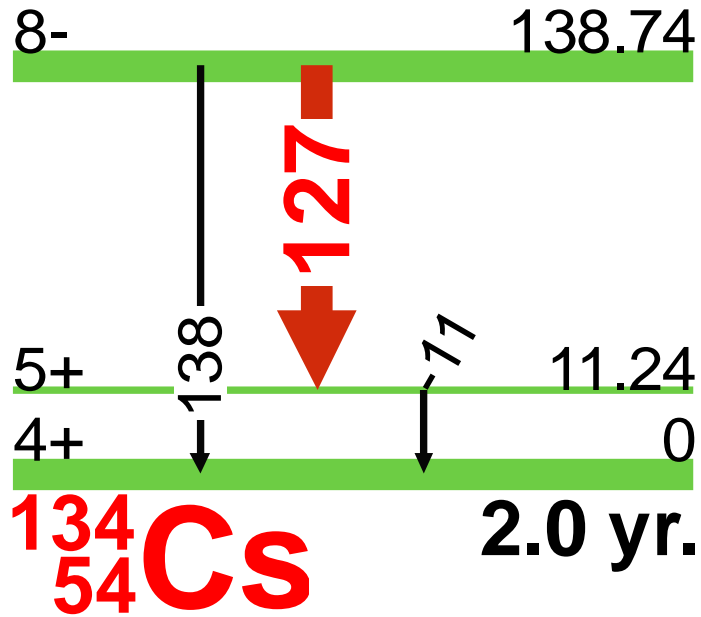
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{134m}Cs(2.9 hr.) Decay Scheme

2.9 hr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{134m}Cs

Half Life: 2.903(8) hr.

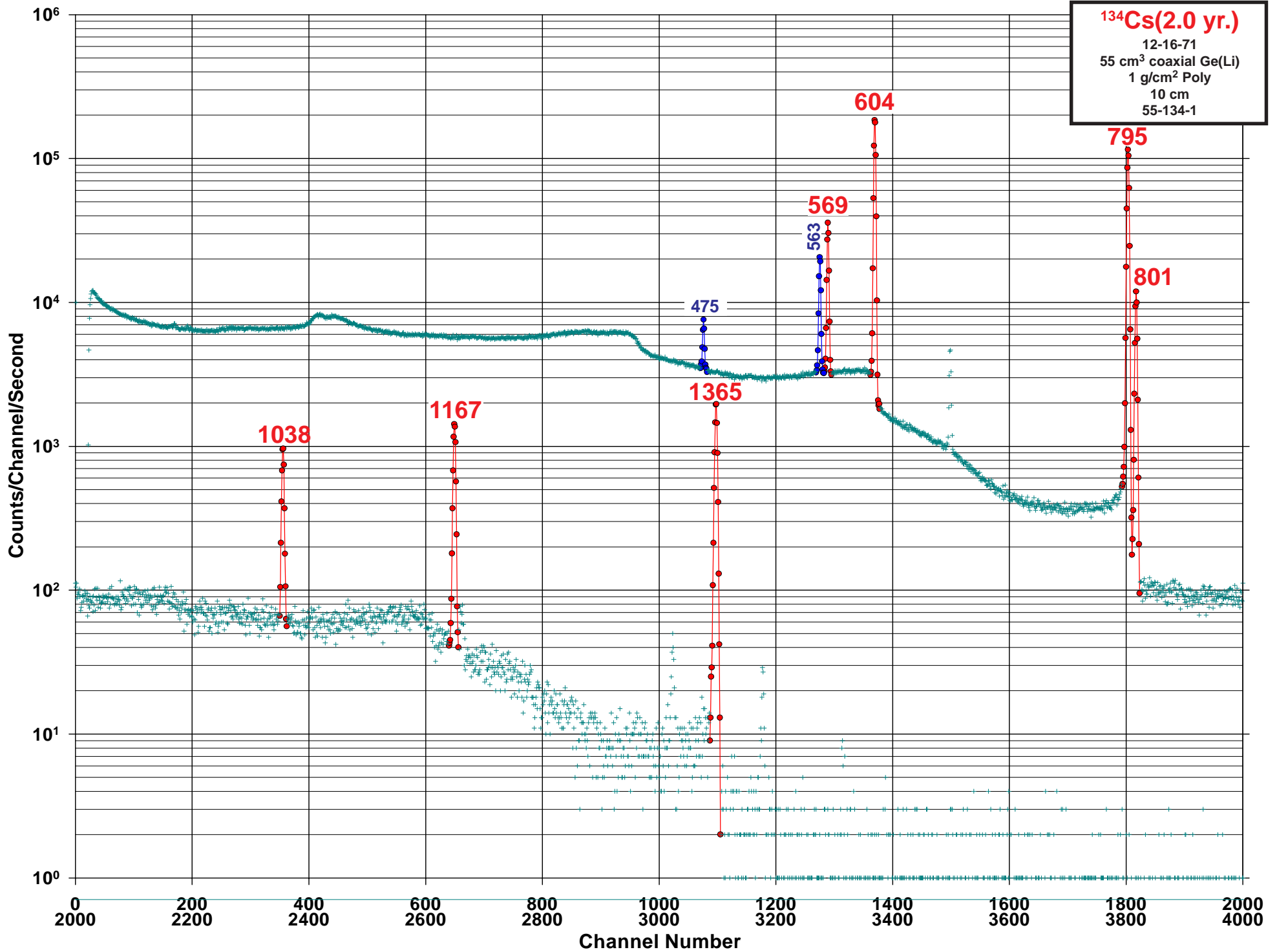
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ¹³³Cs(n,γ)

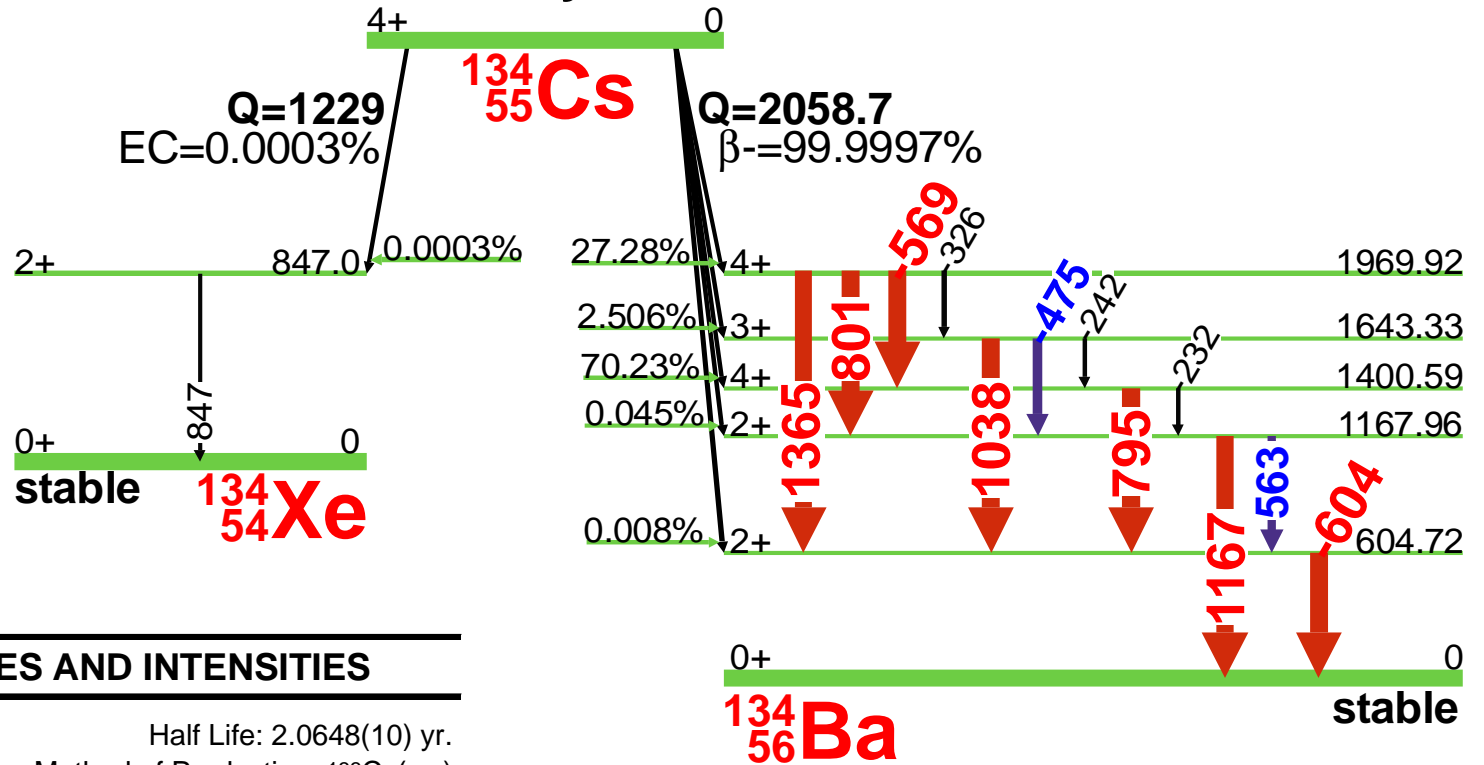
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
11.242	0.007		1.08	0.07	4
127.502	0.003	100	12.6	0.4	1
138.733	0.011		0.0039	0.0003	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹³⁴Cs(2.0 yr.) Decay Scheme 2.0 yr.



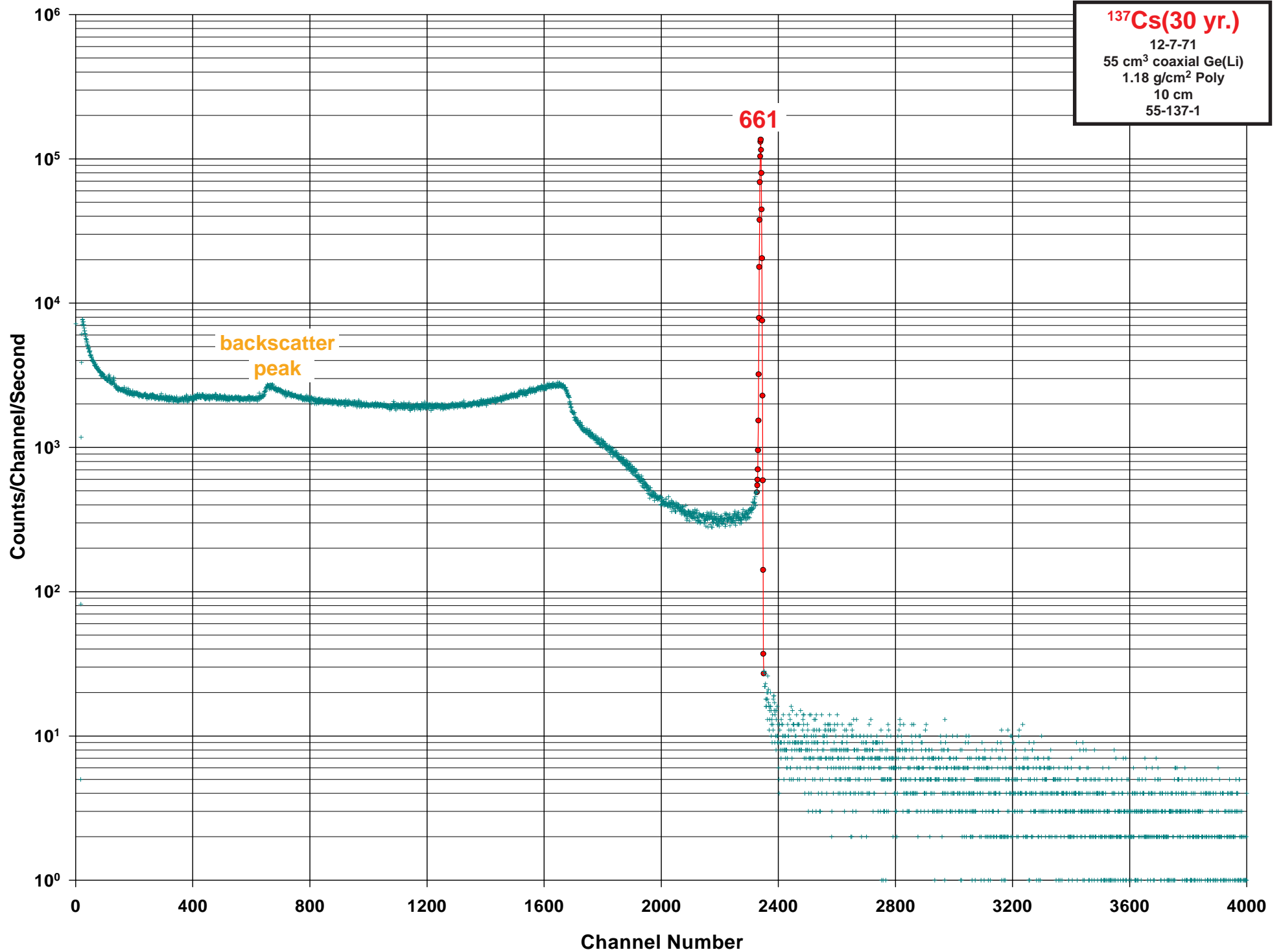
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³⁴Cs Half Life: 2.0648(10) yr.
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: ¹³³Cs(n,γ)

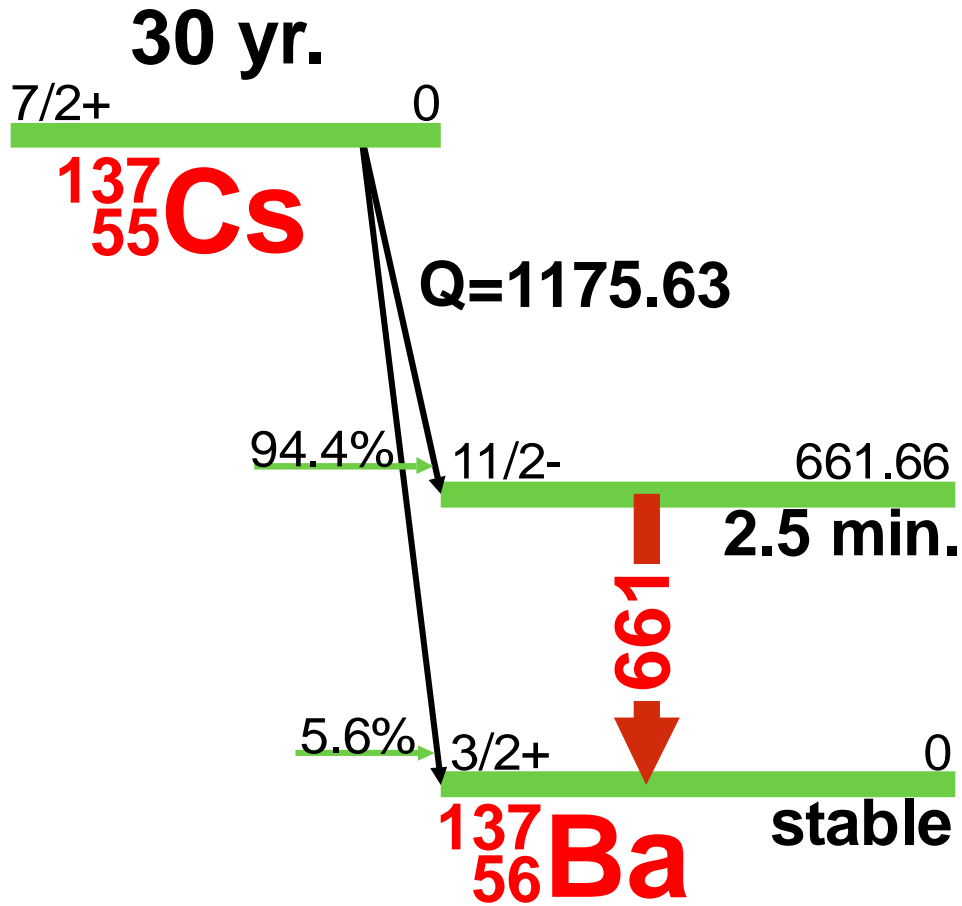
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
232.6			0.0011		4
242.738	0.008		0.027	0.003	4
326.589	0.013		0.0162	0.0010	4
475.365	0.002	1.86	1.486	0.010	3
563.246	0.005	8.0	8.35	0.04	2
569.331	0.003	15.3	15.38	0.06	1
604.721	0.002	100.	97.62	0.03	1
795.864	0.004	87.0	85.53	0.04	1
801.953	0.004	8.8	8.69	0.04	1
847.00	0.20		0.0003	0.0001	4
1038.610	0.007	1.05	0.988	0.004	1
1167.968	0.005	1.96	1.789	0.007	1
1365.185	0.007	3.26	3.014	0.012	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹³⁷Cs(30 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³⁷Cs

Half Life: 30.07(3) yr.

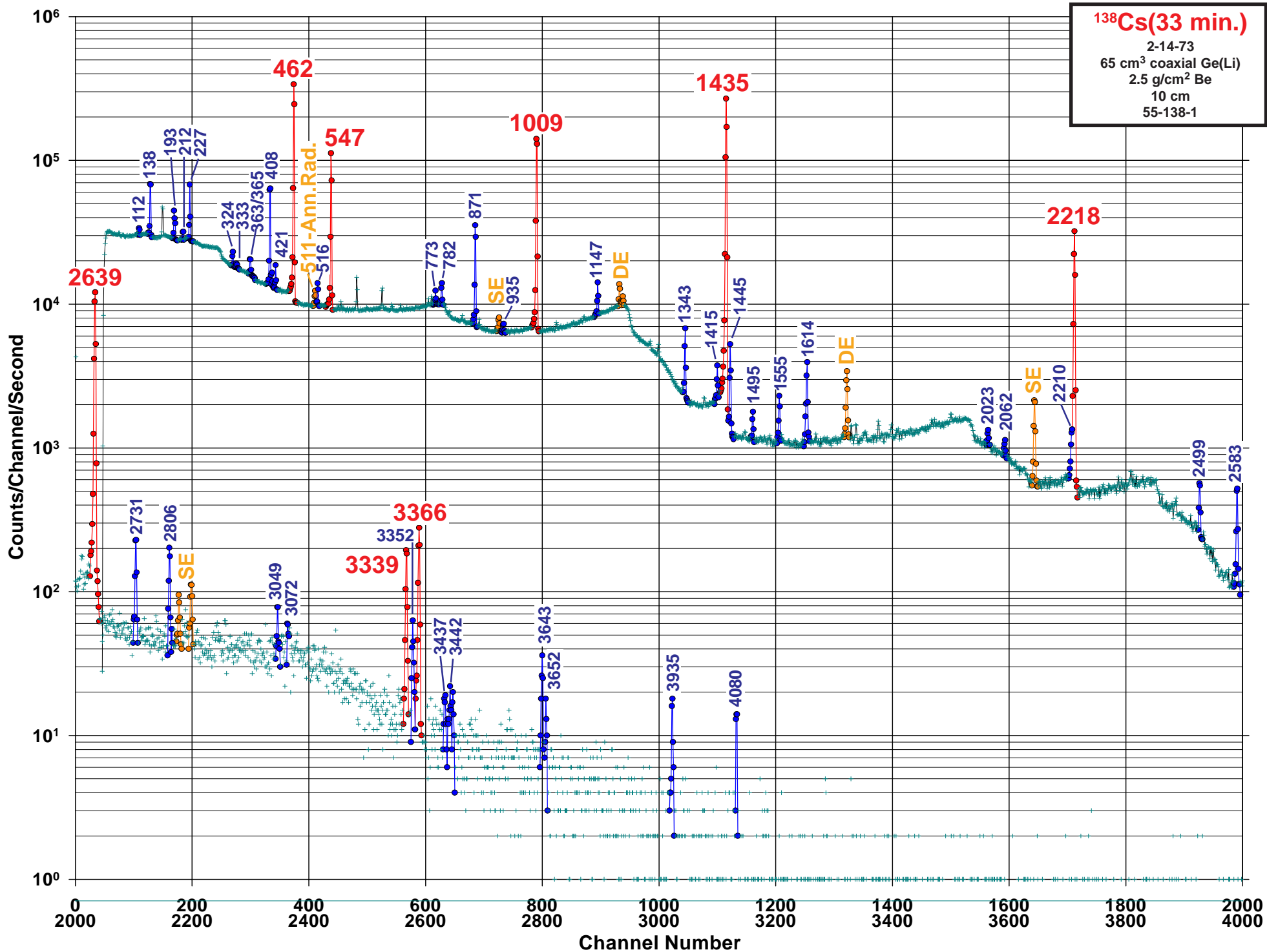
Detector: 55 cm³ coaxial Ge (Li)

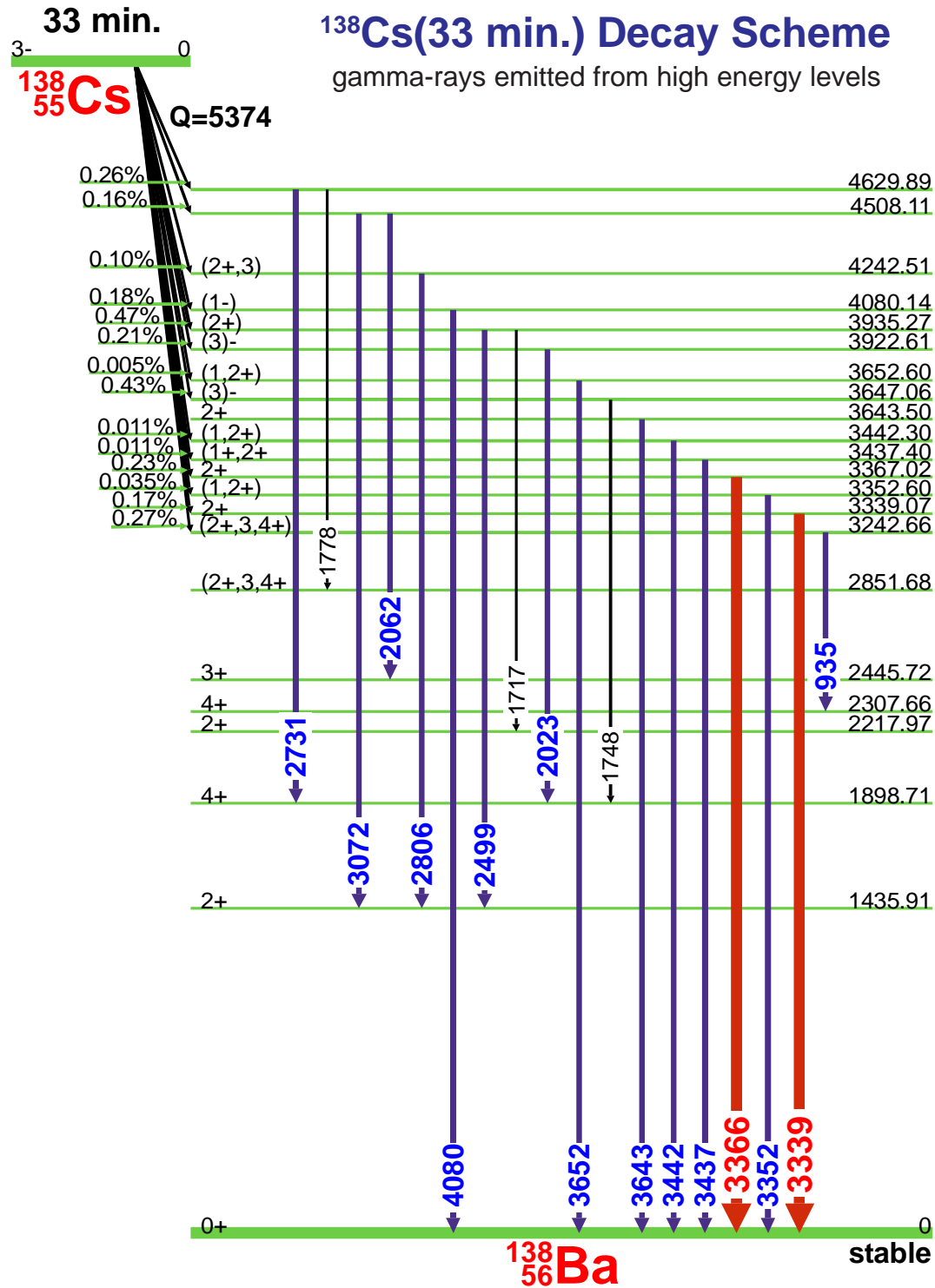
Method of Production: U(n,f) chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
283.5	0.1		0.0006	0.0001	4
661.657	0.003	100	85.1	0.2	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





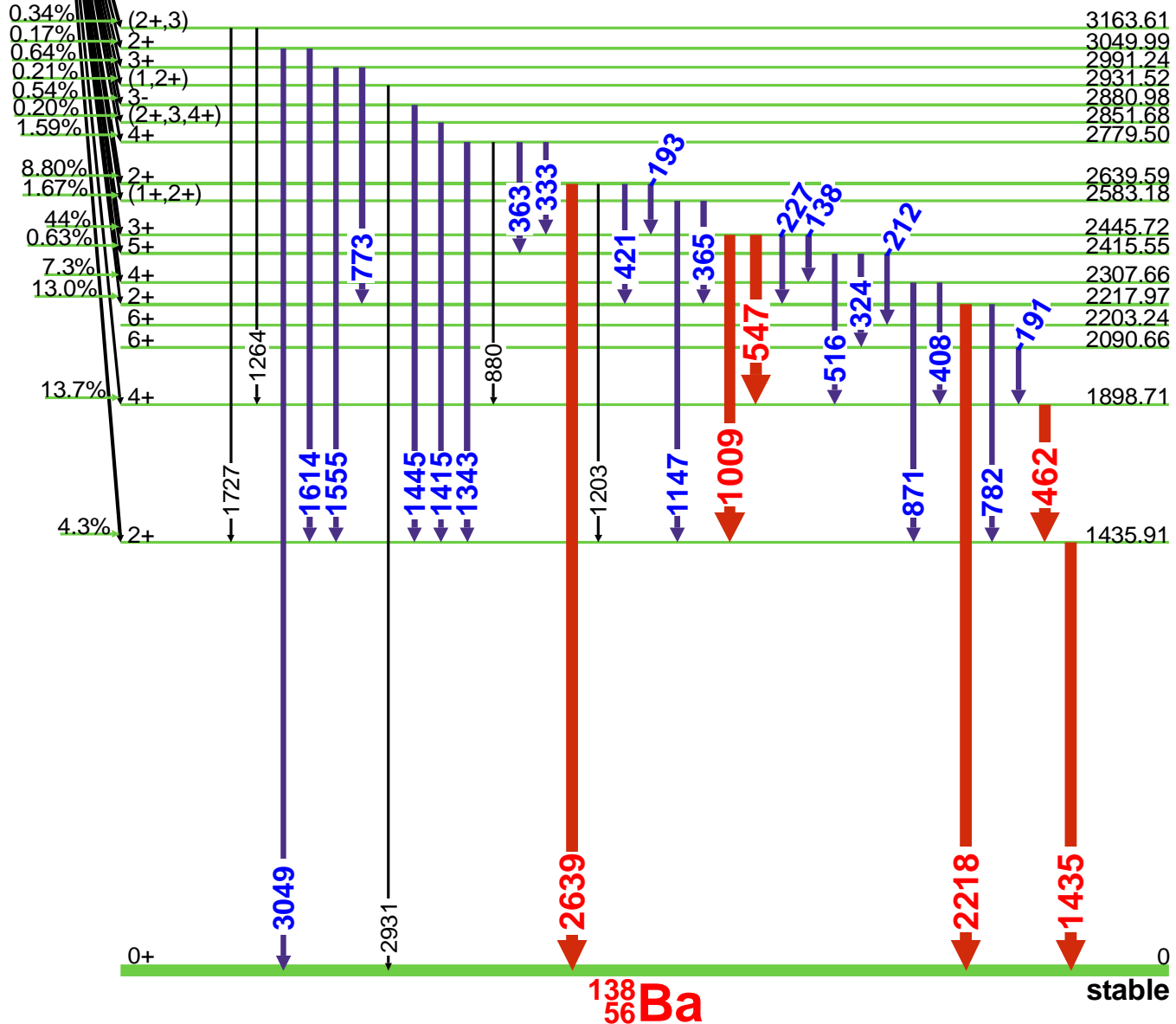


33 min.
3+ 0
¹³⁸₅₅Cs

¹³⁸Cs(33 min.) Decay Scheme

gamma-rays emitted from low energy levels

Q=5374



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ¹³⁸CsE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 33.41(18) min.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S	
	112.60	0.13		0.130	0.023	4		953.0	0.3		0.053	0.014	4	
	138.10	0.06	1.70	1.49	0.08	4		1009.78	0.08	38.5	29.8	0.6	1	
D	191.96	0.06	1.10	0.50	0.04	4		1041.4	0.3		0.063	0.017	4	
	193.89	0.08		0.328	0.023			1054.32	0.15		0.159	0.019	4	
	212.32	0.08	0.21	0.175	0.014	4	D	1147.		1.62			3	
	227.76	0.06	1.80	1.51	0.04	3		1147.22	0.09		1.24	0.07		
	324.90	0.08	0.54	0.290	0.018	4		1199.15	0.24		0.17	0.03	4	
	333.86	0.16		0.089	0.015	4		1203.69	0.13	0.5	0.40	0.04	3	
D	363.93	0.08	0.85	0.244	0.023	4		1264.94	0.16	1.50	0.137	0.017	3	
	365.								1343.59	0.09	1.73	1.14	0.05	3
	365.29	0.13		0.191	0.023			1359.1	0.5		0.048	0.019	4	
	368.7	0.4		0.022	0.008	4		1386.39	0.21		0.075	0.011	4	
	408.98	0.06	5.90	4.66	0.09	2		1415.68	0.13	0.59	0.37	0.03	4	
	421.59	0.07	0.60	0.427	0.023	4		1435.86	0.09	100.	76.3	1.6	1	
	462.796	0.005	37.4	30.7	0.6	1		1445.04	0.25	1.54	0.97	0.19	3	
Ann.	511.006		0.46			4		1495.63	0.23	0.25	0.18	0.04	4	
	516.74	0.12	0.74	0.43	0.05	4		1555.31	0.10	0.60	0.366	0.023	4	
	547.001	0.005	13.2	10.76	0.23	1		1614.09	0.20	0.85	0.137	0.023	3	
	575.7	0.4		0.021	0.008	4		1717.1	0.3	0.18	0.107	0.023	4	
	596.2	0.4		0.026	0.010	4		1727.68	0.18	0.22	0.111	0.013	4	
	683.59	0.15		0.108	0.014	4		1748.7	0.5	0.18	0.07	0.03	4	
	702.92	0.17		0.084	0.013	4		1778.25	0.23	0.20	0.137	0.023	4	
	717.7	0.3		0.040	0.012	4		1806.65	0.18		0.092	0.011	4	
	754.5	0.4		0.034	0.012	4		1821.7	0.3		0.045	0.010	4	
	766.10	0.12		0.146	0.014	4		1903.2	0.4		0.046	0.014	4	
	773.31	0.10	0.35	0.233	0.018	4		1941.0	0.3		0.079	0.015	4	
	782.08	0.09	0.46	0.33	0.03	4		2023.93	0.20	0.43	0.118	0.015	3	
	797.7	0.5		0.053	0.023	4		2062.34	0.17	0.56	0.111	0.012	3	
	802.6	0.3		0.038	0.023	4		2105.9	0.3		0.055	0.010	4	
	813.0	0.3		0.060	0.018	4		2114.3	0.7		0.021	0.009	4	
	842.21	0.16		0.082	0.011	4		2210.7	0.4		0.21	0.06	4	
	855.6	0.5		0.023	0.009	4		2218.00	0.10	20.4	15.2	0.3	1	
	871.80	0.08	6.60	5.11	0.13	2		2487.1	0.6		0.023	0.008	4	
	880.8	0.3	0.50	0.11	0.03	3		2499.4	0.3	0.46	0.17	0.05	3	
	935.03	0.12	0.25	0.181	0.016	4		2510.5	0.8		0.015	0.007	4	
	946.0	0.5		0.031	0.013	4		2583.15	0.13	0.34	0.239	0.015	4	

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{138}Cs E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 33.41(18) min.

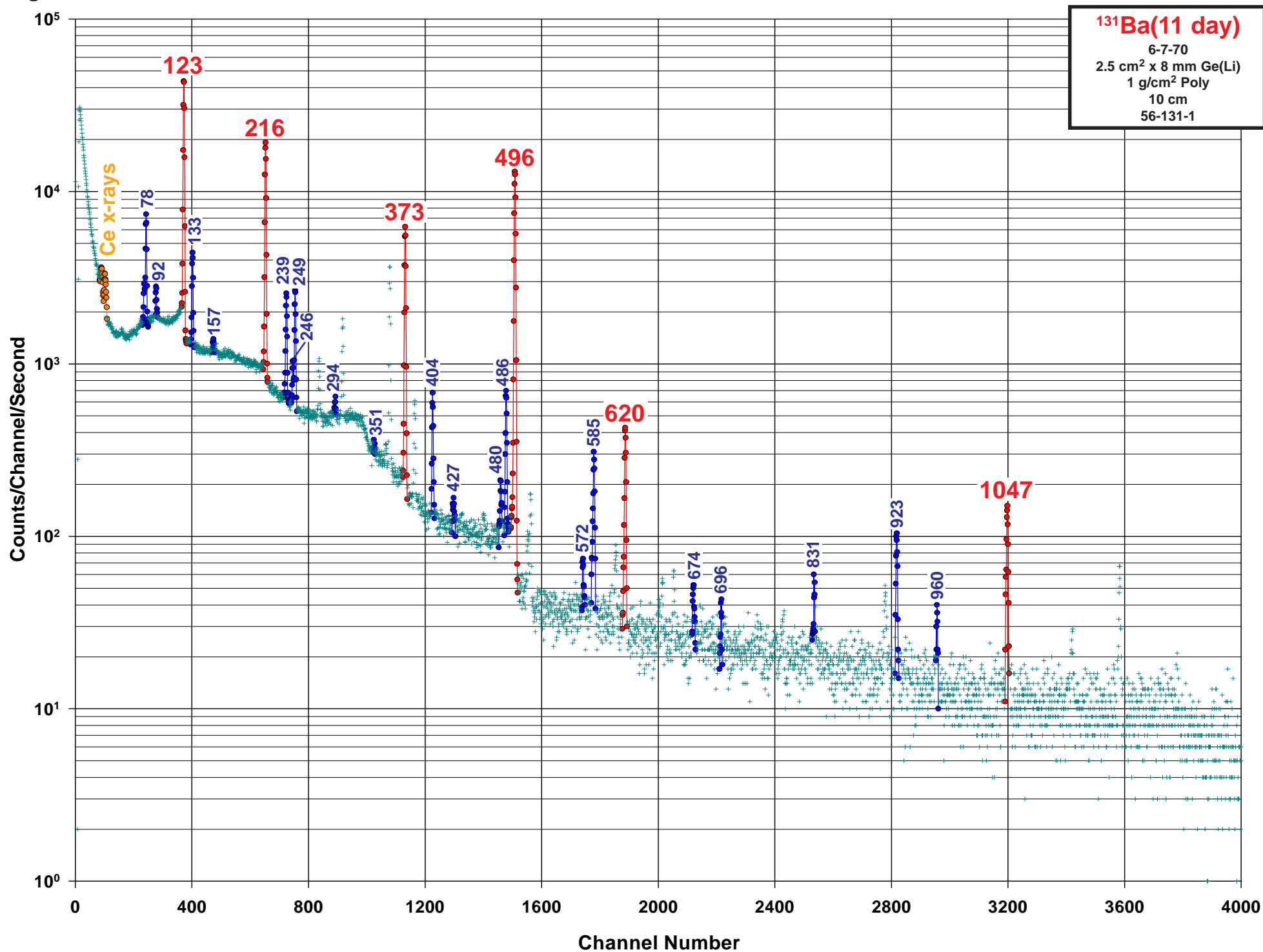
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem.

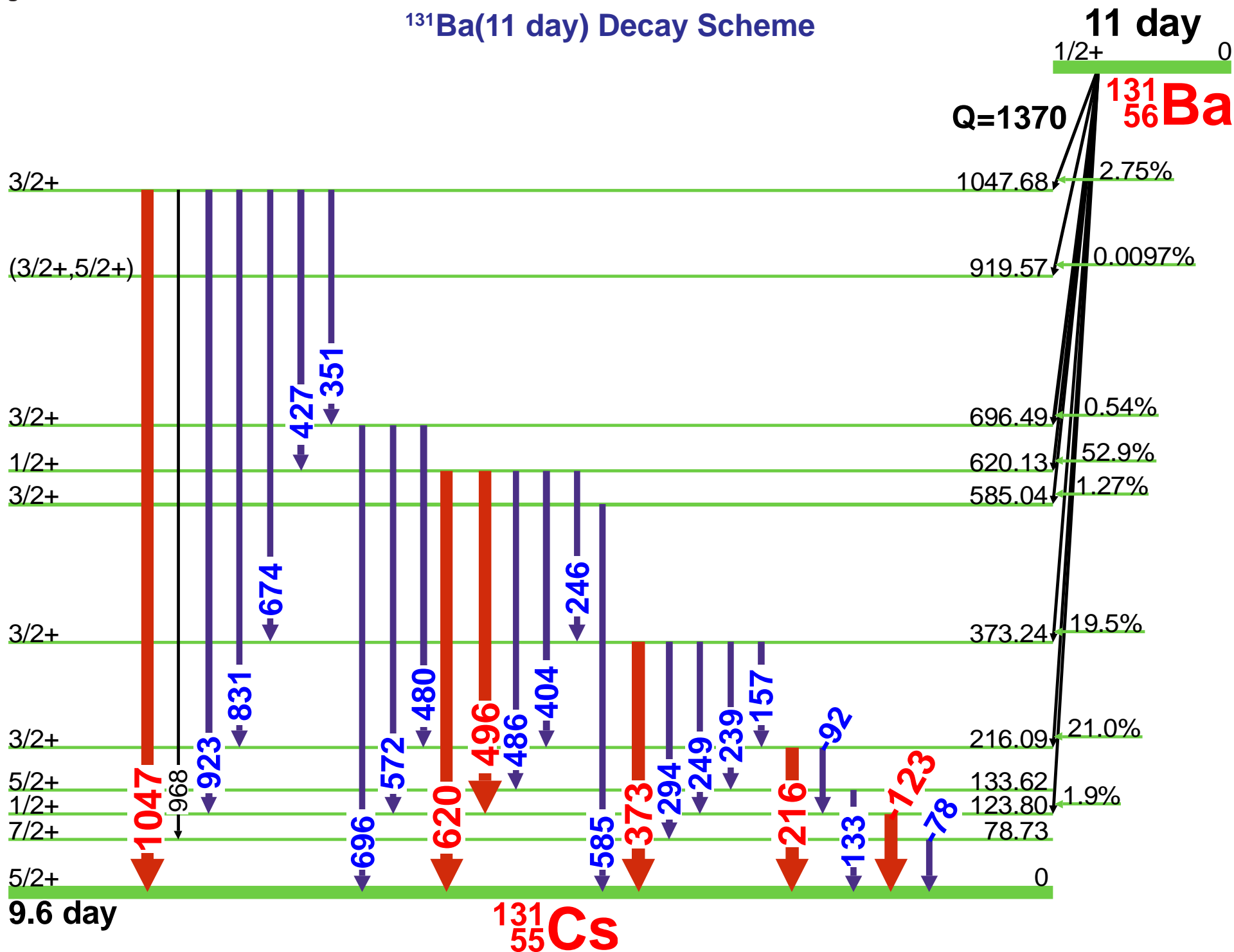
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2609.3	0.3		0.034	0.005	4
2639.59	0.13	9.95	7.63	0.23	1
2731.12	0.15	0.20	0.120	0.008	3
2806.57	0.17	0.12	0.100	0.008	4
2931.4	0.4	0.03	0.020	0.004	4
3049.9	0.3	0.05	0.031	0.005	4
3072.5	0.4		0.019	0.004	4
3180.4	0.7		0.0084	0.0023	4
3339.01	0.25	0.25	0.151	0.009	1

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
3352.6	0.3	0.09	0.035	0.004	4
3366.98	0.25	0.35	0.227	0.013	1
3437.5	0.6	0.02	0.011	0.003	4
3442.6	0.6	0.015	0.011	0.003	3
3643.3	0.4	0.05	0.022	0.003	3
3652.5	0.8	0.025	0.0053	0.0015	4
3935.2	0.5	0.025	0.018	0.003	3
4080.1	0.5	0.030	0.0175	0.0023	2





¹³¹Ba(11 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{131}Ba E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

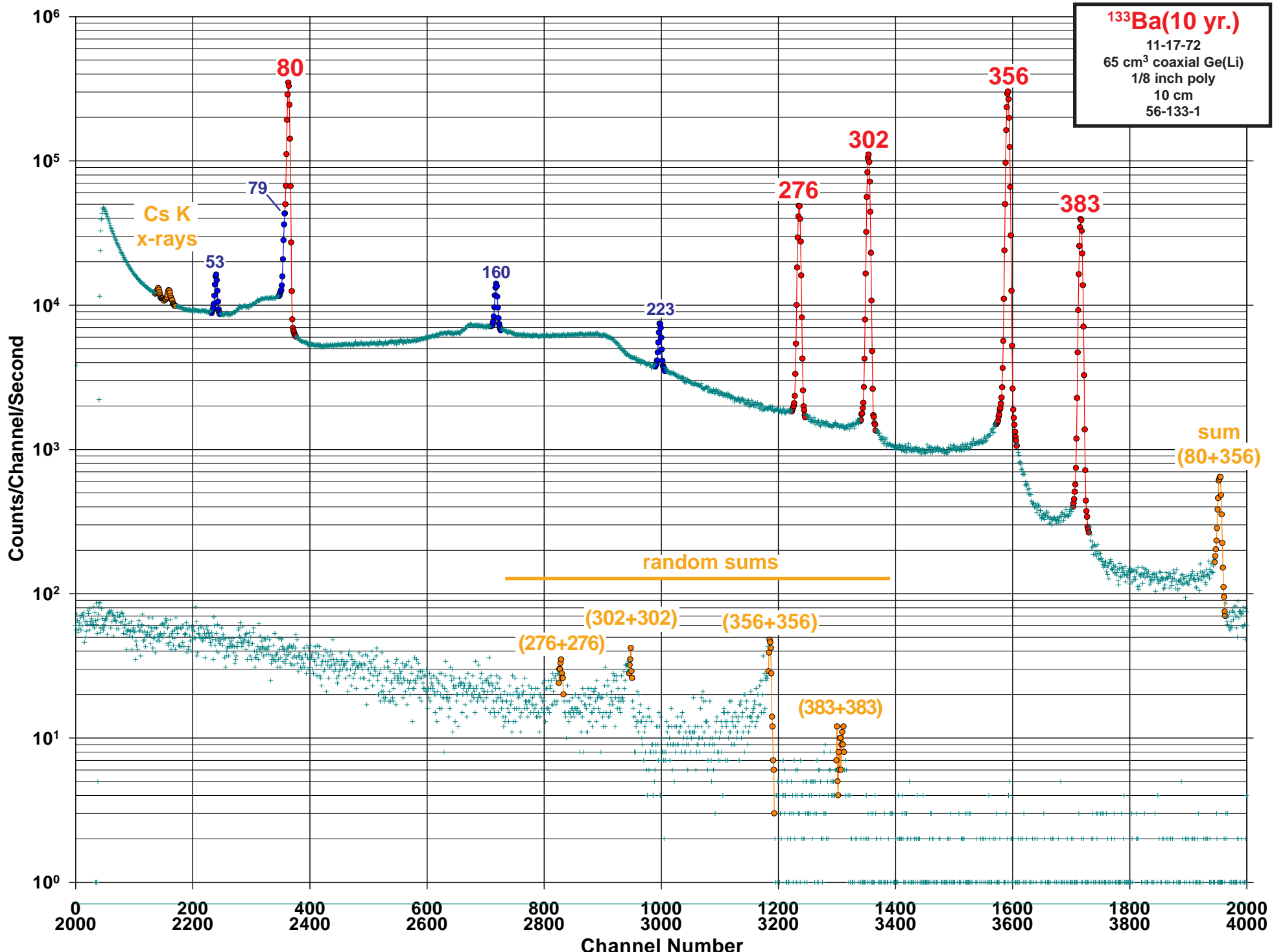
Half Life: 11.50(6) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{130}\text{Ba}(n,\gamma)$

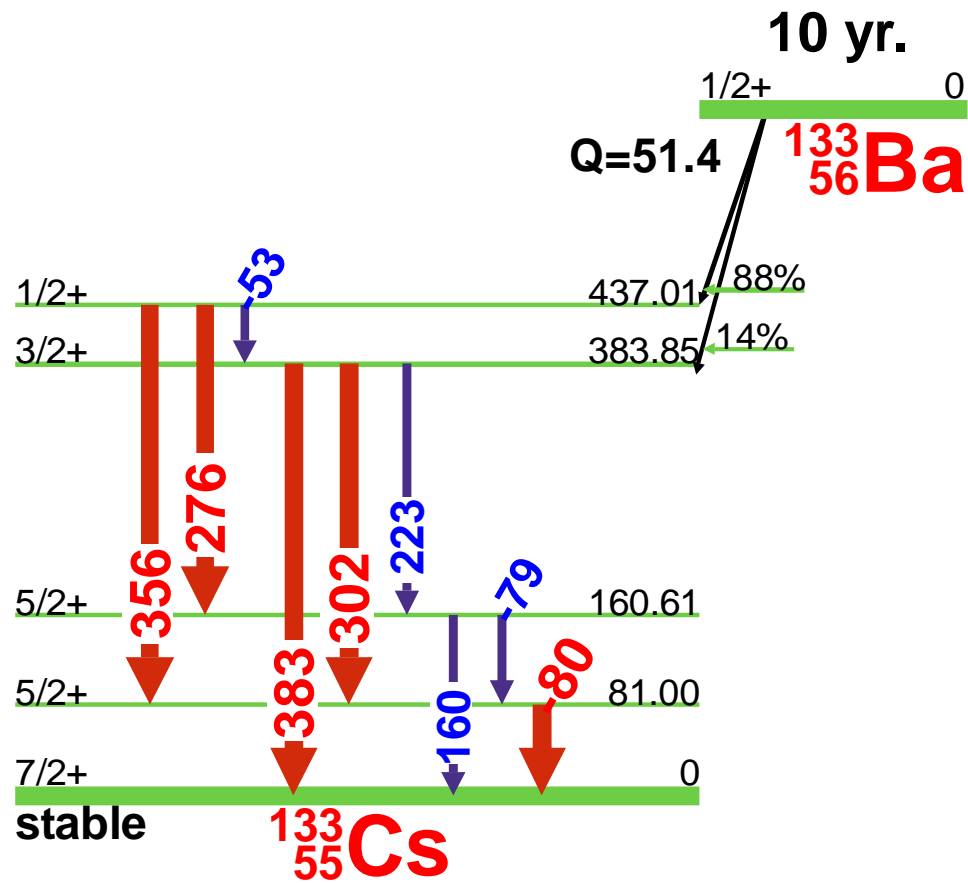
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
54.889	0.005		0.1025	0.0028	4
78.733	0.003		0.735	0.019	4
82.58	0.09		0.014	0.005	4
92.284	0.003	2.0	0.585	0.010	4
123.805	0.003	62.1	28.97	0.26	1
128.09	0.14		0.0140	0.0009	4
133.609	0.007	4.86	2.12	0.03	3
137.36	0.04		0.0374	0.0014	4
157.151	0.009	0.47	0.176	0.006	4
216.078	0.008	41.66	19.66	0.25	1
239.629	0.008	5.76	2.410	0.026	3
246.885	0.012	1.66	0.632	0.010	4
249.432	0.008	6.22	2.813	0.026	3
294.515	0.020	0.62	0.166	0.003	4
351.196	0.024	1.0	0.091	0.003	4
369.12	0.13		0.014	0.003	4
373.246	0.011	31.3	14.04	0.20	1
390.05	0.17		0.0019	0.0005	4
404.046	0.011	3.07	1.310	0.011	2
427.570	0.017	0.64	0.0955	0.0010	4
451.418	0.015		0.0407	0.0010	4
461.258	0.024		0.056	0.009	4
462.68	0.05		0.047	0.009	4
474.2	0.3		0.0023	0.0006	4
480.407	0.013	0.82	0.328	0.003	3
486.522	0.012	4.34	2.087	0.017	2
496.326	0.013	100.	46.80	0.20	1
506.1	0.4		0.0019	0.0005	4
517.5	0.4		0.0014	0.0005	4
533.7	0.4		0.0014	0.0005	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
546.28	0.09		0.0035	0.0003	4
550.39	0.15		0.0022	0.0005	4
562.87	0.13		0.0036	0.0005	4
572.686	0.015	0.32	0.1563	0.0016	4
585.041	0.015	2.75	1.193	0.015	2
596.5	0.3		0.0016	0.0005	4
620.111	0.017	4.06	1.437	0.015	1
657.6	0.3		0.0035	0.0005	4
674.430	0.020	0.39	0.1320	0.0015	4
696.490	0.020	0.44	0.145	0.004	4
703.44	0.08		0.0064	0.0004	4
745.5	0.4		0.0014	0.0003	4
757.00	0.20		0.0005	0.0001	4
785.92	0.09		0.0023	0.0007	4
795.85	0.08		0.0007	0.0001	4
797.45	0.06		0.0360	0.0009	4
831.62	0.03	0.45	0.2279	0.0021	3
840.9	0.4		0.0019	0.0009	4
914.070	0.020		0.0463	0.0010	4
919.60	0.09		0.0089	0.0005	4
923.870	0.020	1.59	0.721	0.010	3
954.61	0.03		0.0328	0.0005	4
968.94	0.03	0.12	0.0365	0.0019	4
1037.0	0.4		0.0005	0.0001	4
1046.4	0.3		0.090	0.007	4
1047.60	0.03	2.89	1.324	0.015	1
1125.97	0.16		0.0027	0.0005	4
1170.53	0.11		0.0016	0.0002	4
1208.43	0.12		0.0017	0.0002	4
1218.30	0.15		0.0005	0.0001	4
1341.88	0.15		0.0011	0.0001	4





¹³³Ba(10 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³³Ba

Half Life: 10.51(5) yr.

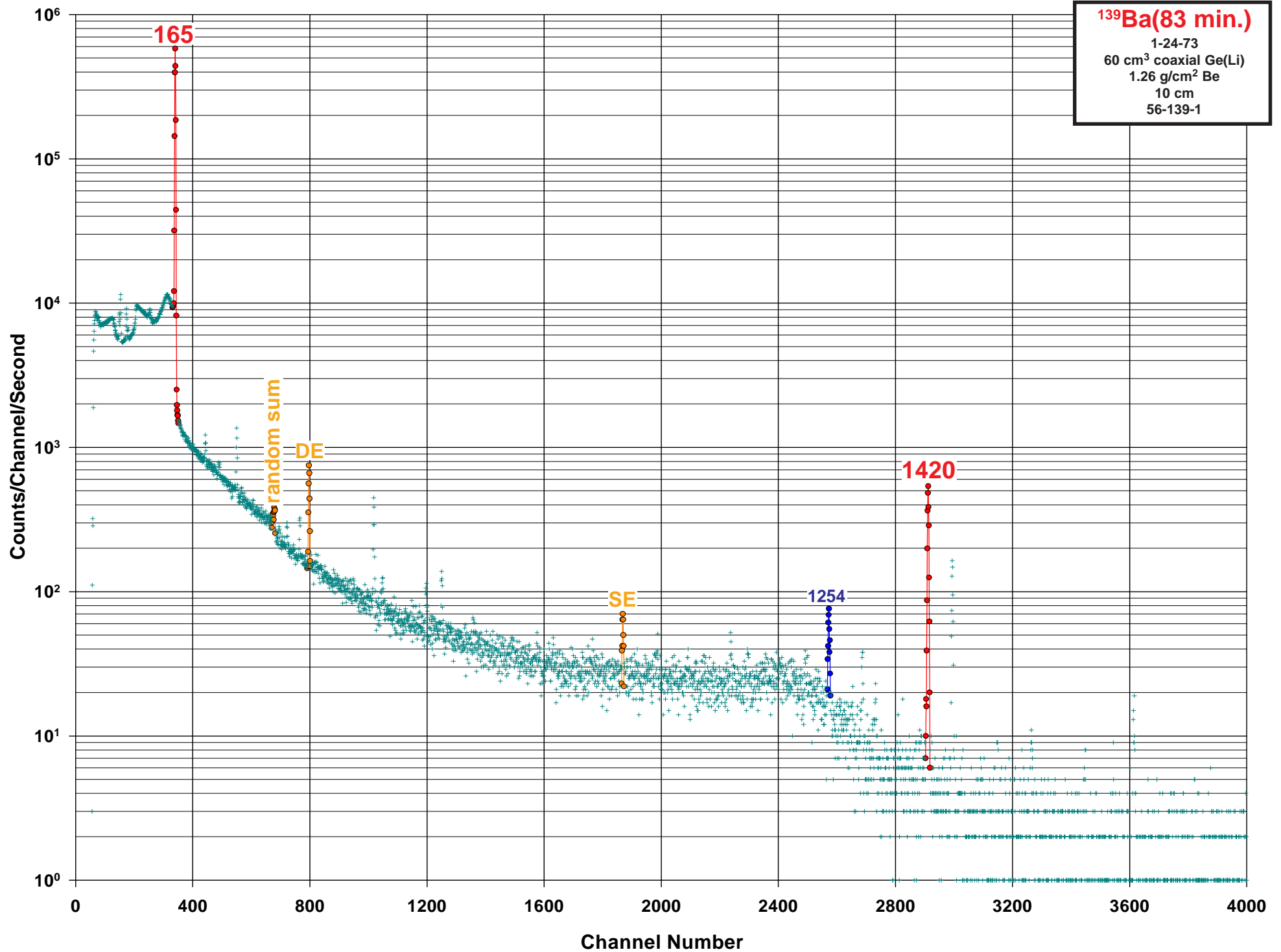
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ¹³²Ba(n,γ)

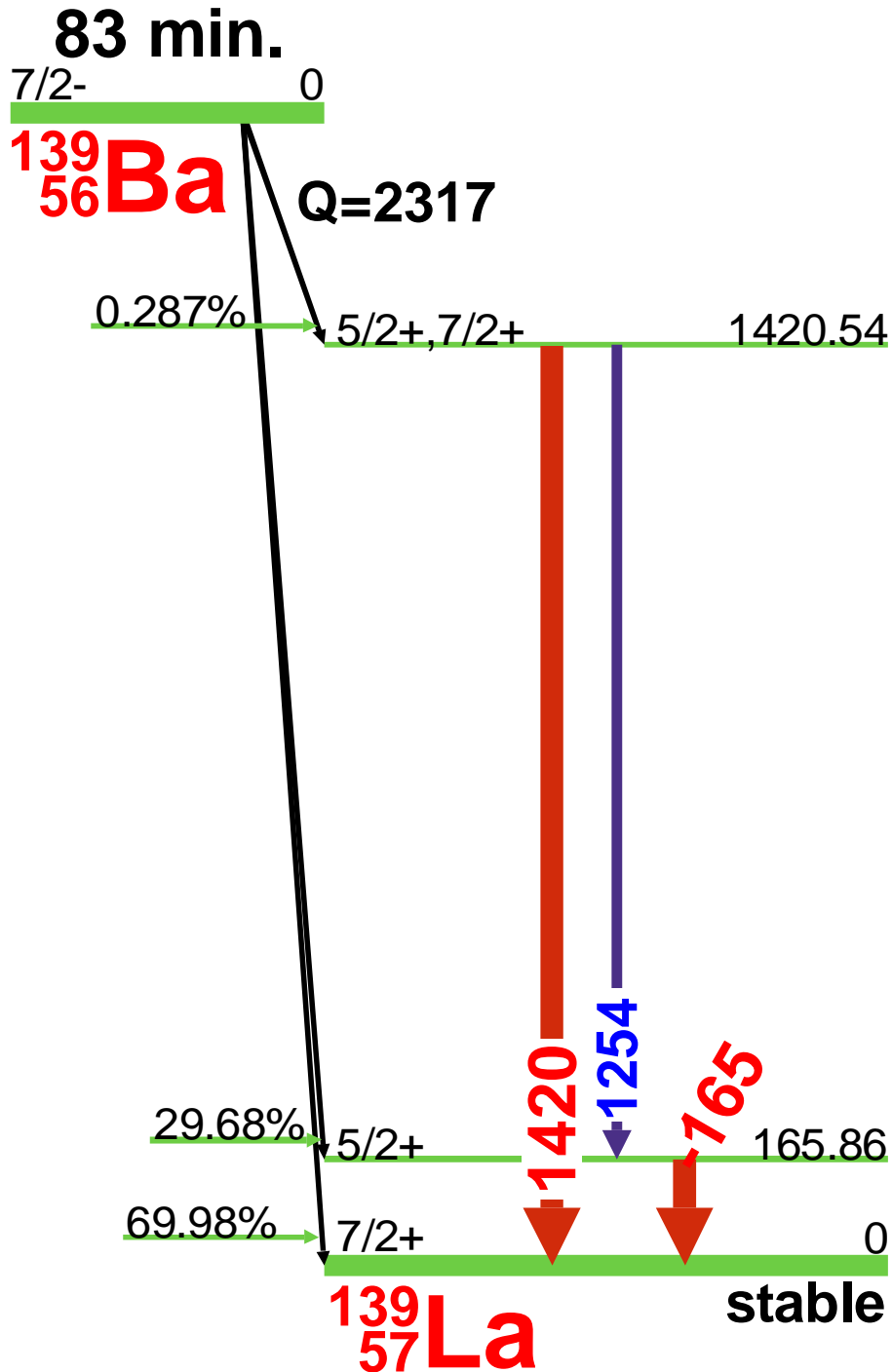
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
53.162	0.001	3.0	2.199	0.022	3
79.614	0.001	5.6	2.62	0.06	3
80.997	0.001	52.0	34.06	0.27	1
160.611	0.002	1.12	0.645	0.008	3
223.237	0.001	0.85	0.45	0.004	3
276.400	0.001	11.69	7.164	0.022	1
302.851	0.001	29.78	18.33	0.06	1
356.013	0.001	100.	62.05	0.19	1
383.848	0.001	14.43	8.94	0.03	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





¹³⁹Ba(83 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹³⁹Ba

Half Life: 83.06(28) min.

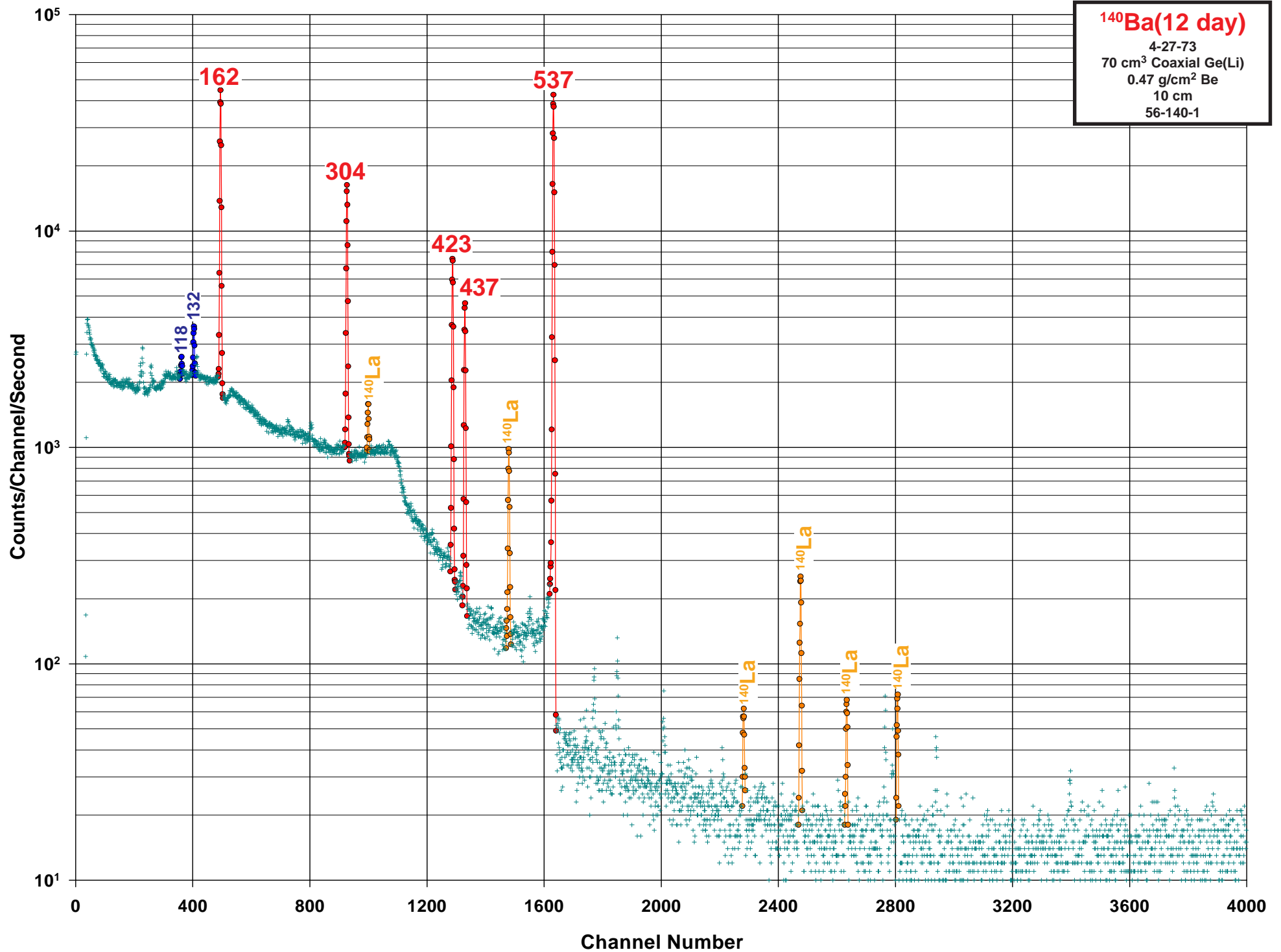
Detector: 60 cm³ coaxial Ge (Li)

Method of Production: ¹³⁸Ba(n,γ)

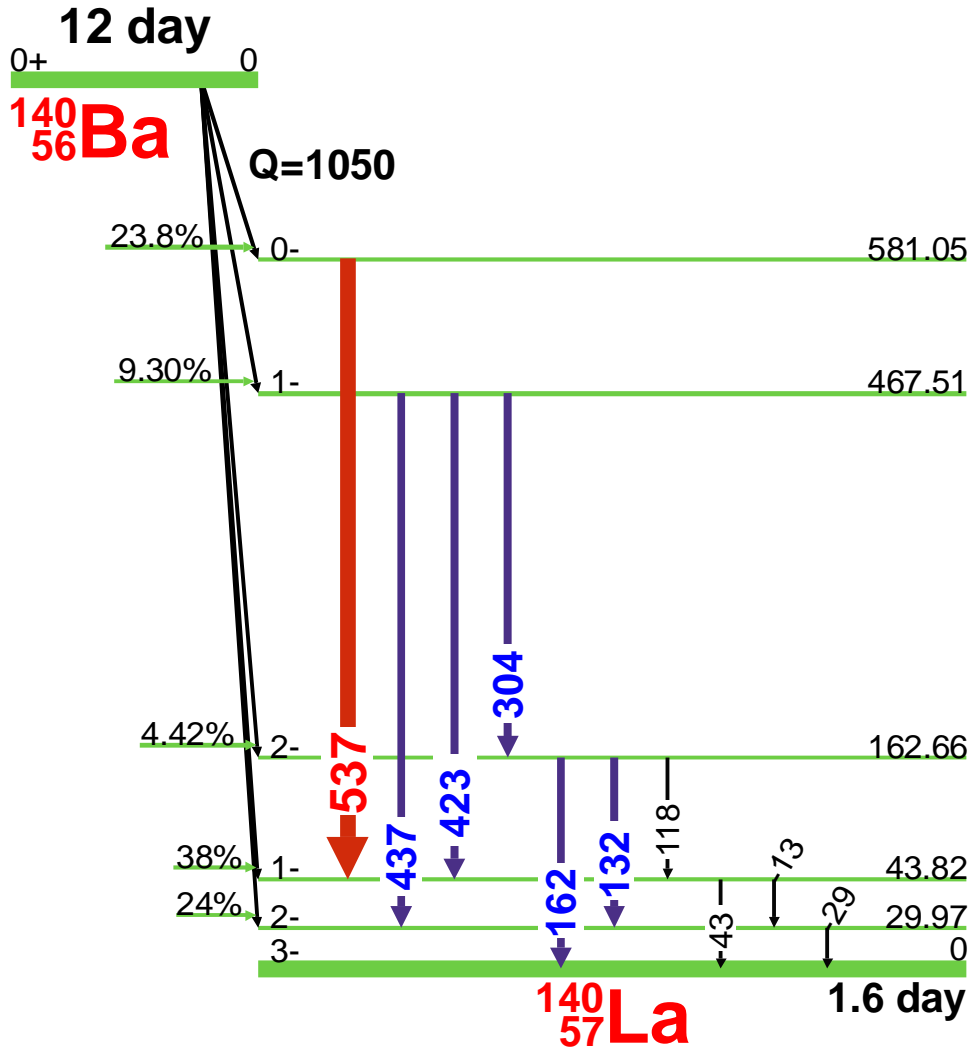
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
165.864	0.006	100	23.7	3.4	1
1042.9					4
1053	0.5		0.0003	0.0001	4
1090.8	0.2		0.0081	0.0011	4
1215.5	0.4		0.0031	0.0004	4
1219.1	0.4		0.0039	0.0007	4
1254.7	0.2	0.14	0.026	0.004	2
1256.7	1		0.0027	0.0004	4
1310.6	0.2		0.0159	0.0018	4
1370.5	0.3		0.0029	0.0004	4
1381.5	0.5		0.0001		4
1392.4	0.5		0.0001		4
1420.5	0.2	1.12	0.26	0.04	1
1476.3	0.3		0.0016	0.0002	4
1518	1		0.0001		4
1536.3	0.3		0.0021	0.0003	4
1558.2	0.4		0.0002	0.0001	4
1578.2	0.4		0.0005	0.0001	4
1595.3	0.3		0.0021	0.0003	4
1601.4	1		0.0001		4
1683.1	0.3		0.0026	0.0003	4
1691.2	1		0.0003		4
1754.5	0.5		0.0001		4
1762	1		0.0001		4
1765.5	0.4		0.0002	0.0001	4
1797.4	1		0.0001		4
1894.7	0.7				4
1920.6	0.4		0.0001		4
2060.1	0.4				4

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





¹⁴⁰Ba(12 day) Decay Scheme



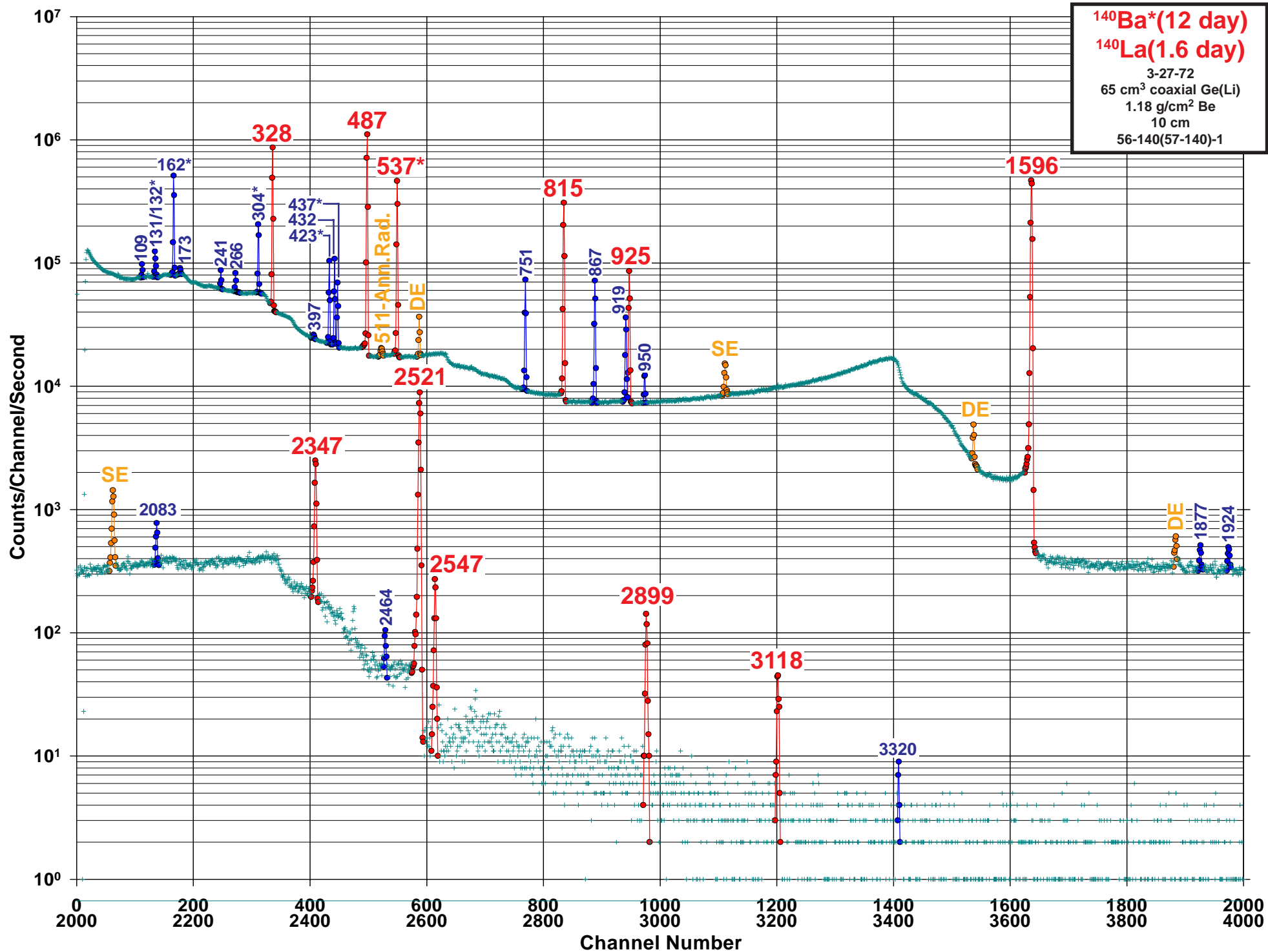
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴⁰Ba
 Half Life: 12.752(3) day
 Detector: 70 cm³ coaxial Ge (Li)
 Method of Production: U(n,f) chem.

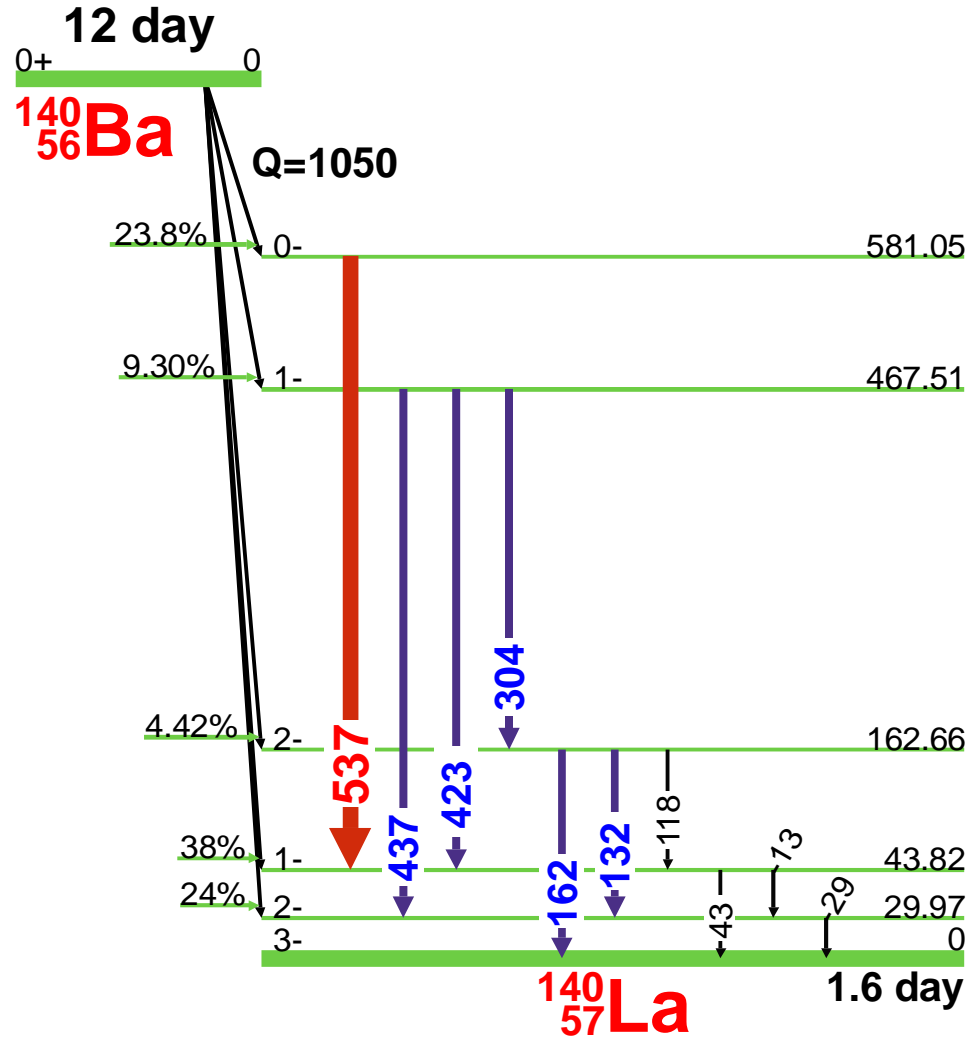
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
13.846	0.015		1.22	0.17	4
29.966	0.001		14.1	0.4	4
43.8			0.0020		4
63.17	0.22				4
99.490	0.020				4
113.51	0.03		0.0161	0.0012	4
118.837	0.003	0.32	0.061	0.007	4
132.687	0.001	0.90	0.202	0.005	3
162.660	0.001	28.4	6.22	0.07	1
183.83	0.09		0.0010	0.0005	4
275.18	0.18		0.0004	0.0001	4
304.849	0.003	18.8	4.29	0.05	1
418.44	0.04		0.0037	0.0002	4
423.722	0.001	12.99	3.15	0.04	1
437.575	0.002	8.10	1.9292	0.010	1
467.5			0.0020		4
537.261	0.009	100.	24.39	0.07	1
551.08	0.04		0.0031	0.0002	4
699.89	0.13		0.0008	0.0002	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data



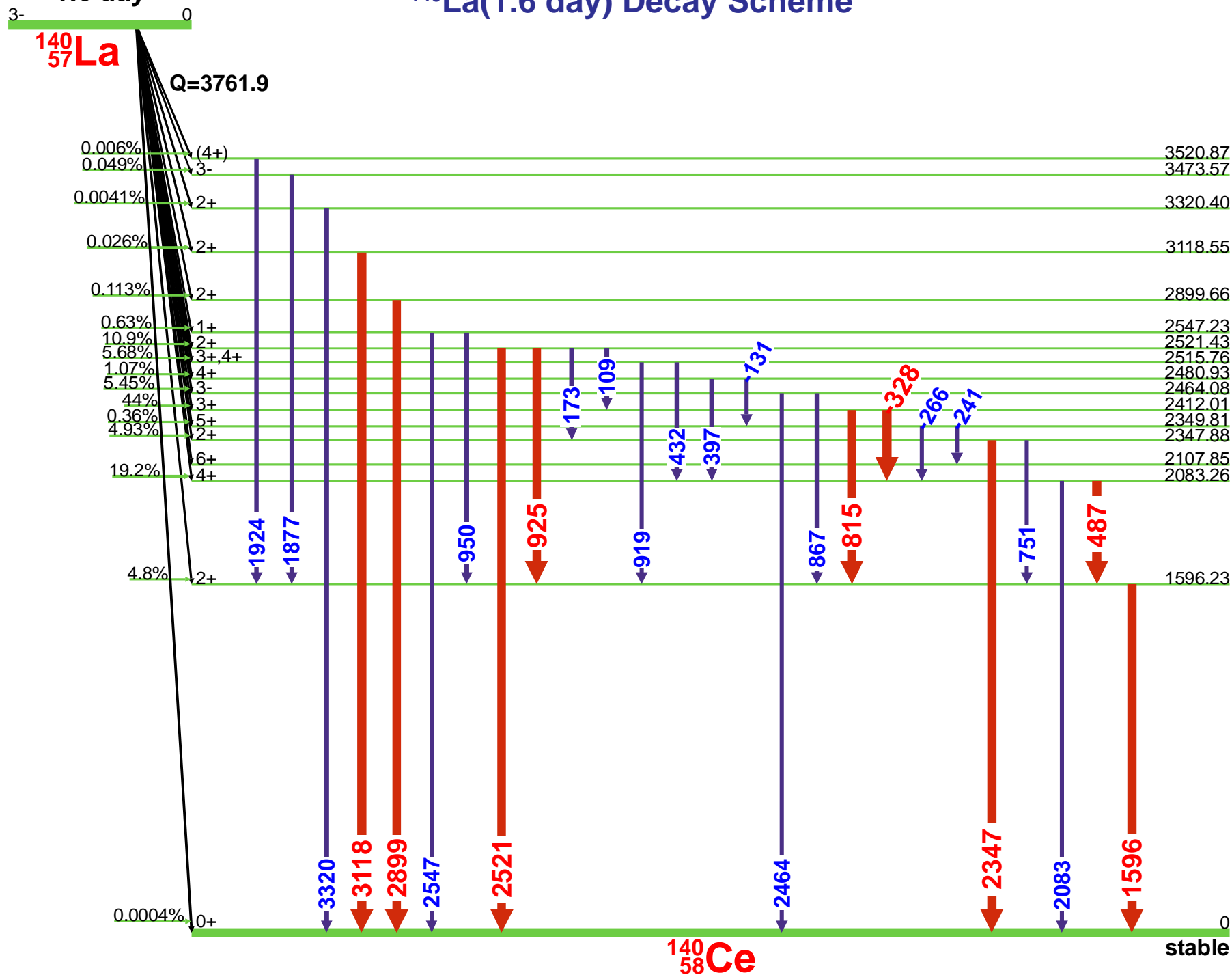


¹⁴⁰Ba(12 day) Decay Scheme



1.6 day

¹⁴⁰La(1.6 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: $^{140}\text{Ba}^* - ^{140}\text{La}$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

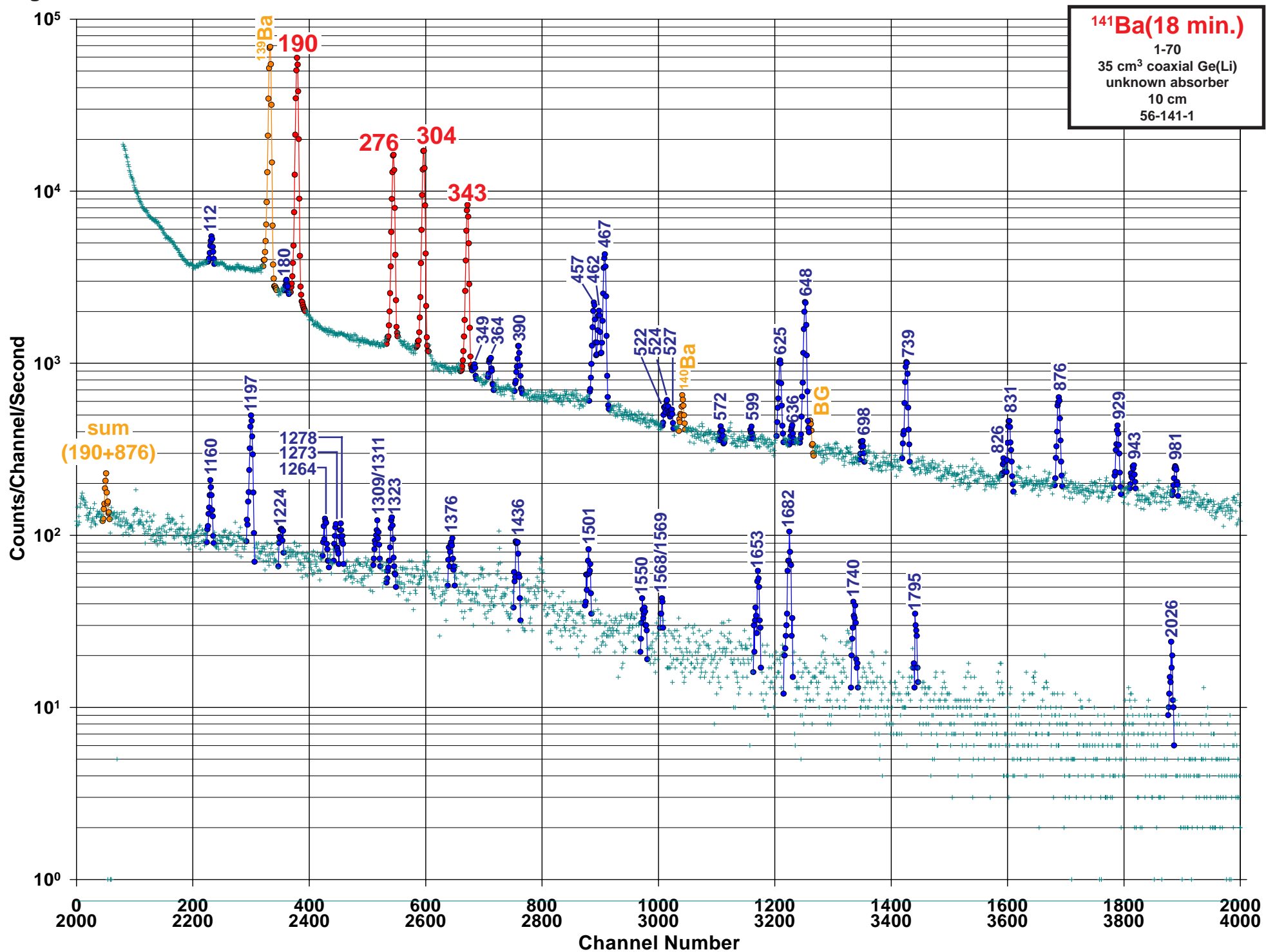
Half Life: 12.752(3) day* - 1.6781(3) day

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	13.846	0.015		1.22	0.17	4
	24.595	0.004		0.0029		4
*	29.966	0.001		14.1	0.4	4
*	43.8			0.0020		4
*	63.17	0.22				4
	64.135	0.010		0.0143	0.0019	4
	68.916	0.006		0.0754	0.0019	4
*	99.490	0.020				4
	109.422	0.011	0.17	0.219	0.004	4
*	113.51	0.03		0.0161	0.0012	4
*	118.837	0.003		0.061	0.007	4
	131.117	0.008	0.42	0.468	0.010	4
*	132.687	0.001		0.202	0.005	4
*	162.660	0.001		6.22	0.07	2
	173.543	0.009	0.6	0.127	0.004	4
*	183.83	0.09	5.28	0.0010	0.0005	4
	241.93	0.03	0.51	0.414	0.008	4
	266.543	0.012	0.50	0.466	0.008	4
*	275.18	0.18		0.0004	0.0001	4
*	304.849	0.003	4.1	4.29	0.05	3
	306.90	0.20		0.025	0.007	4
	328.762	0.008	19.6	20.32	0.29	1
	397.52	0.05	0.12	0.074	0.005	4
*	418.44	0.04		0.0037	0.0002	4
*	423.722	0.001	2.78	3.15	0.04	3
	432.493	0.012	2.94	2.900	0.029	3
*	437.575	0.002	1.75	1.929	0.010	3
	438.5	0.5		0.039	0.010	4
	445.5	0.5		0.0029	0.0010	4

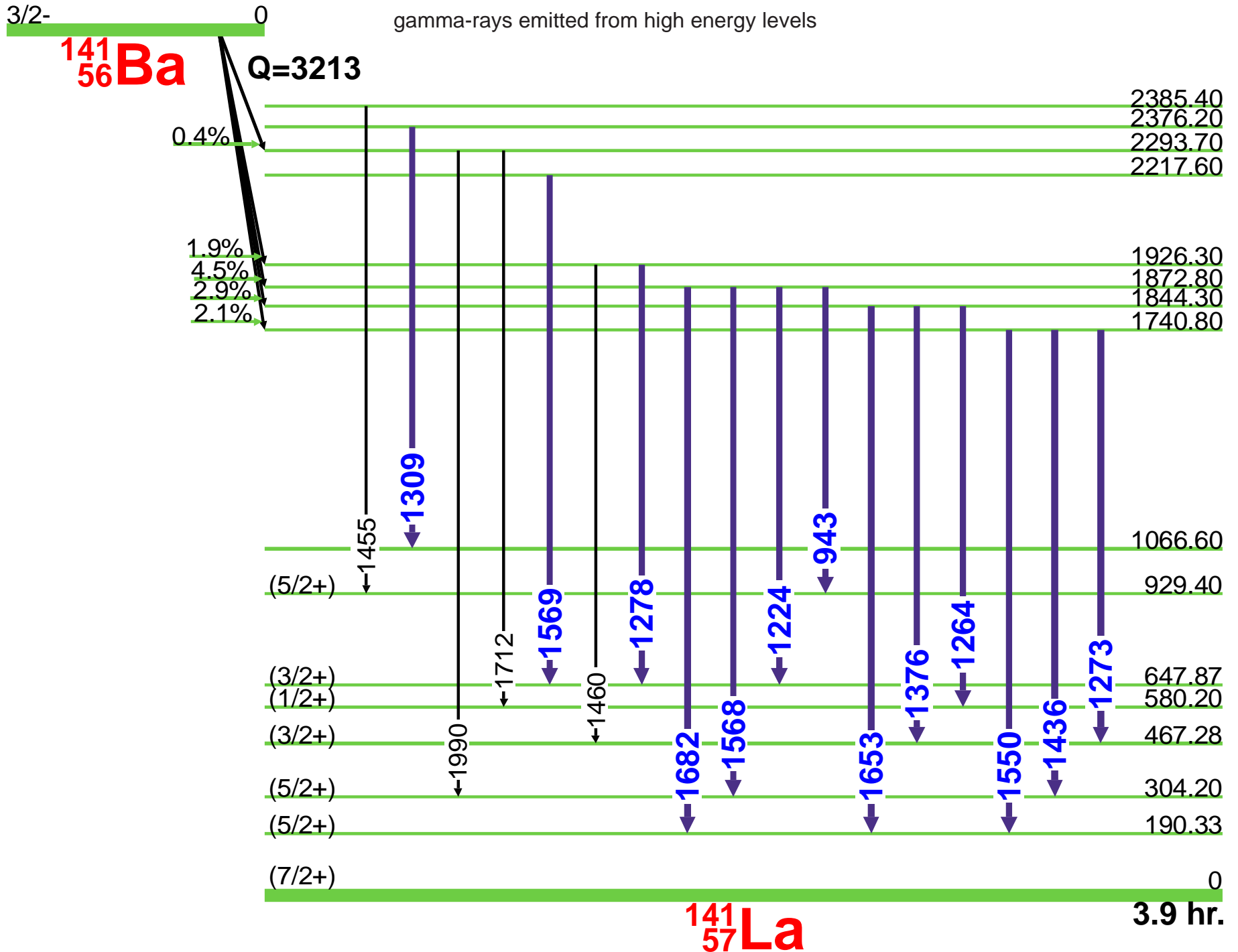
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	467.5			0.0020		4
	487.021	0.012	44.7	45.5	0.6	1
*	537.261	0.009	21.5	24.39	0.07	1
*	551.08	0.04		0.0031	0.0002	4
	618.12	0.05		0.037	0.004	4
*	699.89	0.13		0.0008	0.0002	4
	751.637	0.018	4.5	4.33	0.04	2
	815.772	0.019	24.2	23.28	0.19	1
	867.846	0.020	5.7	5.50	0.07	2
	919.550	0.023	2.89	2.662	0.029	3
	925.189	0.021	7.2	6.90	0.07	1
	950.99	0.03	0.56	0.519	0.007	4
	992.9	0.5		0.013	0.005	4
	1045.05	0.24		0.025	0.014	4
	1097.20	0.23		0.023	0.005	4
	1303.5	0.4		0.042	0.007	4
	1405.20	0.17		0.059	0.007	4
	1596.21	0.04	100.	95.4	1.4	1
	1877.29	0.19	0.05	0.041	0.004	4
	1903.5					4
	1924.62	0.13	0.023	0.0134	0.0019	4
	2083.2	0.5		0.0115	0.0007	4
	2347.88	0.05	0.89	0.849	0.029	1
	2464.1	0.5		0.0114	0.0019	4
	2521.40	0.05	3.59	3.46	0.04	1
	2547.34	0.11	0.110	0.1011	0.0029	1
	2899.61	0.16	0.073	0.0668	0.0019	1
	3118.51	0.16	0.028	0.0248	0.0010	1
	3320.4	0.6	0.005	0.0038	0.0003	3



18 min.

¹⁴¹Ba(18 min.) Decay Scheme

gamma-rays emitted from high energy levels



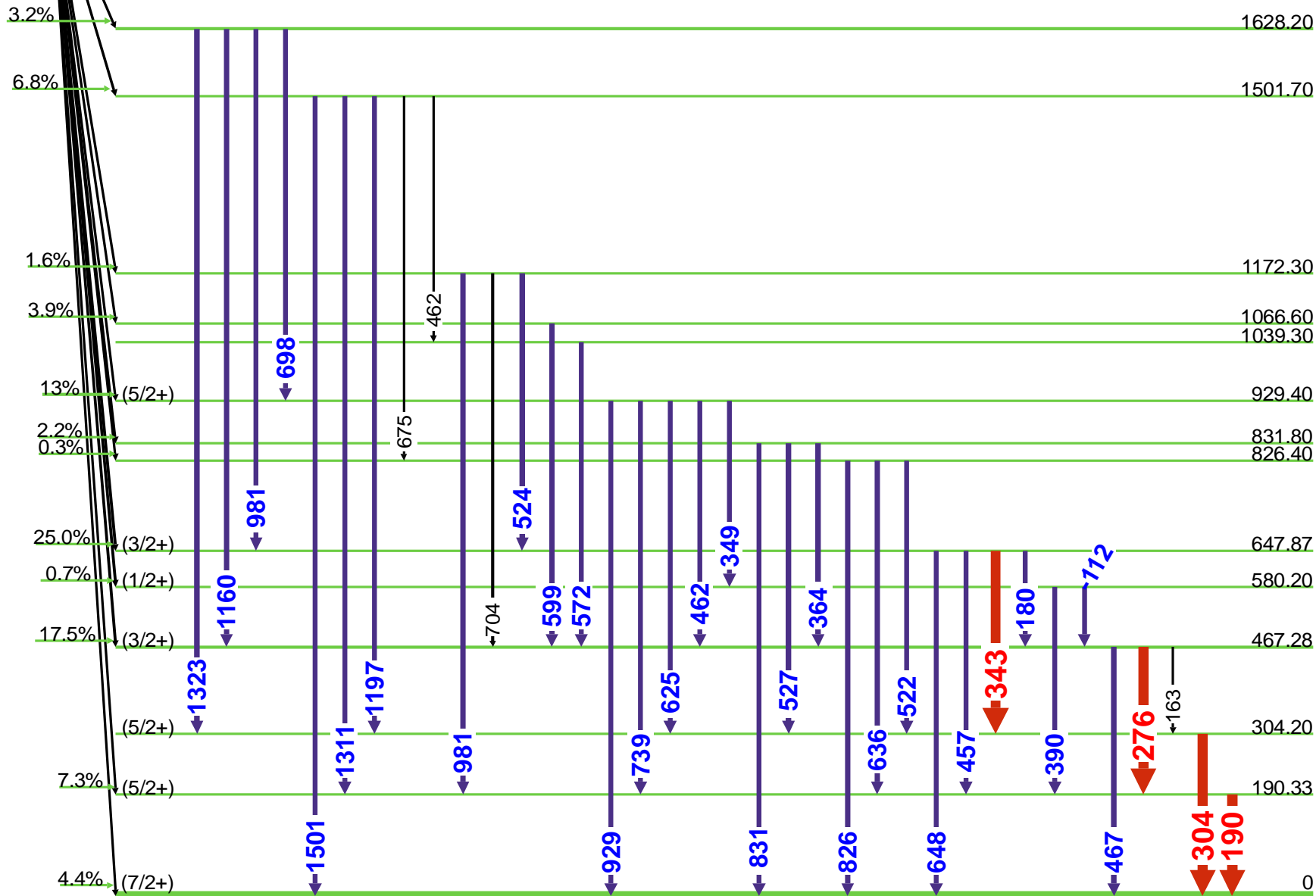
18 min.

¹⁴¹Ba(18 min.) Decay Scheme

gamma-rays emitted from low energy levels

¹⁴¹₅₆Ba

Q=3213



¹⁴¹₅₇La

3.9 hr.



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ¹⁴¹BaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 18.27(7) min.

Detector: 35 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
67.8			0.0023	0.0002	4
112.8		2.2	1.01	0.11	4
113.9			0.106	0.008	4
163.0		1.7	0.29	0.04	4
180.8		0.80	0.52	0.16	4
190.328	0.005	100.	46.	3.	1
234.9			0.060	0.014	4
242.7			0.092	0.015	4
255.1	0.6		0.009	0.005	4
276.950	0.010	54.0	23.4	1.7	1
281.6			0.101	0.015	4
304.190	0.020	60.0	25.4	1.8	1
321.5			0.028	0.014	4
343.670	0.020	35.0	14.4	1.0	1
349.5		0.9	0.230	0.024	4
359.2			0.010	0.008	4
364.5		1.0	0.59	0.05	4
381.4			0.120	0.020	4
390.		3.3	1.33	0.10	3
418.8			0.064	0.014	4
441.1	0.4		0.032	0.009	4
457.8		12.0	5.0	0.4	3
462.3		12.0	4.9	0.3	3
462.9			0.055	0.028	3
467.5		15.0	5.7	0.4	2
486.7			0.060	0.014	4
510.3			0.14	0.05	4
522.3		1.2	0.43	0.03	4
524.3		1.0	0.46	0.04	4
527.6		1.0	0.46	0.08	4
541.6			0.083	0.024	4
551.0			0.097	0.015	4
561.7			0.189	0.026	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
572.3		0.6	0.262	0.029	4
588.8			0.124	0.020	4
599.4			0.267	0.029	4
609.0			0.37	0.05	4
611.3			0.018	0.005	4
625.4		8.0	3.59	0.25	3
636.2		<1.0	0.317	0.025	4
641.5			0.40	0.03	4
648.1		15.0	6.3	0.5	2
655.3			0.018	0.014	4
658.9			0.032	0.014	4
670.3			0.184	0.022	4
675.4		1.1	0.30	0.03	4
685.4			0.18	0.05	4
688.0			0.051	0.014	4
698.8		1.2	0.40	0.03	4
700.7			0.129	0.016	4
704.8		<1.0	0.27	0.03	4
739.2		11.0	4.8	0.3	3
753.8			0.046	0.019	4
762.0			0.19	0.03	4
778.4			0.078	0.019	4
783.6	0.3		0.060	0.004	4
801.7			0.133	0.020	4
805.3			0.064	0.014	4
806.4			0.064	0.014	4
826.4		1.0	0.40	0.03	4
831.7		3.8	1.61	0.13	3
833.8			0.17	0.04	4
841.0			0.046	0.010	4
846.6			0.064	0.010	4
867.8			0.110	0.020	4
876.3		9.2	3.68	0.27	3
880.8			0.032	0.018	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ¹⁴¹BaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 18.27(7) min.

Detector: 35 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
881.2			0.147	0.025	4
885.2			0.046	0.010	4
909.3			0.115	0.020	4
917.4			0.055	0.010	4
929.5		1.8	0.75	0.06	3
943.2		2.4	0.80	0.07	4
959.0			0.055	0.014	4
967.6			0.032	0.009	4
974.9			0.037	0.014	4
981.2		1.9	0.18	0.05	4
981.7			0.74	0.10	
996.8			0.129	0.024	4
1008.4			0.064	0.014	4
1012.5			0.147	0.025	4
1034.3			0.19	0.04	4
1039.9			0.087	0.015	4
1046.3			0.34	0.05	4
1055.2			0.092	0.019	4
1066.6			0.101	0.020	4
1093.2			0.09	0.05	4
1094.2			0.14	0.05	4
1136.8			0.037	0.010	4
1147.0			0.028	0.009	4
1160.8		3.3	1.10	0.09	3
1173.1			0.175	0.018	4
1178.3			0.069	0.014	4
1187.8			0.011	0.009	4
1197.3		12.0	4.8	0.3	2
1224.9		0.7	0.44	0.07	4
1233.2			0.018	0.009	4
1236.0			0.193	0.026	4
1264.0		1.7	0.87	0.07	4
1273.4		1.5	0.50	0.05	4
1278.0		1.7	0.66	0.06	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1302.1			0.110	0.016	4
1309.4		1.5	0.23	0.04	4
1311.2			0.66	0.06	
1323.8		2.2	0.97	0.08	3
1345.7		<1.0	0.179	0.022	4
1354.6			0.074	0.010	4
1357.1			0.106	0.015	4
1361.2			0.032	0.012	4
1373.1			0.092	0.006	4
1376.8		2.1	0.83	0.07	4
1391.0			0.055	0.014	4
1405.1		0.5	0.33	0.03	4
1421.9	0.8		0.0230	0.0015	4
1436.6		1.8	0.86	0.08	4
1437.8			0.19	0.04	4
1447.0			0.143	0.021	4
1455.9		2.0	0.13	0.03	4
1460.			0.76	0.09	
1501.4		0.8	0.39	0.06	3
1525.7	0.9		0.051	0.014	4
1540.2			0.083	0.011	4
1540.2			0.083	0.011	
1547.1			0.032	0.009	4
1550.2		0.5	0.39	0.03	4
1559.9	0.7		0.06	0.03	4
1568.3		1.0	0.28	0.03	4
1569.8			0.046	0.023	
1588.6	0.7		0.08	0.04	4
1600.6			0.064	0.014	4
1609.3			0.041	0.010	4
1621.4			0.069	0.019	4
1642.5			0.083	0.015	4
1653.6		1.8	0.92	0.08	3
1682.3		2.8	1.70	0.14	2



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ¹⁴¹BaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 18.27(7) min.

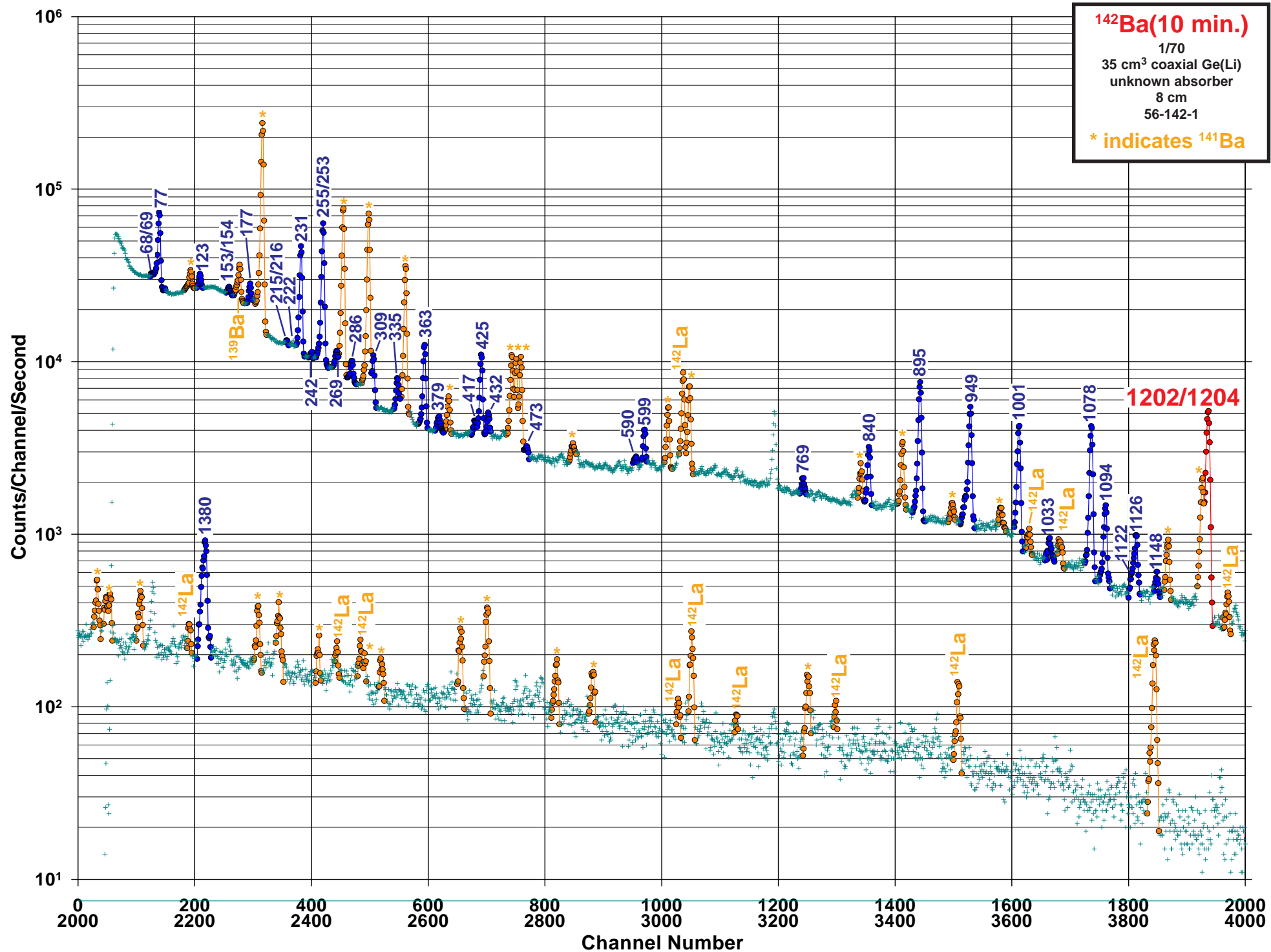
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1712.7		0.8	0.21	0.04	3
1727.7			0.092	0.011	4
1735.4		<1.0	0.21	0.04	4
1740.6		1.0	0.33	0.03	3
1795.4		1.3	0.58	0.06	3
1820.5			0.120	0.016	4
1841.7	0.8		0.041	0.023	4
1851.9	0.5		0.055	0.014	4
1859.9			0.092	0.015	4
1912.2			0.152	0.025	4
1918.3			0.060	0.010	4
1990.		<1.0	0.25	0.05	4

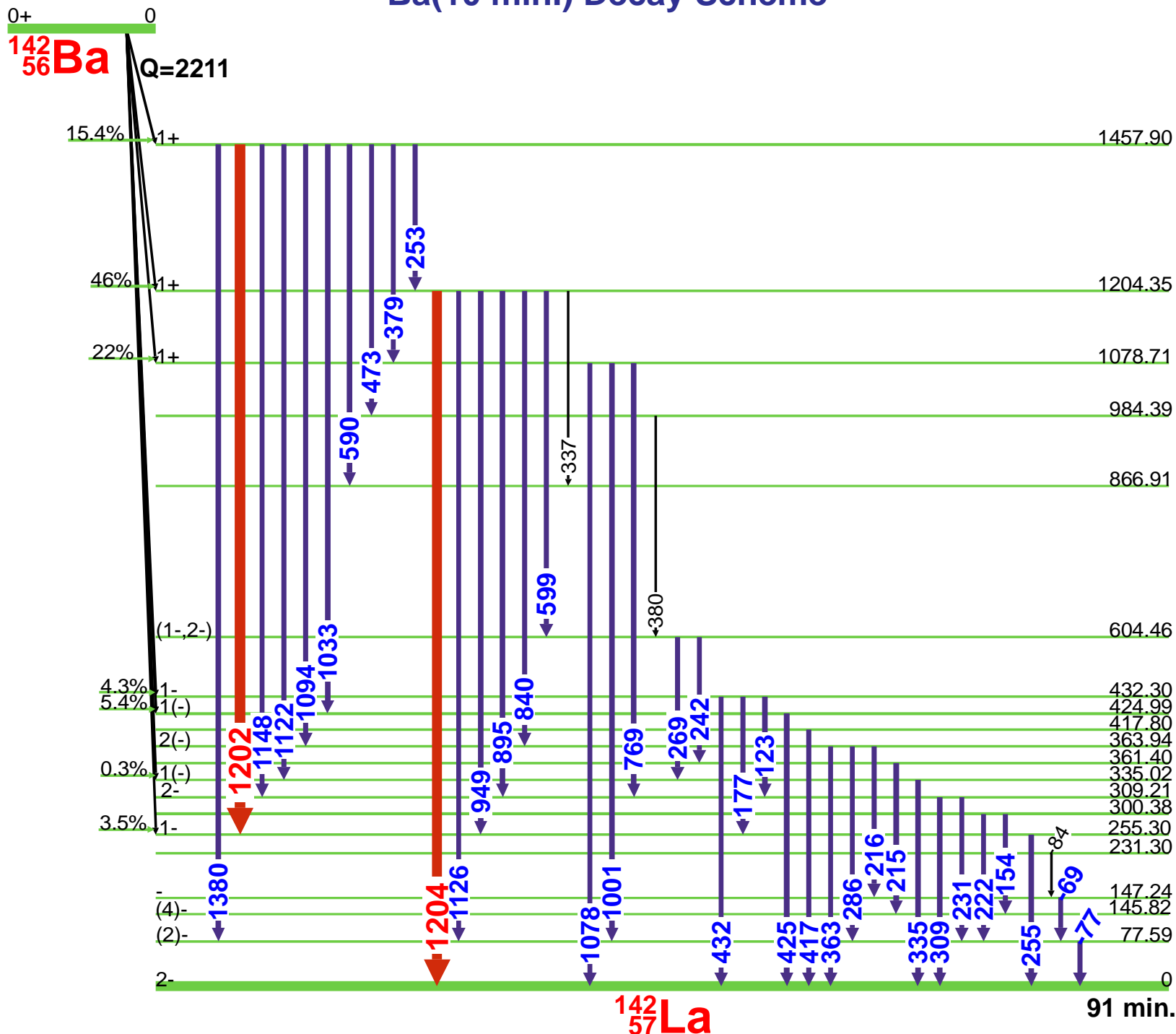
E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
2026.2		1.0	0.45	0.08	2
2078.9	1.2		0.037	0.019	4
2136.6			0.032	0.009	4
2164.0			0.18	0.04	4
2195.0			0.097	0.015	4
2217.3	0.5		0.14	0.06	4
2269.0	0.4		0.0138	0.0009	4
2277.9			0.110	0.012	4
2463.90	0.20		0.014	0.005	4
2468.8			0.244	0.021	4
2516.3	1.0		0.037	0.014	4
2810.3	0.6		0.0138	0.0009	4





10 min.

¹⁴²Ba(10 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{142}Ba E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 10.6(2) min.

Detector: 35 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	8.7					4		356.8			0.082	0.025	4
	63.60	0.10		0.090	0.013	4		363.96	0.03	28.0	4.72	0.20	3
	68.30	0.10		0.078	0.010			379.40	0.10	3.5	0.576	0.021	4
D	68.30	0.10	1.0	0.082	0.019	4		380.0		~1.0	0.066	0.023	4
	69.70	0.10		0.262	0.014			412.7				0.055	0.027
	77.594	0.003	42.0	9.5	0.4	3		417.80	0.20	2.2	0.37	0.04	4
	79.8			0.037	0.012	4		425.04	0.03	30.0	5.72	0.20	3
	84.0		<1.0	0.031	0.010	4		432.30	0.10	6.0	1.02	0.09	4
	123.00	0.10	4.2	0.92	0.04	4		434.40	0.10		0.45	0.06	4
	130.0			0.062	0.016	4		448.30	0.10		0.248	0.016	4
	147.5			0.074	0.012	4		457.10	0.10		0.373	0.018	4
	153.10	0.10		0.086	0.021	4		473.40	0.10	2.4	0.416	0.019	4
	154.60	0.10	2.7	0.48	0.03	4		488.30	0.20		0.092	0.015	4
	162.30	0.10		0.113	0.009	4		537.20	0.20		0.070	0.012	4
	172.6	0.3		0.037	0.014	4		557.70	0.10		0.246	0.012	4
	177.00	0.10	6.5	1.72	0.06	4		577.70	0.20		0.068	0.010	4
D	215.70	0.20	1.2	0.10	0.04	4		588.40	0.20		0.090	0.015	4
	216.60	0.10		0.20	0.04			590.70	0.10	3.3	0.310	0.017	4
	220.20	0.20		0.066	0.012	4		599.80	0.10	12.0	1.84	0.06	4
	222.80	0.10	1.7	0.322	0.014	4		604.30	0.20		0.418	0.024	4
	231.611	0.010	57.0	12.1	0.4	2		620.3	0.3		0.049	0.012	4
	242.90	0.20	1.5	0.18	0.04	4		622.80	0.20		0.066	0.012	4
D	253.70	0.10	100.	0.53	0.04	2		649.30	0.20		0.070	0.012	4
	255.300	0.012		20.5	0.8			654.60	0.20		0.088	0.013	4
	257.50	0.10		0.14	0.03	4		660.90	0.10		0.226	0.014	4
	269.50	0.10	4.6	0.92	0.09	4		674.4	0.6		0.066	0.027	4
	283.50	0.20		0.29	0.08	4		674.7	0.7		0.070	0.027	4
	286.30	0.10	5.9	1.11	0.09	4		714.4	0.4		0.041	0.014	4
	309.20	0.10	15.0	2.58	0.11	4		769.40	0.10	3.8	0.752	0.029	4
	335.00	0.10	7.6	1.47	0.04	4		771.90	0.20		0.094	0.015	4
	337.70	0.20	1.6	0.310	0.024	4		786.60	0.20		0.189	0.015	4
	340.5	0.7		0.025	0.020	4		791.60	0.20		0.084	0.015	4
	346.80	0.20		0.133	0.013	4		823.4	0.3		0.29	0.10	4
	354.7			0.049	0.016	4		840.40	0.10	18.0	3.61	0.16	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{142}Ba E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 10.6(2) min.

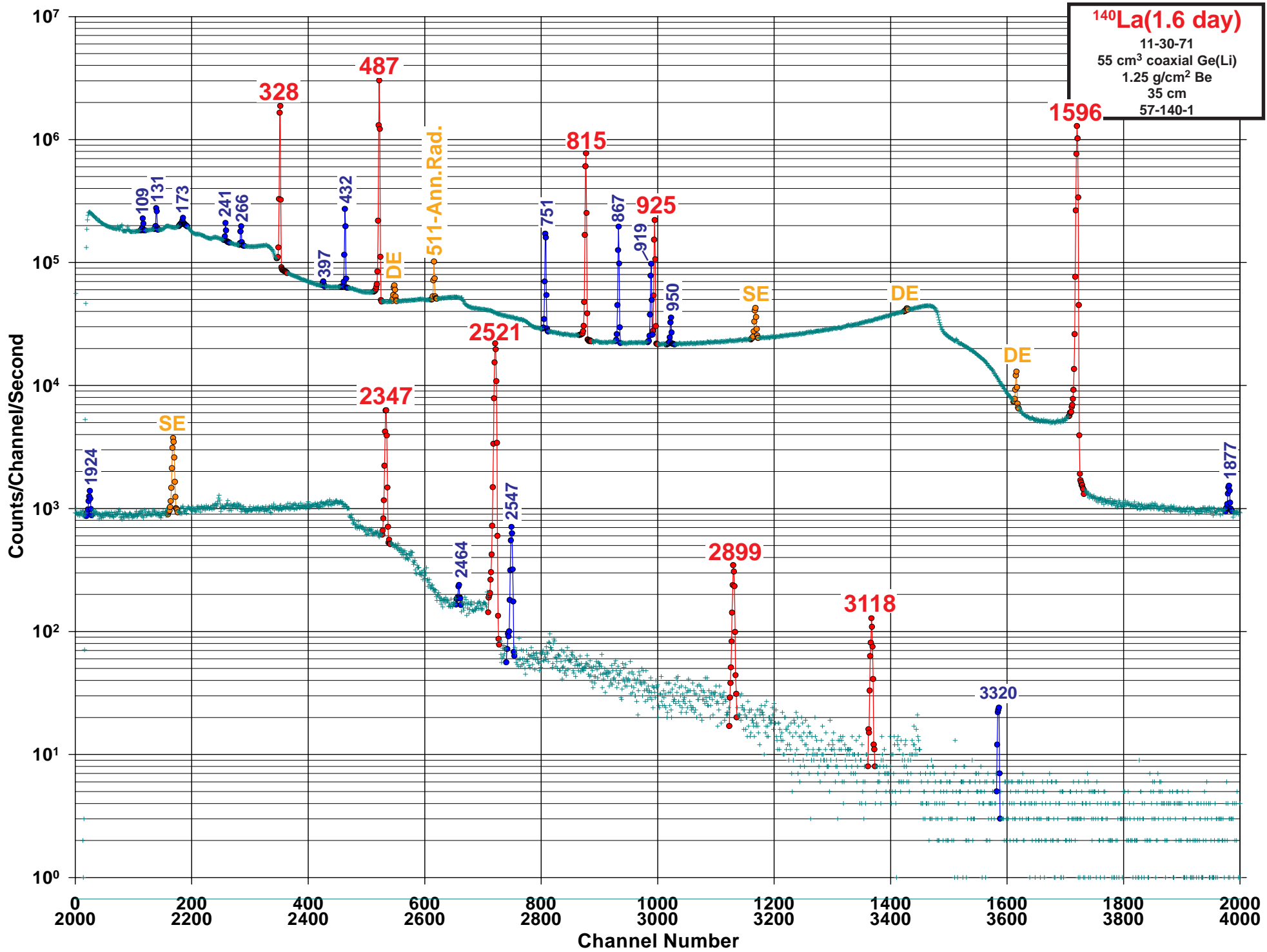
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
853.0			0.031	0.016	4
895.20	0.10	69.0	13.9	0.6	2
907.2	0.4		0.041	0.014	4
931.6	0.4		0.08	0.06	4
932.6	0.9		0.08	0.06	4
934.0			0.031	0.016	4
949.10	0.10	58.0	10.6	0.4	4
984.5	0.3		0.074	0.014	4
1001.20	0.10	52.0	9.7	0.4	2
1033.00	0.10		0.342	0.018	4
1040.0			0.078	0.027	4

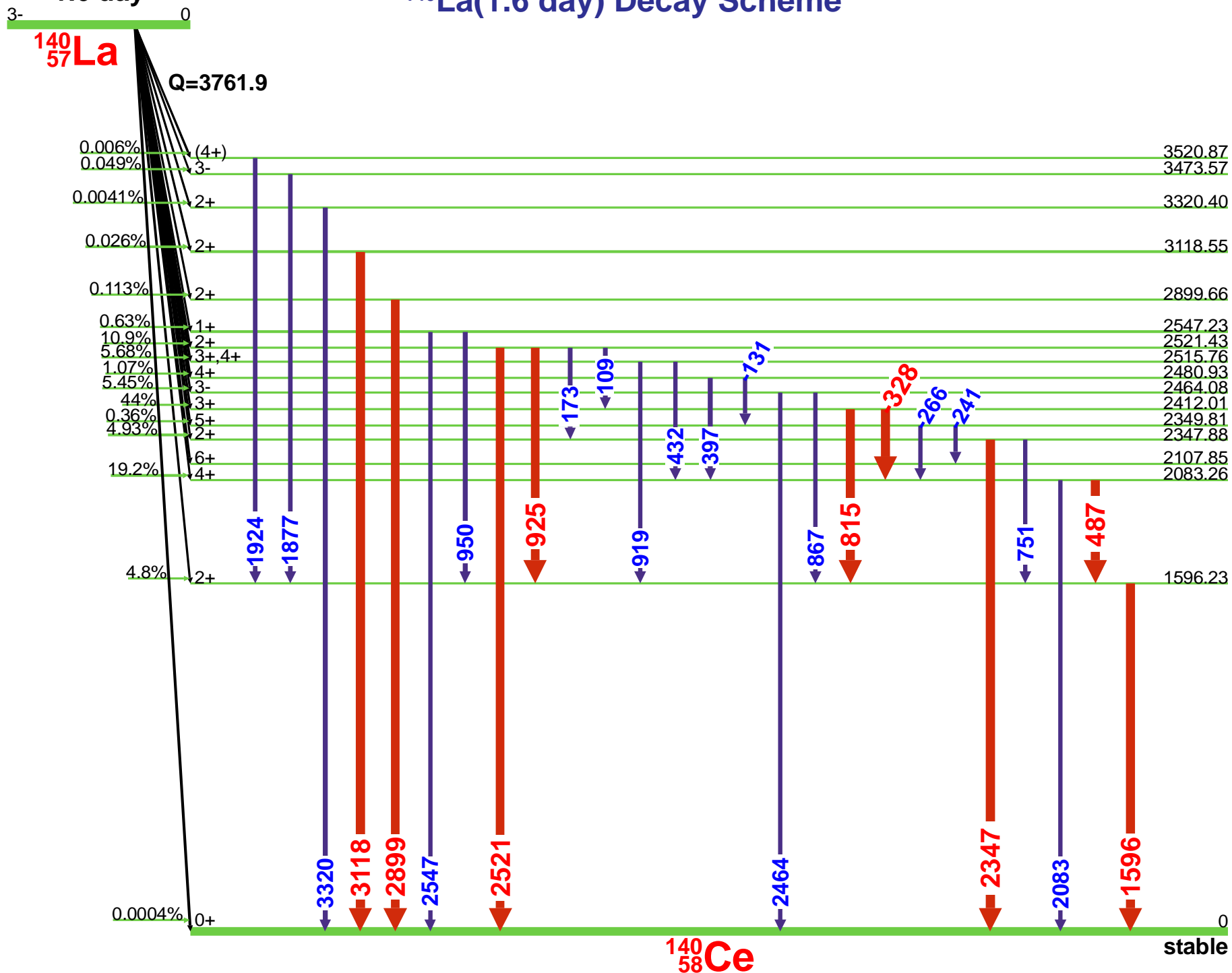
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1078.70	0.10	59.0	11.5	0.5	2
1094.10	0.10	16.0	2.81	0.15	3
1114.4	0.4		0.10	0.04	4
1122.90	0.10	2.3	0.392	0.020	4
1126.80	0.10	8.9	1.50	0.13	3
1148.70	0.10	2.3	0.498	0.024	4
1202.40	0.10	97.0	5.54	0.26	1
1204.30	0.10		14.2	0.5	
1230.20	0.20		0.084	0.009	4
1283.6	0.3		0.066	0.012	4
1380.20	0.10	15.0	3.40	0.19	2





1.6 day

¹⁴⁰La(1.6 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{140}La E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

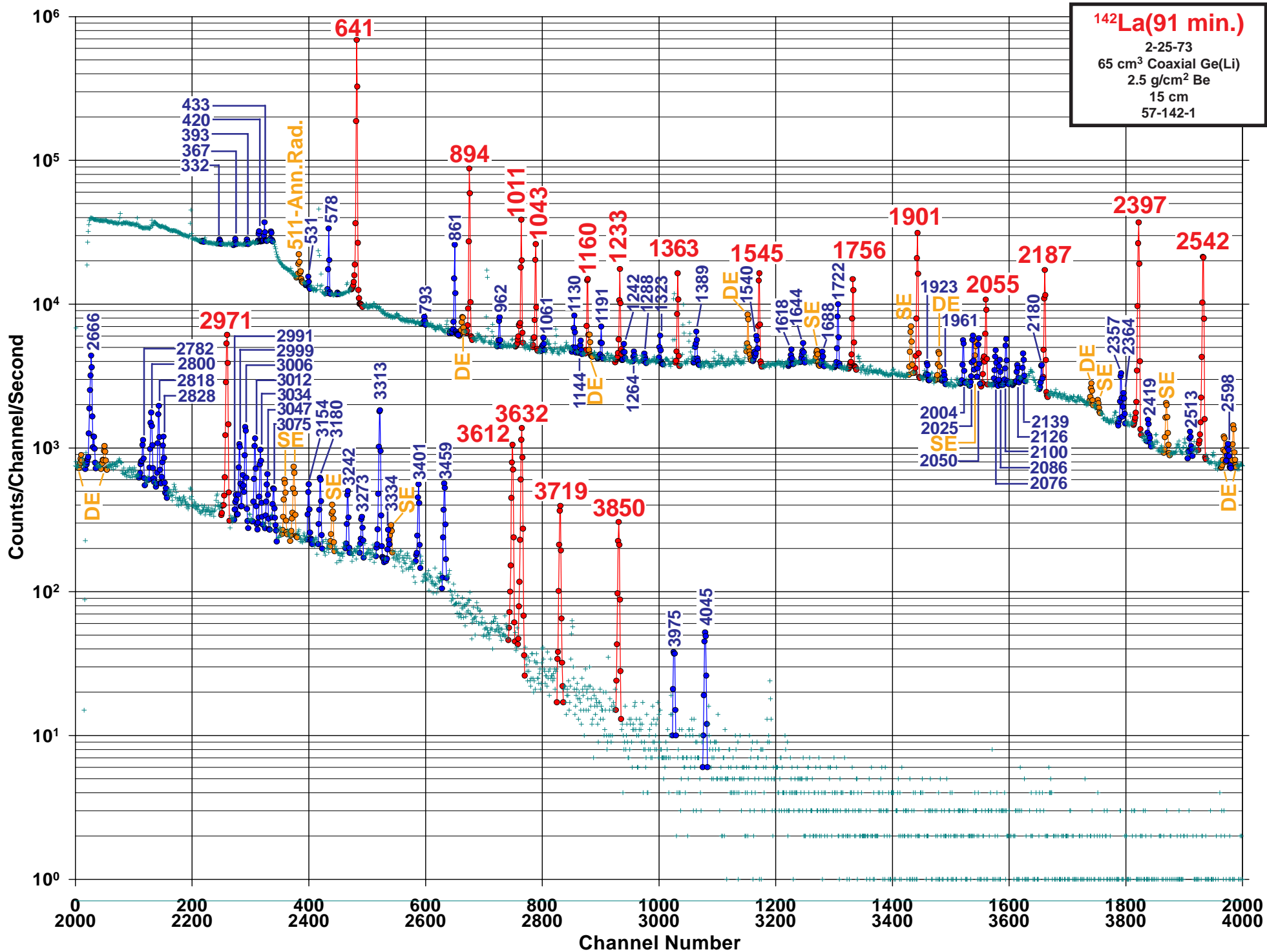
Half Life: 1.6781(3) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{139}\text{La}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
24.595	0.004		0.0029		4
64.135	0.010		0.0143	0.0019	4
68.916	0.006		0.0754	0.0019	4
109.422	0.011	0.17	0.219	0.004	4
131.117	0.008	0.42	0.468	0.010	4
173.543	0.009	0.6	0.127	0.004	4
241.93	0.03	0.51	0.414	0.008	4
266.543	0.012	0.50	0.466	0.008	4
306.90	0.20		0.025	0.007	4
328.762	0.008	19.6	20.32	0.29	1
397.52	0.05	0.12	0.074	0.005	4
432.493	0.012	2.94	2.900	0.029	3
438.5	0.5		0.039	0.010	4
445.5	0.5		0.0029	0.0010	4
487.021	0.012	44.7	45.5	0.6	1
618.12	0.05		0.037	0.004	4
751.637	0.018	4.5	4.33	0.04	2
815.772	0.019	24.2	23.28	0.19	1
867.846	0.020	5.7	5.50	0.07	2
919.550	0.023	2.89	2.662	0.029	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
925.189	0.021	7.2	6.90	0.07	1
950.99	0.03	0.56	0.519	0.007	4
992.9	0.5		0.013	0.005	4
1045.05	0.24	0.04	0.025	0.014	4
1097.20	0.23		0.023	0.005	4
1303.5	0.4		0.042	0.007	4
1405.20	0.17		0.059	0.007	4
1596.21	0.04	100.	95.4	1.4	1
1877.29	0.19	0.05	0.041	0.004	4
1903.5					4
1924.62	0.13	0.023	0.0134	0.0019	4
2083.2	0.5		0.0115	0.0007	4
2347.88	0.05	0.89	0.849	0.029	1
2464.1	0.5		0.0114	0.0019	4
2521.40	0.05	3.59	3.46	0.04	1
2547.34	0.11	0.110	0.1011	0.0029	2
2899.61	0.16	0.073	0.0668	0.0019	1
3118.51	0.16	0.028	0.0248	0.0010	1
3320.4	0.6	0.005	0.0038	0.0003	3





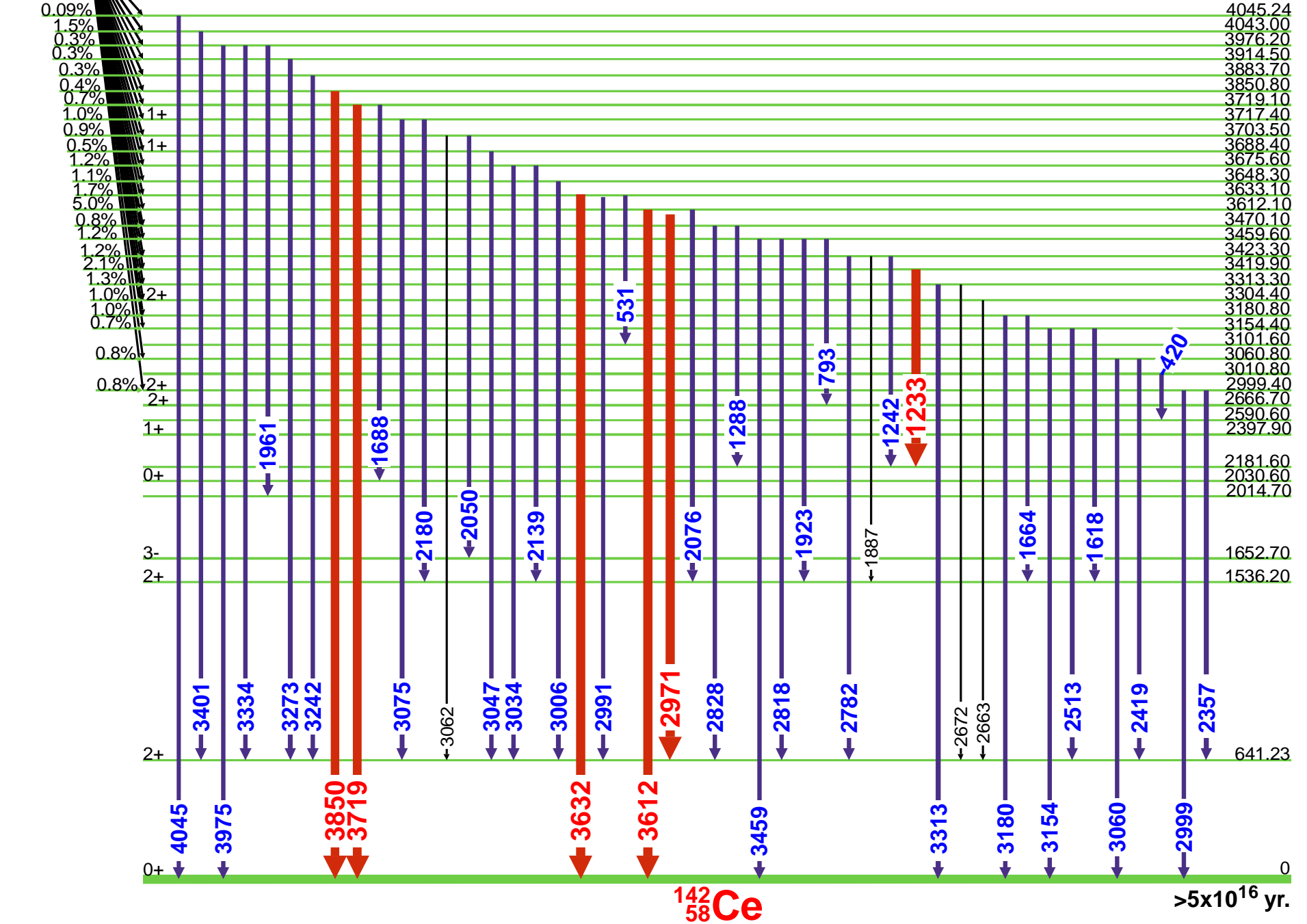
91 min.

¹⁴²La(91 min.) Decay Scheme

gamma-rays emitted from high energy levels

¹⁴²₅₇La

Q=4505



¹⁴²₅₈Ce

>5x10¹⁶ yr.



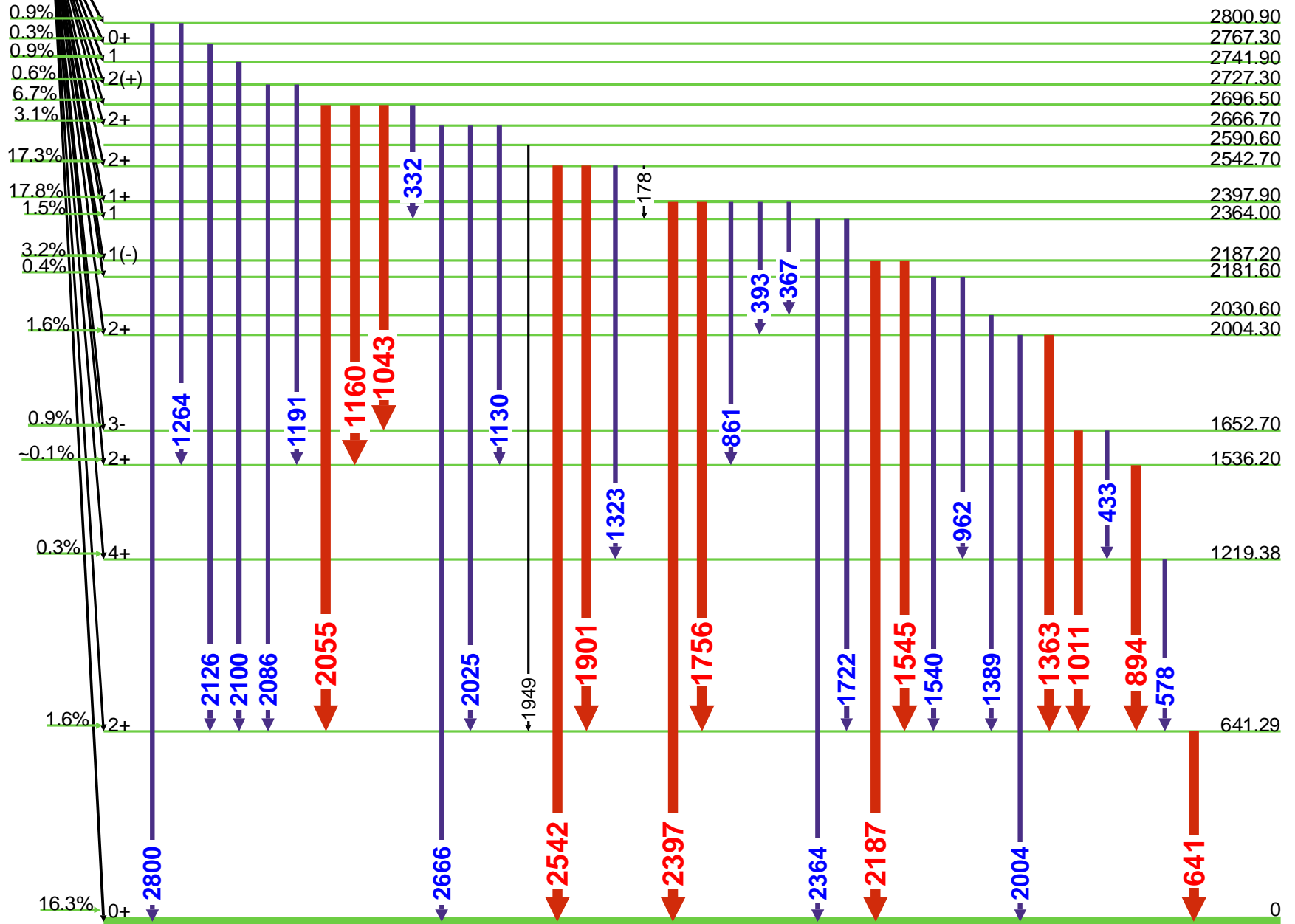
91 min.

¹⁴²La(91 min.) Decay Scheme

gamma-rays emitted from low energy levels



Q=4505



>5x10¹⁶ yr.



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{142}La E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 91.1(5) min.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
105.9	0.3		0.1422	0.0015	4
173.5	0.3		0.09	0.05	4
178.3	0.3	0.1	0.19	0.05	4
297.9	0.3		0.05	0.05	4
318.0	0.3		0.05	0.05	4
332.1	0.4	0.22	0.05	0.05	4
339.5	0.4		0.09	0.05	4
341.7	0.4		0.05	0.05	4
350.3	0.3		0.0474	0.0005	4
355.3	0.3		0.0474	0.0005	4
361.1	0.3		0.0948	0.0010	4
367.3	0.2	0.20	0.1422	0.0015	4
393.60	0.20	0.15	0.1896	0.0020	4
420.20	0.20	0.48	0.2370	0.0025	4
433.30	0.20	0.93	0.379	0.004	4
439.0	0.5		0.05	0.05	4
453.7	0.5		0.0948	0.0010	4
Ann. 511.006					
514.7	0.4		0.14	0.05	4
529.4	0.6		0.05	0.05	4
531.60	0.20	0.60	0.1422	0.0015	4
538.3	0.5		0.0474	0.0005	4
546.00	0.20		0.0474	0.0005	4
570.6	0.5		0.05	0.05	4
578.09	0.04	2.83	1.33	0.05	3
639.5	0.4		0.09	0.05	4
641.285	0.009	100.	47.4	0.5	1
646.2	0.7		0.14	0.09	4
677.0	0.6		0.05	0.05	4
681.2	0.6		0.05	0.05	4
692.4	0.6		0.0948	0.0010	4
793.1	0.4	0.32	0.05	0.05	4
861.6	0.7	3.86	1.66	0.05	2
878.2	0.4		0.1896	0.0020	4
894.9	0.4	17.97	8.34	0.17	1
915.6	0.5		0.05	0.05	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
946.9	0.4		0.0948	0.0010	4
962.2	0.4	0.83	0.38	0.05	4
989.8	0.5		0.0948	0.0010	4
1006.70	0.20		0.2370	0.0025	4
1011.4	0.3	7.77	3.93	0.10	1
1020.8	0.4		0.0474	0.0005	4
1039.4	0.3		0.0948	0.0010	4
1043.7	0.5	5.88	2.70	0.06	1
1058.4	0.4		0.0948	0.0010	4
1061.5	0.4	0.42			4
1069.4	0.5		0.09	0.05	4
1072.2	0.8		0.09	0.05	4
1089.9	0.7		0.1422	0.0015	4
1091.2	0.8		0.0948	0.0010	4
1100.7	0.8		0.0474	0.0005	4
1104.8	0.8		0.0474	0.0005	4
1112.9	0.5		0.05	0.05	4
1117.7	0.5		0.0474	0.0005	4
1121.2	0.6		0.0474	0.0005	4
1130.6	0.5	1.30	0.48	0.05	3
1144.2	0.4	0.45	0.0474	0.0005	4
1160.2	0.5	3.76	1.71	0.05	1
1176.4	0.4		0.1422	0.0015	4
1191.1	0.4	0.90	0.379	0.004	4
1205.7	0.5		0.0474	0.0005	4
1214.0	0.5		0.05	0.05	4
1231.3	0.5		0.05	0.05	4
1233.1	0.6	4.65	1.90	0.05	1
1242.0	0.4	0.54	0.2370	0.0025	4
1264.7	0.4	0.26	0.0948	0.0010	4
1280.1	0.4		0.0474	0.0005	4
1283.2	0.5		0.0474	0.0005	4
1288.5	0.4	0.26	0.0474	0.0005	4
1323.2	0.5	0.85	0.33	0.05	3
1348.7	0.5		0.0474	0.0005	4
1352.6	0.5		0.0948	0.0010	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{142}La E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 91.1(5) min.

Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1363.0	0.5	4.60	2.13	0.05	1
1372.9	0.7		0.05	0.05	4
1389.3	0.8		0.43	0.05	3
1393.0	0.8		0.1422	0.0015	4
1402.2	0.5		0.1422	0.0015	4
1445.5	0.5	0.28	0.1422	0.0015	4
1455.1	0.5		0.0948	0.0010	4
1461.2	0.5		0.95	0.05	4
1494.1	0.7	0.48	0.1422	0.0015	3
1500.3	0.6		0.0948	0.0010	4
1516.3	0.6		0.43	0.05	4
1524.6	0.7		0.47	0.05	4
1540.2	0.7	1.44	0.47	0.09	3
1545.8	0.5	6.07	2.99	0.15	1
1618.2	0.7	0.46	0.284	0.003	4
1628.5	0.7		0.0474	0.0005	4
1644.3	0.7	0.77	0.2370	0.0025	4
1688.6	0.8	0.59	0.2370	0.0025	4
1722.7	0.8	3.29	1.517	0.05	2
1756.4	0.8	6.42	2.70	0.06	1
1768.2	0.7		0.24	0.05	4
1770.8	0.7		0.19	0.05	4
1793.8	0.7		0.0474	0.0005	4
1846.2	0.8		0.05	0.05	4
1887.3	0.8		0.14	0.09	4
1901.3	0.7	14.7	7.16	0.16	1
1923.3	0.7	0.75	0.19	0.05	4
1933.6	0.7		0.1422	0.0015	4
1949.4	0.9		0.38	0.05	4
1961.5	0.9	0.82	0.1422	0.0015	4
2004.2	0.9	1.90	0.90	0.05	3
2014.1	1.0		0.0948	0.0010	4
2025.5	1.0	2.43	1.00	0.05	2
2038.7	0.8	1.98	0.95	0.05	3
2050.9	0.8		0.47	0.09	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2055.2	0.8	5.25	2.18	0.10	1
2076.1	0.9	1.55	0.81	0.10	3
2086.0	0.9	0.74	0.379	0.004	4
2096.6	0.9		0.05	0.05	4
2100.4	0.8	2.00	1.04	0.10	2
2111.9	0.8		0.0474	0.0005	4
2126.2	0.9	1.84	0.33	0.05	3
2139.3	0.8	1.63	0.52	0.10	3
2152.0	0.8		0.14	0.05	4
2160.0	0.9		0.0474	0.0005	4
2180.9	0.9	1.54	0.52	0.10	3
2187.2	1.0	10.4	3.70	0.10	1
2347.4	0.9		0.05	0.05	4
2357.8	1.0	1.90	0.57	0.05	3
2364.4	0.9	0.78	0.43	0.05	4
2378.6	0.9		0.1422	0.0015	4
2397.8	0.9	24.80	13.3	0.3	1
2419.5	0.9	0.94	0.1896	0.0020	4
2460.3	1.0	1.44	0.47	0.05	3
2513.1	0.9		0.0948	0.0010	4
2523.3	0.9		0.0474	0.0005	4
2539.2	1.1		0.38	0.05	4
2542.7	1.0	20.3	10.00	0.26	1
2590.6	1.0		0.1422	0.0015	4
2598.7	0.9	0.40	0.1422	0.0015	4
2612.4	0.9		0.332	0.004	4
2645.7	1.0	0.12	0.0948	0.0010	4
2663.1	1.0	1.6	0.71	0.10	2
2666.8	0.9	3.72	1.80	0.10	2
2672.6	1.0	0.61	0.1896	0.0020	3
2732.5	1.0		0.14	0.05	4
2782.2	1.0	1.03	0.332	0.004	3
2800.8	1.0	1.91	0.76	0.05	3
2818.5	1.1	1.69	0.76	0.05	3
2828.8	1.1		0.284	0.003	4
2888.0	1.0		0.10	0.05	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{142}La E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 91.1(5) min.

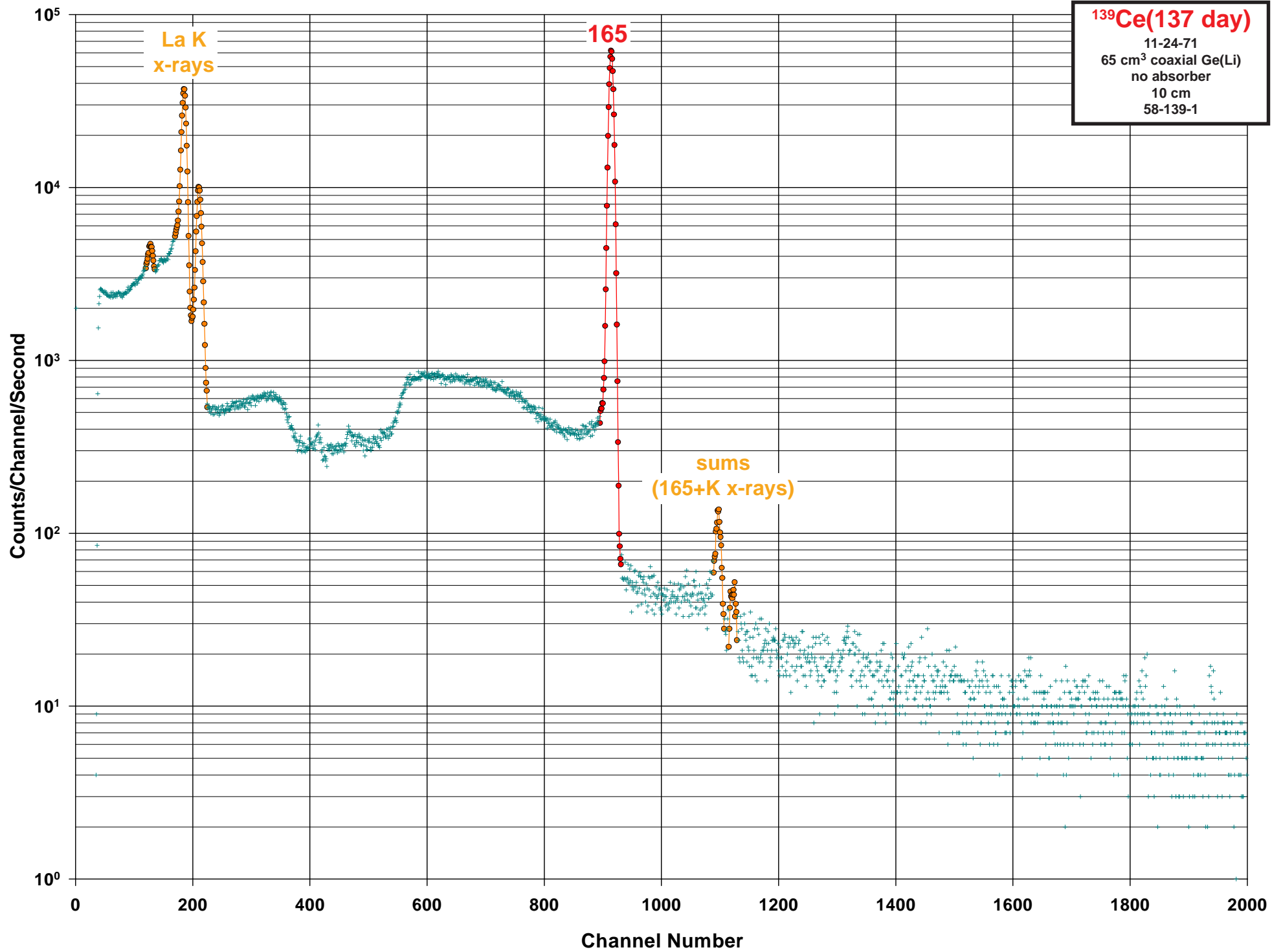
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: U(n,f) chem

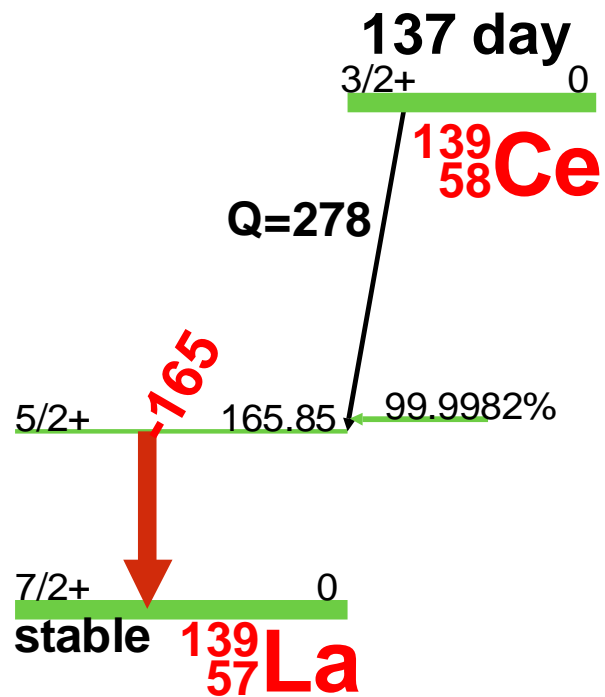
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2971.0	1.2	7.23	3.13	0.15	1
2991.6	1.1		0.0948	0.0010	4
2999.9	1.2	0.89	0.2370	0.0025	3
3002.6	1.2		0.2370	0.0025	4
3006.8	1.2	0.35	0.0948	0.0010	3
3010.8	1.3		0.1422	0.0015	4
3012.4	1.3	1.20	0.427	0.004	3
3034.3	1.4	1.14	0.52	0.05	3
3047.4	1.4	0.94	0.427	0.004	4
3060.7	1.4	0.55	0.0948	0.0010	4
3062.4	1.3				
3075.9	1.2	0.49	0.1896	0.0020	4
3101.5	1.2		0.1422	0.0015	4
3121.9	1.3		0.1896	0.0020	4
3154.3	1.4	0.6	0.1896	0.0020	4
3164.7	1.3		0.0948	0.0010	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
3180.4	1.3	0.52	0.284	0.003	4
3210.2	1.2		0.0948	0.0010	4
3242.4	1.2	0.37	0.1896	0.0020	4
3273.2	1.4	0.24	0.1422	0.0015	4
3313.8	1.2	2.35	0.95	0.05	2
3334.2	1.2	0.09	0.0948	0.0010	4
3401.9	1.2	0.62	0.332	0.004	3
3459.3	1.3	0.82	0.2370	0.0025	3
3470.0	1.3		0.0948	0.0010	4
3612.1	1.4	1.26	0.90	0.05	1
3632.7	1.3	1.72	1.00	0.05	1
3719.1	1.3	0.51	0.284	0.003	1
3850.4	1.3	0.41	0.2370	0.0025	1
3975.60	0.20	0.07	0.0474	0.0005	3
4045.2	0.0	0.09			3





¹³⁹Ce(137 day) Decay Scheme



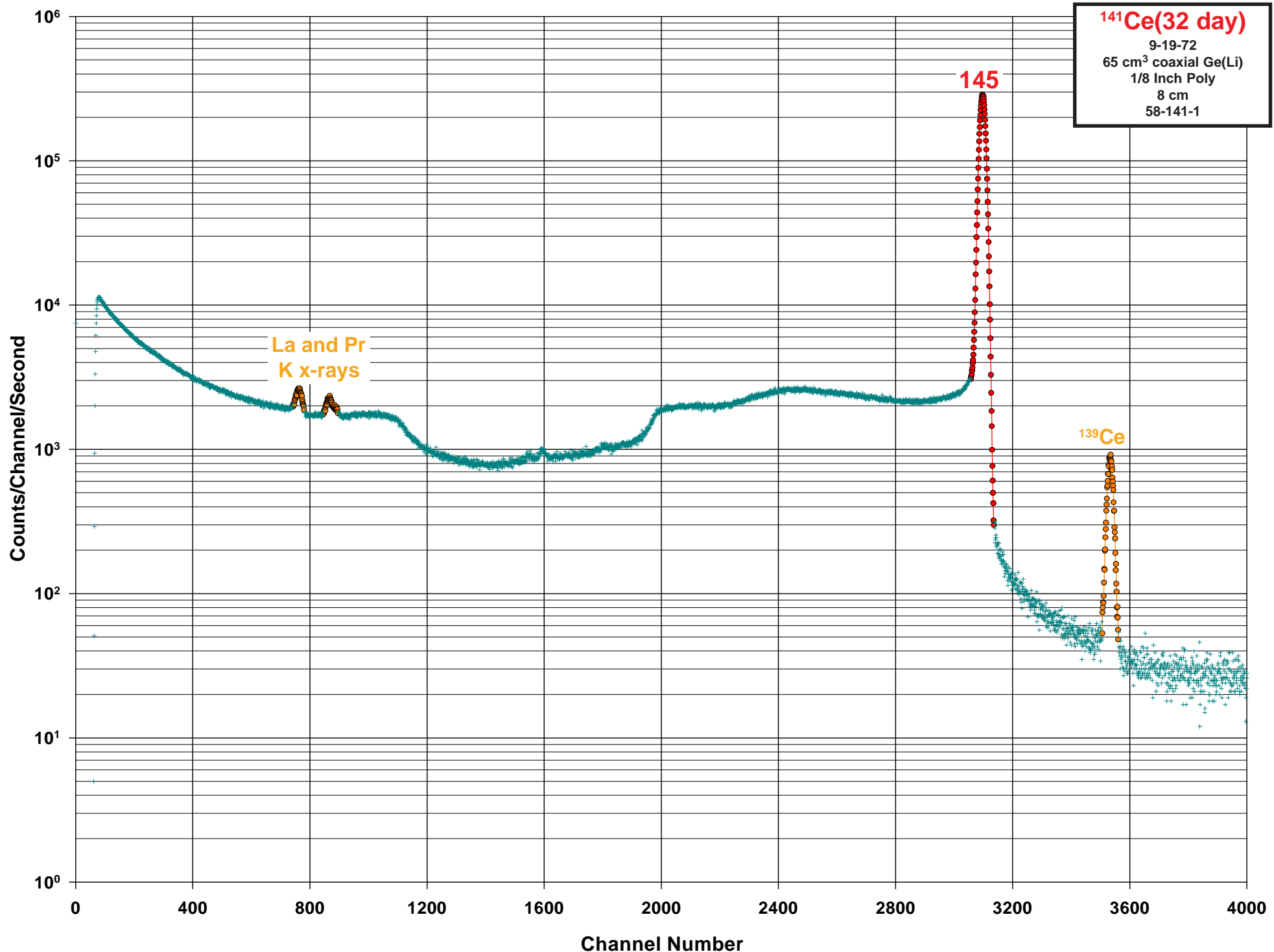
GAMMA-RAY ENERGIES AND INTENSITIES

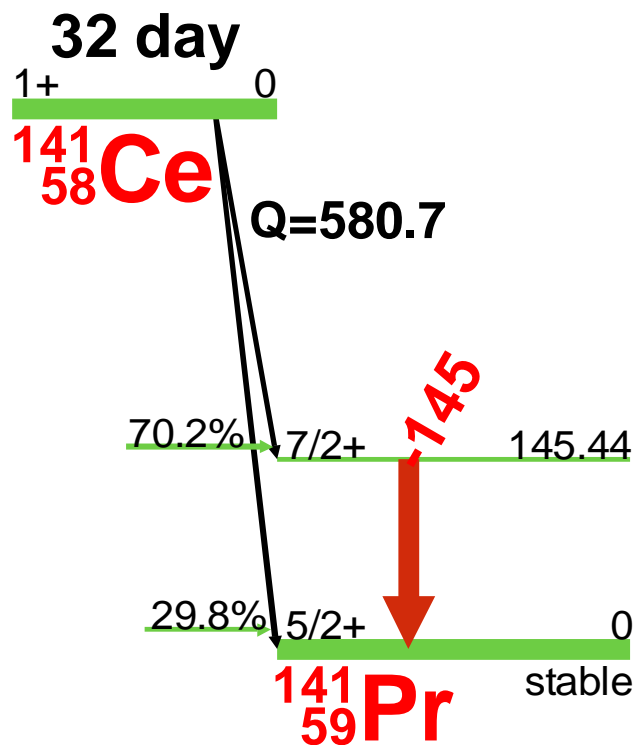
Nuclide: ¹³⁹Ce Half Life: 137.640(23) day
 Detector: 65 cm³ coaxial Ge (Li) Method of Production: ¹³⁹La(p,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
165.853	0.007	100.	79.886	0.014	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





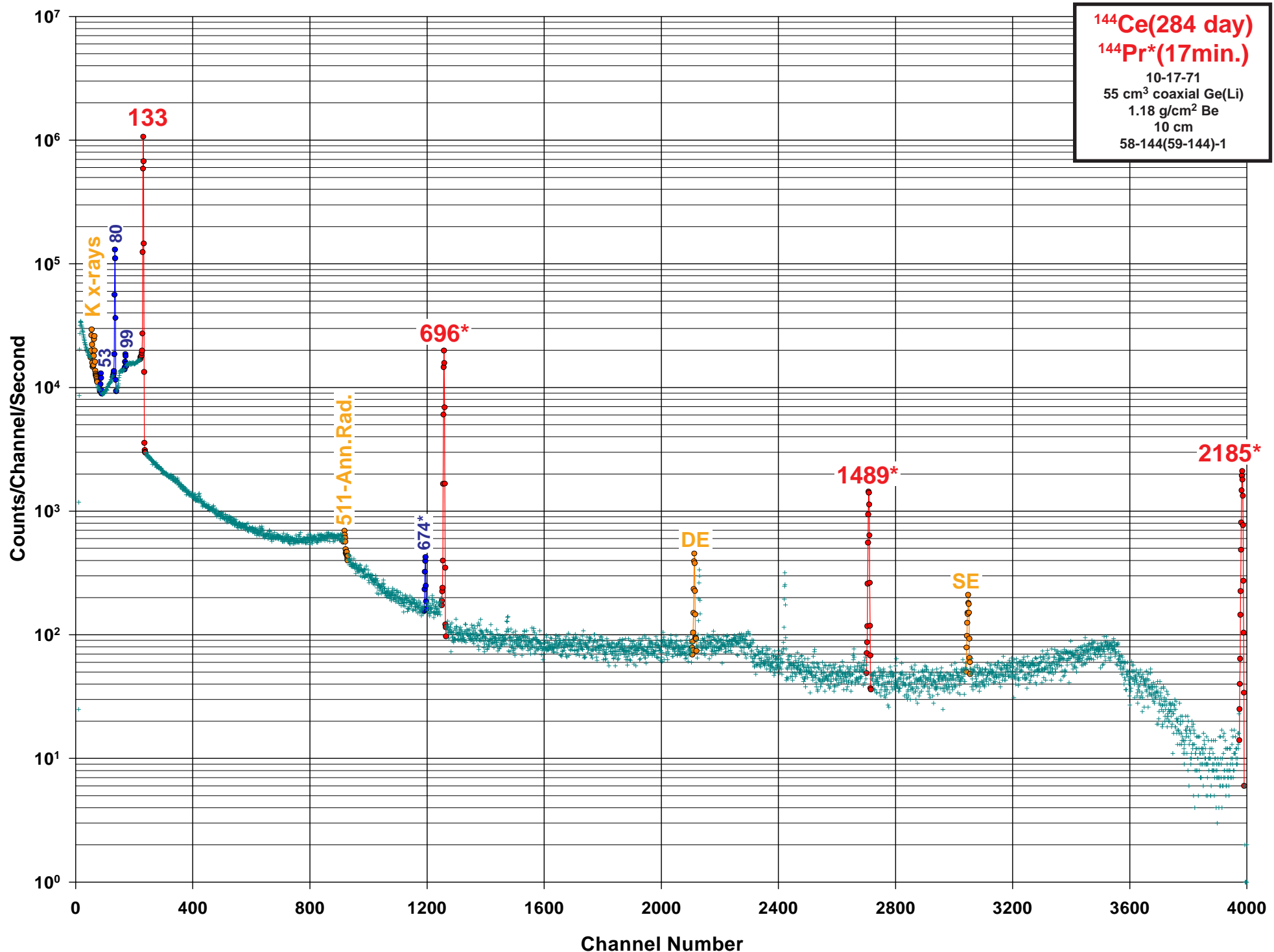
^{141}Ce (32 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{141}Ce

Half Life: 32.501(5) day

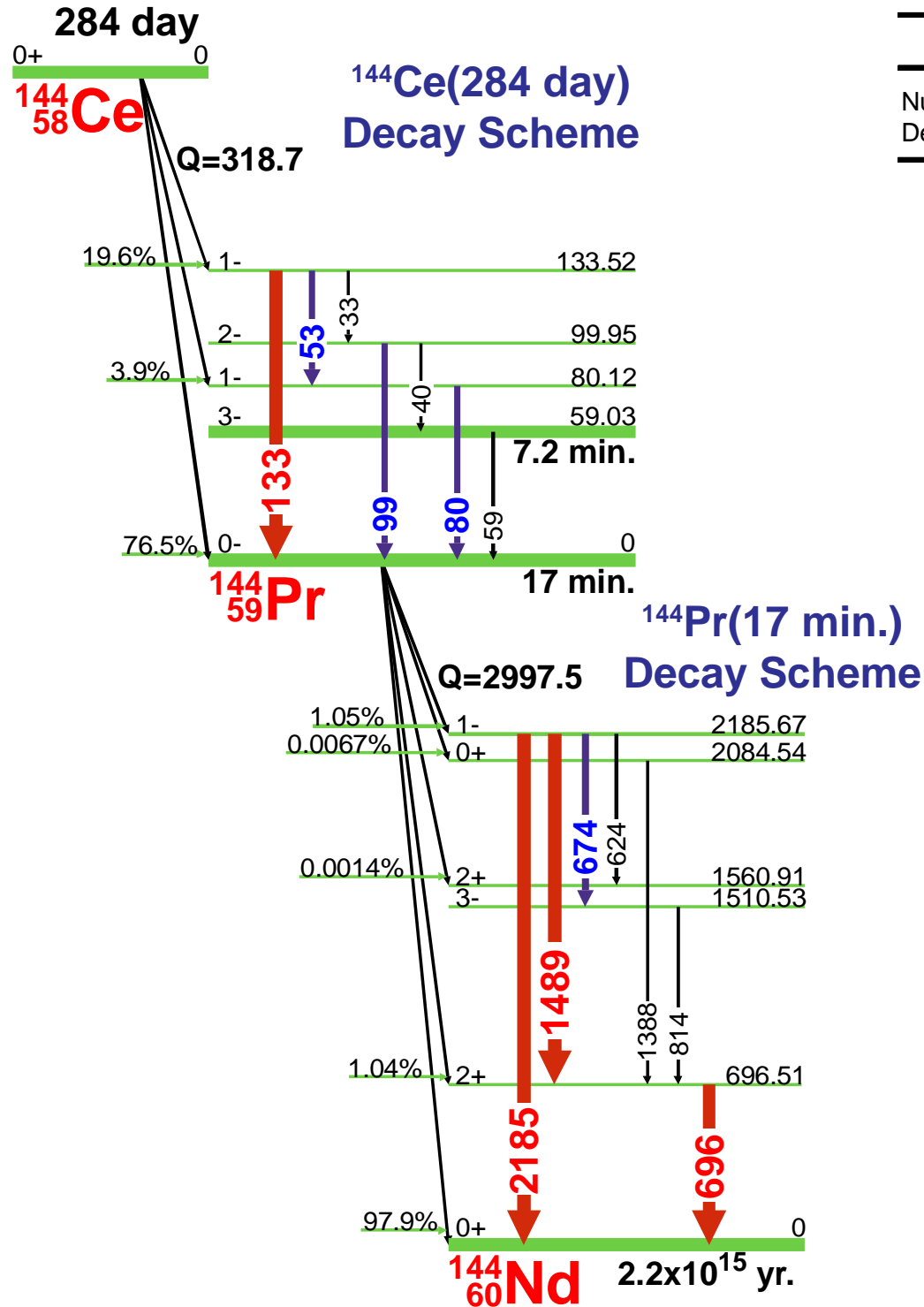
Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{140}\text{Ce}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
145.4405	0.0028	100.	48.2	0.3	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



GAMMA-RAY ENERGIES AND INTENSITIES

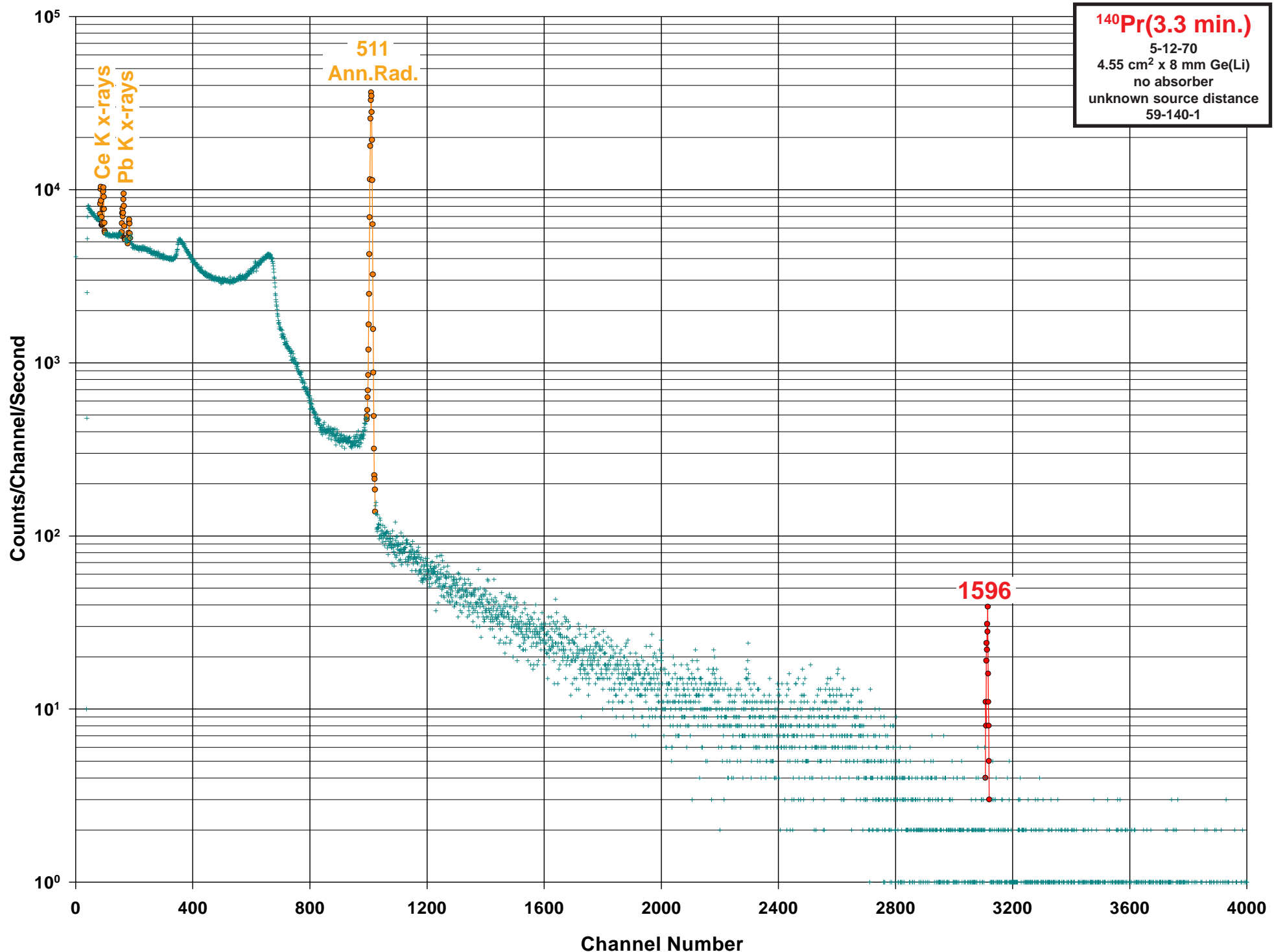


Nuclide: $^{144}\text{Ce} - ^{144}\text{Pr}^*$ Half Life: 284.893(8) day - 17.28(5) min.*
 Detector: 55 cm³ coaxial Ge (Li) Method of Production: U(n,f) chem

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
33.568	0.010		0.200	0.022	4
40.98	0.10		0.257	0.016	4
53.395	0.005	6.64	0.100	0.008	3
59.03	0.03		0.0010	0.0001	4
80.120	0.005	108.3	1.36	0.06	2
99.961	0.015	2.67	0.040	0.004	3
133.515	0.002	804.0	11.09	0.19	1
* 624.70	0.10	0.07	0.0011		4
* 674.95	0.10		0.0030	0.0003	4
* 696.510	0.003	100.	1.342	0.014	1
* 814.10	0.10	0.18	0.0032	0.0003	4
* 864.45	0.10		0.0024	0.0003	4
* 1182.0	0.3		0.0001		4
* 1376.27	0.10		0.0004		4
* 1388.02	0.10	0.57	0.0067	0.0001	3
* 1489.160	0.005	21.4	0.278	0.005	1
* 1560.97	0.10		0.0002		4
* 1671.8					4
* 1978.82	0.10		0.0009	0.0001	4
* 2046.30	0.20		0.0003	0.0001	4
* 2072.90	0.20		0.0002		4
* 2185.662	0.007	57.0	0.694	0.015	1
* 2368.3	0.3		0.0001		4
* 2654.90	0.20		0.0001		4

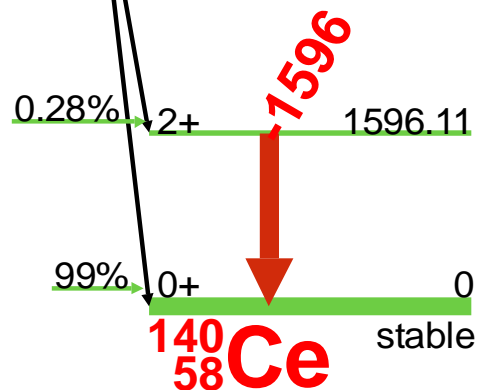
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{140}Pr (3.3 min.) Decay Scheme**3.3 min.**

1+ 0

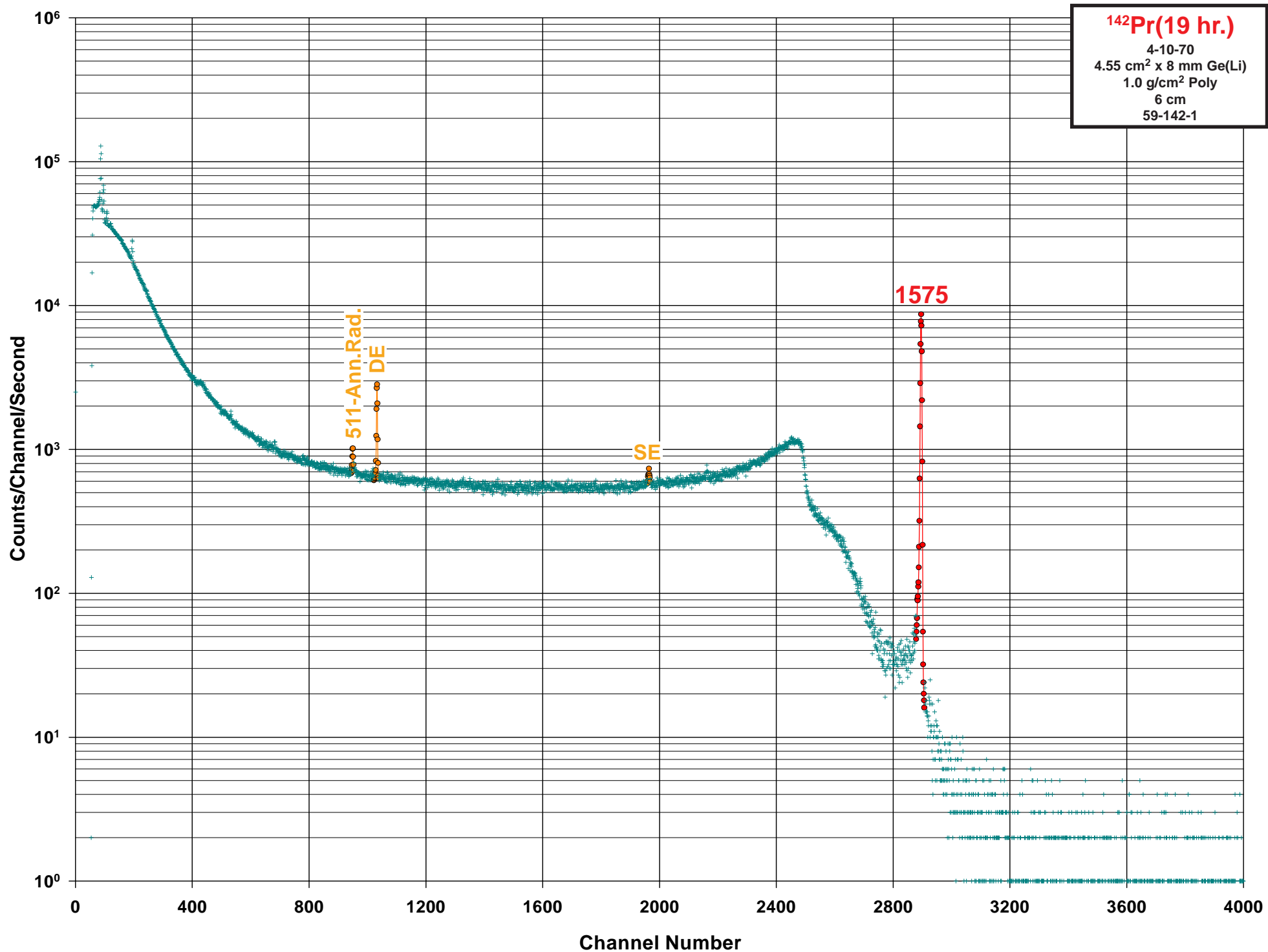
 $^{140}_{59}\text{Pr}$ **Q=3388****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{140}Pr

Half Life: 3.39(1) min.

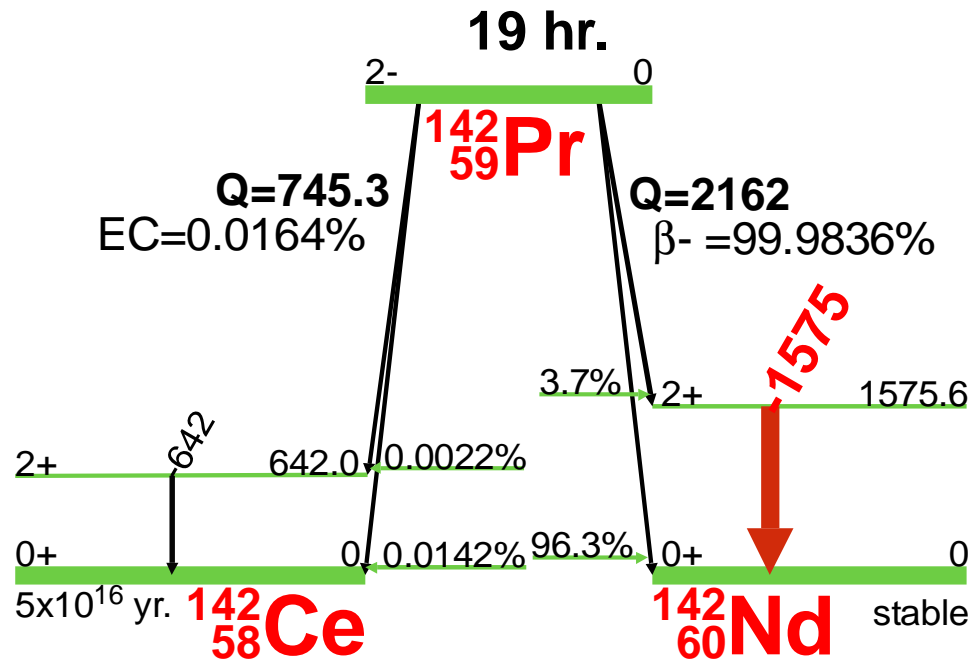
Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{141}\text{Pr}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	306.9	0.5		0.15	0.019	4
Ann.	511.006			100.6		1
	751.8	0.5		0.032	0.004	4
	925.3	0.5		0.026	0.003	4
	1420.7	0.5		0.0065	0.0011	4
	1596.1	0.2	100	0.5	0.04	1
	1903.5					4
	2347.8	0.5		0.0072	0.0009	4
	2521.4	0.5		0.013	0.0018	4
	2547.5	0.7		0.0002	0.0001	4
	2900	1		0.0002	0.0001	4
	3016.3	1.2				4
	3119	1.5		0.0009	0.0001	4
	3320	2		0.0001		4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



¹⁴²Pr(19 hr.) Decay Scheme



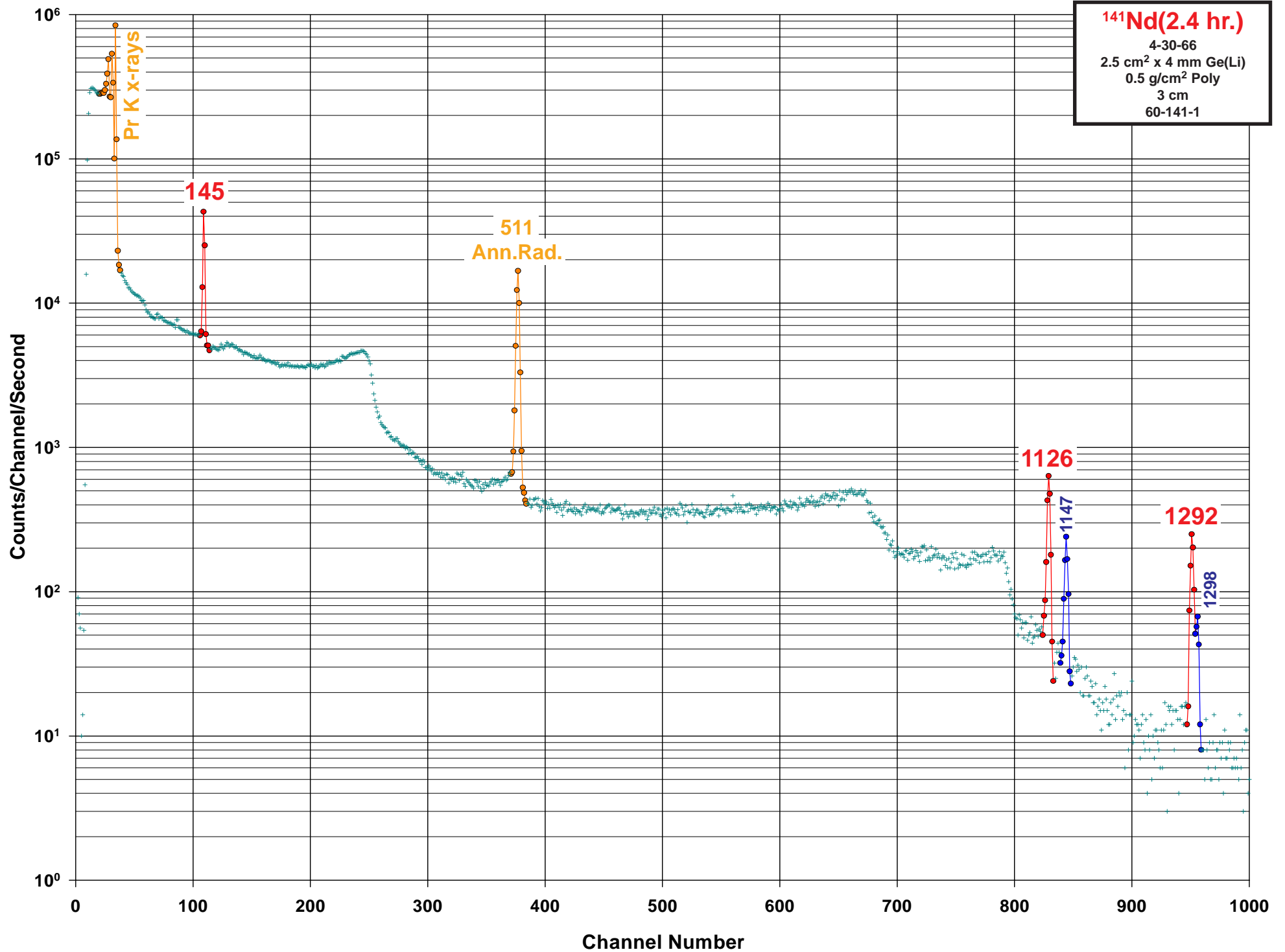
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴²Pr Half Life: 19.12(4) hr.
 Detector: 4.55 cm² x 8 mm Ge (Li) Method of Production: ¹⁴¹Pr(n, γ)

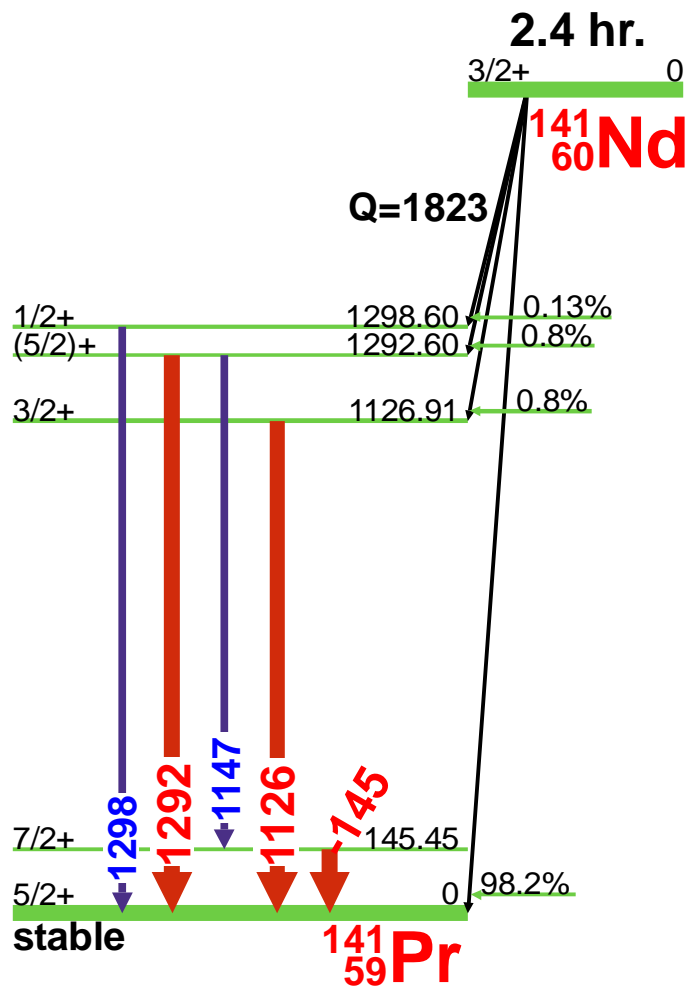
E _{γ} (keV)	σ E _{γ}	I _{γ} (rel)	I _{γ} (%)	σ I _{γ}	S
508.8	0.5		0.023	0.004	4
642.0	1.0		0.0022		4
1575.6	0.5	100.	3.7	0.5	1

E _{γ} , σ E _{γ} , I _{γ} , σ I _{γ} - 1998 ENSDF Data





¹⁴¹Nd(2.4 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴¹Nd

Half Life: 2.49(3) hr.

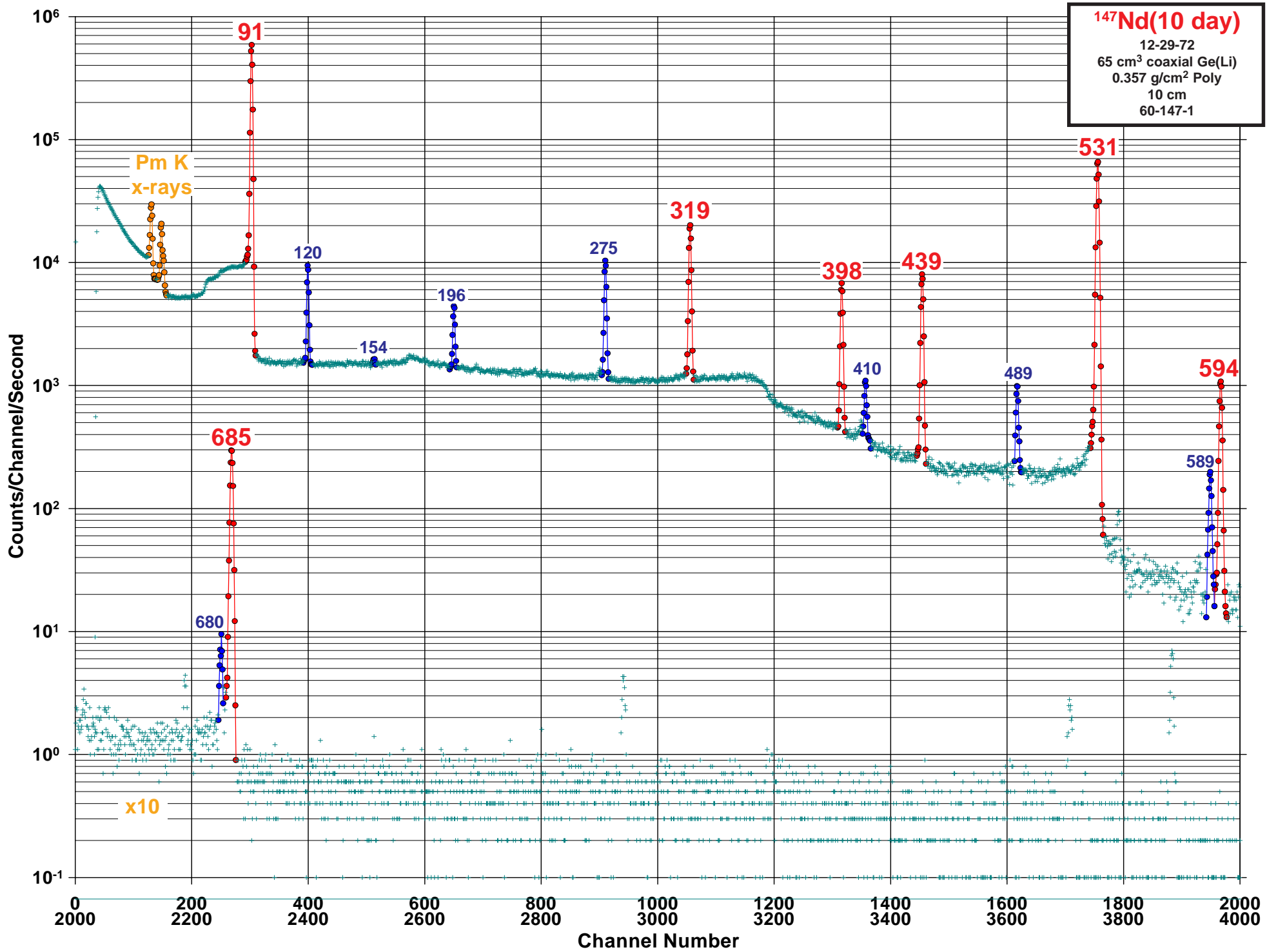
Detector: 2.5 cm² x 4 mm Ge (Li)

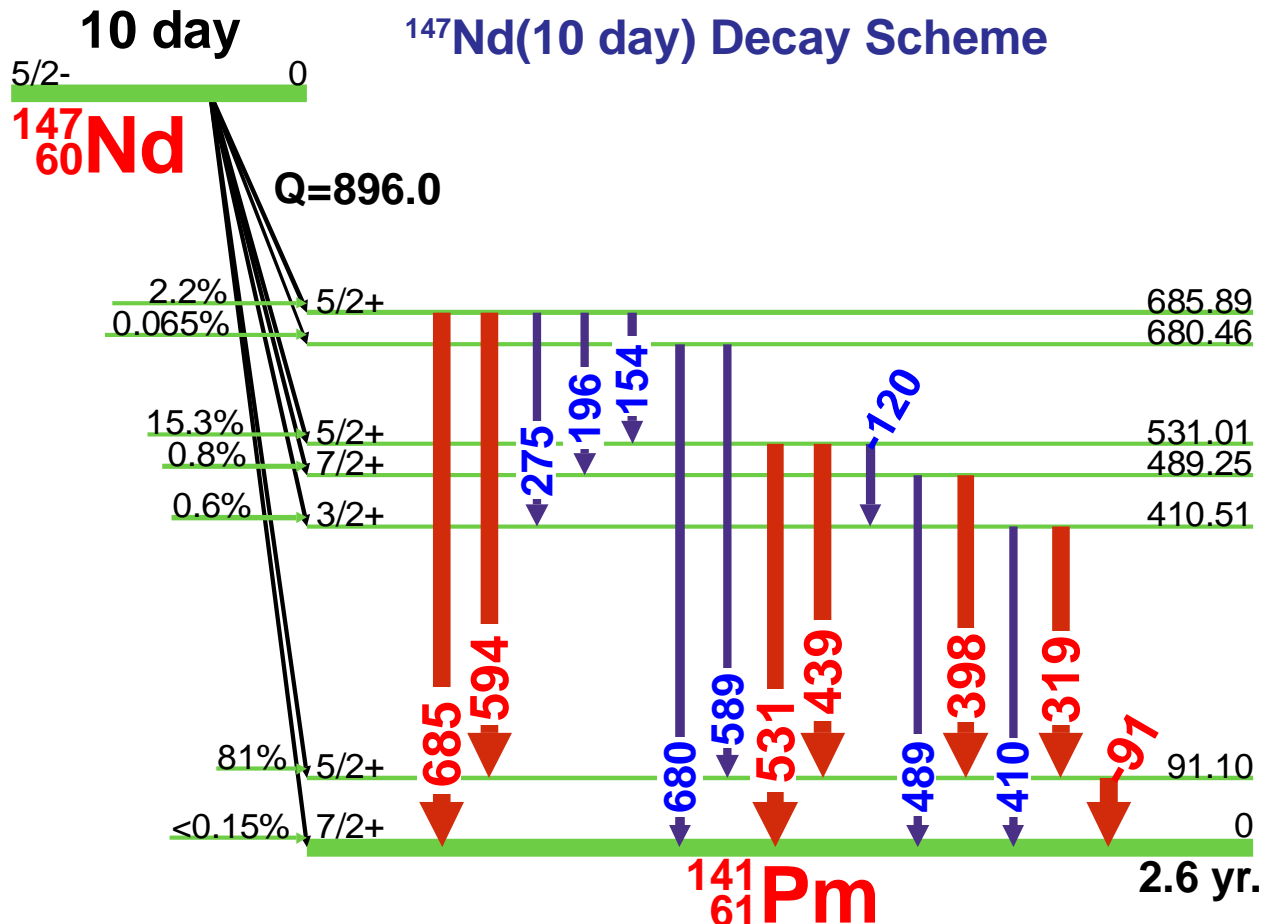
Method of Production: ¹⁴²Nd(γ,n)

	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	145.45	0.30		0.239	0.026	1
Ann.	511.006			4.93	0.20	1
	981.70	0.22		0.0217	0.0024	4
	1126.91	0.20		0.80	0.03	1
	1147.30	0.20		0.306	0.017	2
	1289.58	0.30		0.0098	0.0016	4
	1292.64	0.20		0.46	0.04	1
	1298.60	0.21		0.127	0.014	2
	1306.0	1.0		0.0003		4
	1310.6	1.0		0.0004		4
	1434.6	0.5		0.0056	0.0002	4
	1435.1	2.2		0.0008	0.0024	4
	1456.12	0.54		0.0008	0.0002	4
	1580.17	0.22		0.0060	0.0009	4
	1608.35	0.19		0.0183	0.0025	4
	1657.04	0.40		0.0010	0.0002	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data







GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴⁷Nd

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

Half Life: 10.98(1) day

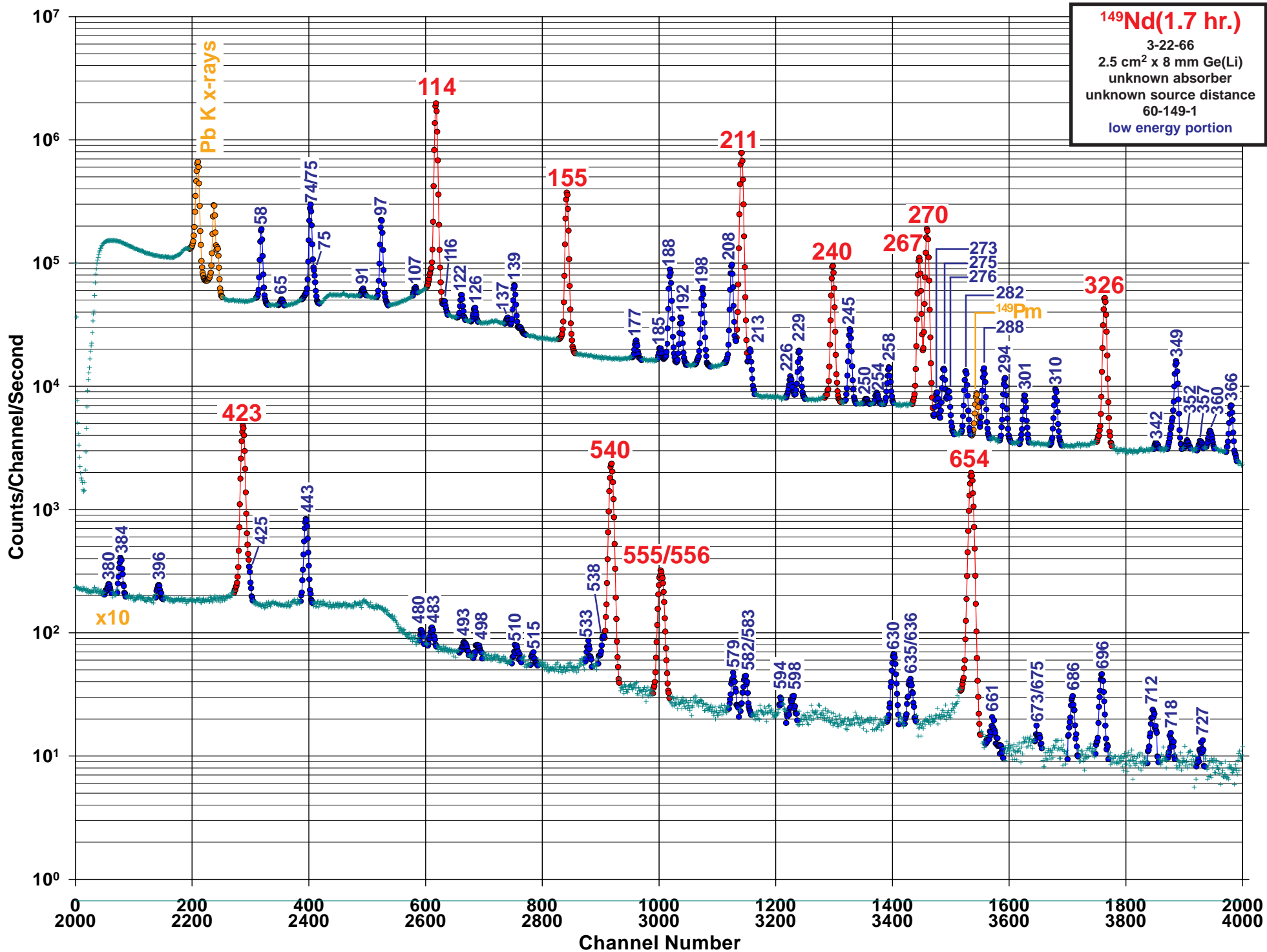
Detector: 65 cm³ coaxial Ge (Li)

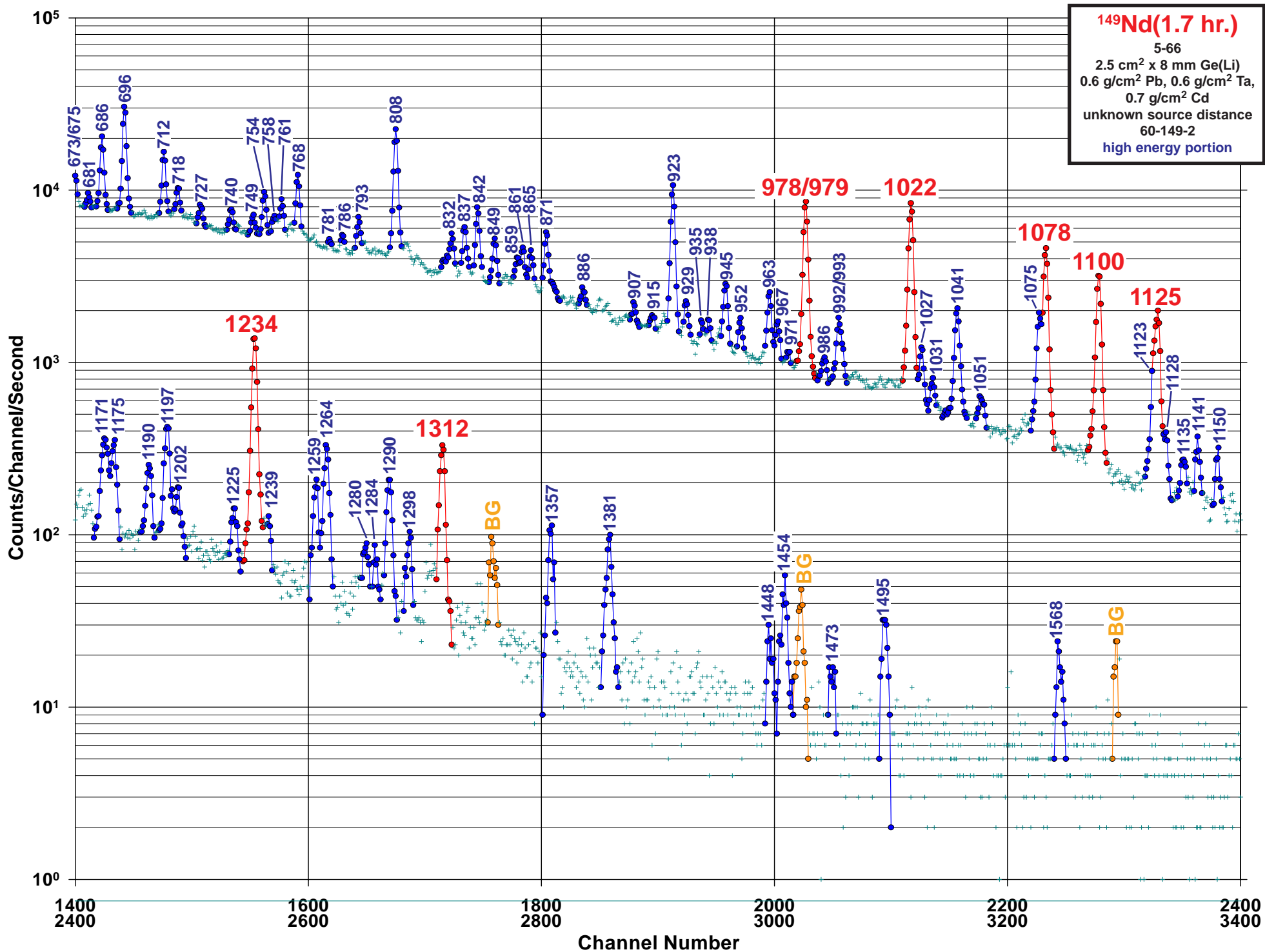
Method of Production: ¹⁴⁶Nd(n, γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
91.105	0.002	100.	27.9	1.1	1
120.48	0.05	1.42	0.40	0.04	2
154.0	1.0		0.0558	0.0022	4
196.64	0.04	0.73	0.204	0.019	3
275.374	0.015	2.87	0.80	0.06	2
319.411	0.018	7.0	1.95	0.14	1
398.155	0.020	3.12	0.87	0.07	1
410.48	0.03	0.50	0.140	0.010	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
439.895	0.022	4.3	1.20	0.10	1
489.24	0.03	0.55	0.154	0.010	3
531.016	0.022	46.9	13.1	0.9	1
589.35	0.04	0.164	0.046	0.005	2
594.80	0.03	0.95	0.265	0.020	1
680.52	0.15	0.070	0.020	0.004	4
685.90	0.04	2.91	0.81	0.06	1







1.7 hr.

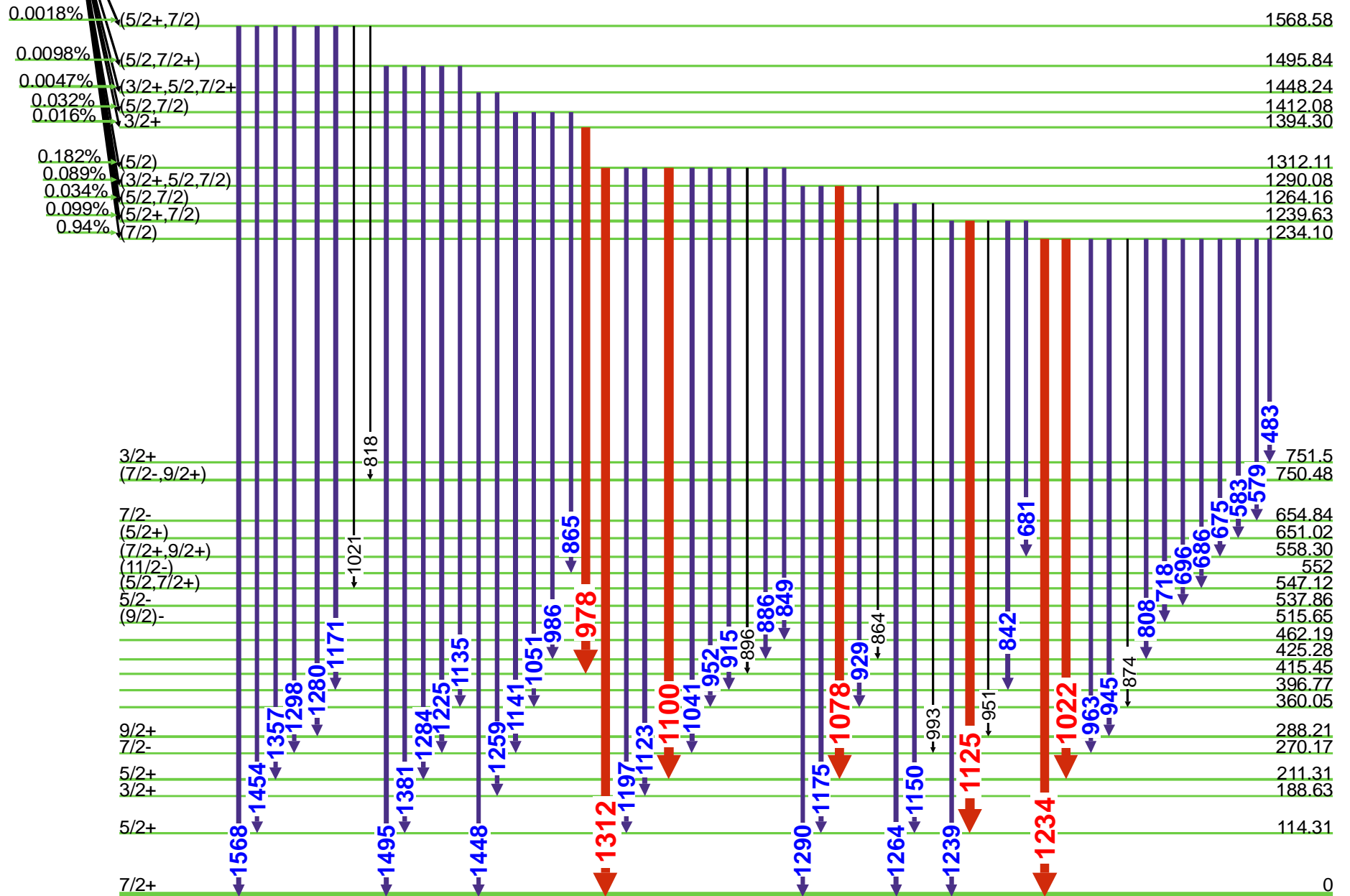
¹⁴⁹Nd(1.7 hr.) Decay Scheme

gamma-rays emitted from high energy levels

5/2- 0

¹⁴⁹₆₀Nd

Q=1691



¹⁴⁹₆₁Pm

53 hr.



1.7 hr.

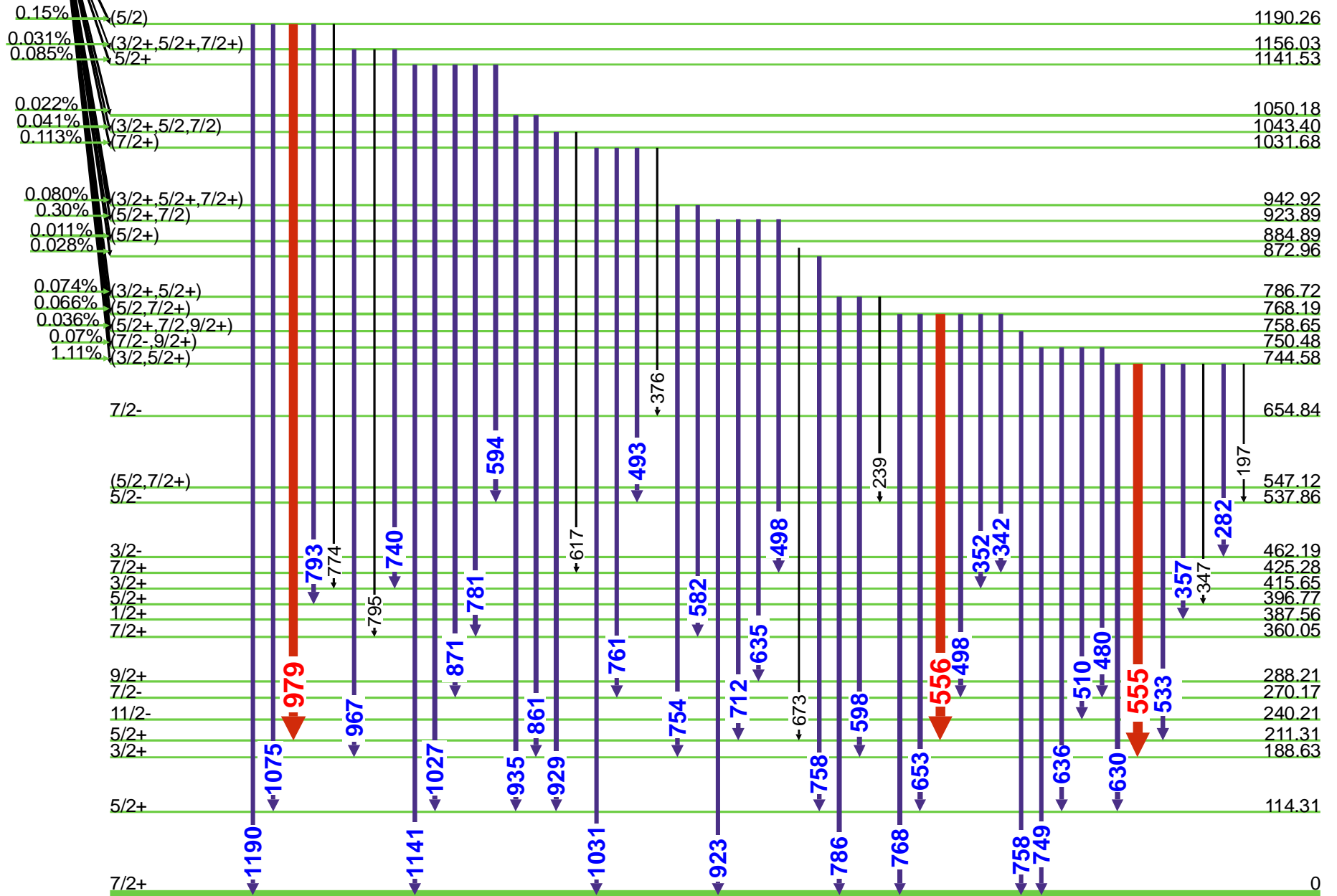
¹⁴⁹Nd(1.7 hr.) Decay Scheme

gamma-rays emitted from medium energy levels

5/2- 0

¹⁴⁹₆₀Nd

Q=1691



¹⁴⁹₆₁Pm

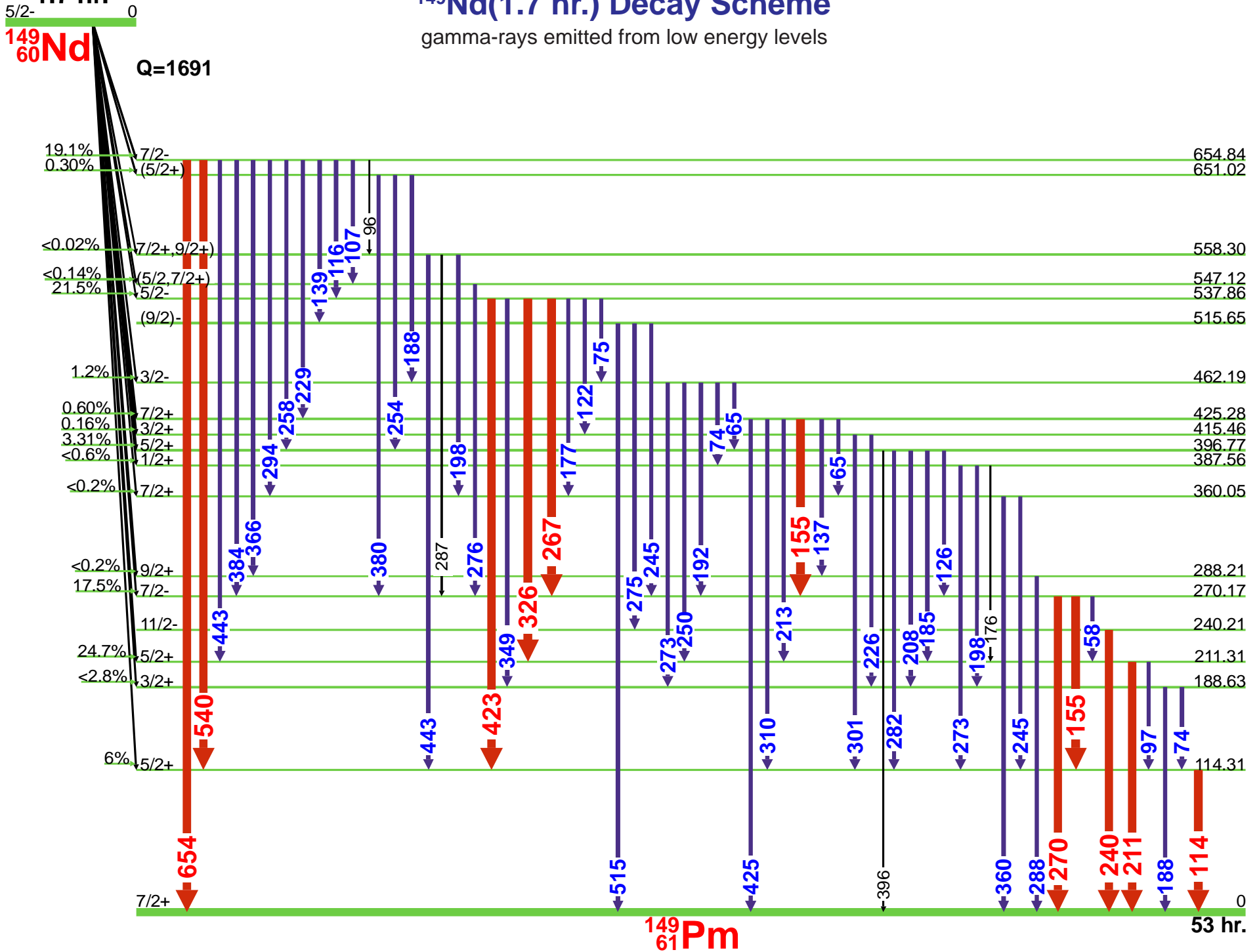
53 hr.



1.7 hr.

¹⁴⁹Nd(1.7 hr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 4)

Nuclide: ^{149}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1.728(1) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{148}\text{Nd}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	22.7			0.0054	0.0016	4		213.947	0.016	1.5	0.40	0.03	3
	30.00	0.03	64.0	0.017	0.004	3		226.847	0.019	0.60	0.163	0.008	3
	36.7			0.018	0.008	4		229.566	0.009	1.83	0.482	0.023	2
	58.883	0.020	5.55	1.30	0.21	3		239.6		14.5	0.0130	0.0005	
D	65.23		0.175	0.016	0.005	4	D	240.220	0.007		3.94	0.22	1
	65.42			0.031	0.010				245.5		3.80	0.21	0.10
	74.32	0.03		1.11	0.24	D	245.72	0.05		0.80	0.21		
D	74.66	0.10	9.4	0.98	0.16	2		250.826	0.031	0.14	0.0337	0.0029	4
	75.69	0.06		0.228	0.022			254.228	0.022	0.32	0.086	0.004	4
	91.125	0.022	0.27			4		258.067	0.013	1.40	0.376	0.018	3
	94.88	0.10		0.041	0.013	4		263.4			0.0233	0.0009	4
	96.9		5.55	0.034	0.013	3		267.693	0.008	22.2	6.03	0.28	1
D	97.001	0.012		1.45	0.12				270.166	0.007	39.3	10.7	0.5
	107.79	0.03	0.23	0.086	0.016	4		273.24	0.04	0.85	0.18	0.08	4
	112.52	0.04		0.119	0.016	4	D	273.5			0.08	0.04	
	114.314	0.011	68.75	19.2	1.5	1		275.437	0.011	2.18	0.65	0.03	3
	116.930	0.024	3.0	0.11	0.03	4		276.960	0.017	1.19	0.342	0.017	4
	122.415	0.013	0.85	0.256	0.018	4		282.4		2.26	0.017	0.006	3
	126.630	0.018	0.42	0.111	0.009	4	D	282.456	0.010		0.616	0.028	
	131.7			0.0044	0.0002	4		287.7		2.48	0.013	0.005	3
	137.05	0.03	0.17	0.062	0.006	4	D	288.194	0.010	0.69	0.03		
	139.210	0.012	1.75	0.51	0.03	3		294.802	0.010	2.13	0.570	0.027	3
	141.06	0.07		0.039	0.003	4		301.128	0.014	1.40	0.376	0.018	3
D	155.1	0.009	22.2	0.034	0.016	1		310.979	0.013	1.9	0.510	0.024	3
	155.873			5.9	0.3					318.2	0.3		0.008
	176.27		0.60	0.049	0.010	4	D	326.554	0.010	17.1	4.56	0.20	1
D	177.818	0.018		0.155	0.017				329.18			0.021	0.010
	185.489	0.025	0.34	0.104	0.006	4		342.81	0.10		0.083	0.018	4
	188.640	0.008	7.26	1.79	0.10	2	D	347.843	0.018	0.68	0.161	0.008	4
D	188.8			0.0104	0.0004				349.231	0.009	5.42	1.38	0.06
	192.026	0.009	2.18	0.570	0.028	3		352.78	0.03		0.054	0.003	4
	197.4			0.0130	0.0005	3		357.03	0.04		0.047	0.003	4
D	198.0		5.34	0.049	0.006				358.49	0.10		0.010	0.005
	198.928	0.008		1.39	0.07			360.052	0.018	0.60	0.153	0.008	4
	208.147	0.009	10.67	2.55	0.10	2		361.4			0.0065	0.0026	4
	211.309	0.007	100.	25.9	1.4	1		366.634	0.014	2.43	0.541	0.026	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 4)

Nuclide: ^{149}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1.728(1) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{148}\text{Nd}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	376.9			0.008	0.004	4		563.8			0.009	0.004	4
	380.79			0.052	0.003	4		567.56			0.017	0.003	4
	384.687	0.016	1.23	0.267	0.013	4		575.4	0.3		0.0078	0.0026	4
	390.9			0.0078	0.0026	4		579.28	0.03		0.075	0.006	4
	396.76	0.04		0.072	0.004	4		582.9		0.307	0.018	0.008	3
	399.1			0.014	0.006	4	D	583.03	0.03		0.049	0.013	
	423.553	0.010	34.6	7.4	0.5	1		588.5	0.3		0.0057	0.0021	4
	425.22	0.03		0.272	0.015	4		594.40	0.05		0.0285	0.0028	4
	432.66			0.013	0.005	4		598.06	0.05		0.0285	0.0028	4
	439.6			0.036	0.016	4		606.67	0.16		0.010	0.005	4
	443.551	0.011	5.51	1.15	0.07	2		617.9			0.0075	0.0026	4
D	443.7			0.0104	0.0004				630.237	0.019	0.81	0.189	0.008
	448.80	0.20		0.008	0.004	4		635.7		0.41	0.067	0.013	3
	462.34	0.10		0.041	0.021	4	D	636.2			0.052	0.011	
	470.5			0.010	0.005	4		651.0			0.062	0.026	4
	480.32	0.05		0.041	0.003	4		653.9		26.9	0.0181	0.0007	1
	483.59	0.05		0.067	0.004	4	D	654.831	0.013			8.0	
	493.85	0.05		0.060	0.006	4		657.2			0.018	0.008	4
	498.06			0.0104	0.0026	4		661.90	0.11		0.0052	0.0021	4
D	498.62			0.0363	0.0029				671.56	0.10		0.010	0.004
	510.30	0.05		0.062	0.016	4		673.58	0.07		0.0109	0.0026	4
D	512.7			0.013	0.005	4		675.79	0.04		0.0254	0.0021	4
	512.7							678.1			0.0052	0.0002	4
	515.75	0.09		0.036	0.005	4		681.34	0.08		0.0080	0.0016	4
	527.6			0.012	0.003	4		686.943	0.021	0.38	0.088	0.006	3
	533.20	0.04	0.32	0.091	0.006	4		696.264	0.021	0.63	0.171	0.012	2
	536.6			0.047	0.021	4		704.07	0.10		0.0034	0.0016	4
	538.15	0.06	0.40			4		712.59	0.03	0.31	0.070	0.006	3
	540.509	0.010	28.2	6.6	0.3	1		718.43	0.04	0.11	0.049	0.006	4
	545.5			0.0091	0.0004	4		727.88	0.05	0.08	0.0163	0.0019	4
	546.5			0.0088	0.0003	4		740.57	0.03	0.07	0.0142	0.0006	4
	547.1			0.016	0.008	4		743.5	0.4		0.0026	0.0010	4
	547.4			0.010	0.005	4		749.63	0.05		0.0135	0.0016	4
	555.88	0.09	4.27	0.59	0.04	1		754.291	0.021	0.128	0.039	0.003	3
D	556.83	0.09		0.44	0.05				758.65	0.08	0.06	0.0155	0.0017
	558.0			0.0104	0.0004	4	D	758.65	0.08				

GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 4)

Nuclide: ^{149}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1.728(1) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{148}\text{Nd}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
761.46	0.05		0.0285	0.0028	4	935.90	0.06		0.0047	0.0008	4
765.1			0.0075	0.0018	4	938.79	0.05		0.0060	0.0008	4
768.172	0.021	0.25	0.060	0.006	3	942.97	0.17		0.0031	0.0010	4
774.6			0.0031	0.0013	4	945.80	0.03	0.089	0.0215	0.0020	3
781.40	0.06	0.026	0.0039	0.0010	4	951.3			0.0026	0.0010	4
786.73	0.04	0.046	0.0101	0.0014	4	952.0			0.0075	0.0026	4
793.43	0.03	0.093	0.0225	0.0020	4	963.95	0.03	0.077	0.0251	0.0028	3
795.93	0.09	0.025	0.0070	0.0011	4	967.43	0.04		0.0083	0.0011	4
808.843	0.020	0.623	0.189	0.015	2	971.77	0.09		0.0028	0.0008	4
809.6			0.0155	0.0006	4	978.8			0.016	0.005	4
813.19	0.08		0.0114	0.0019	4	979.013	0.023	0.41	0.078	0.011	1
818.18			0.0057	0.0016	4	986.68	0.10		0.0023	0.0005	4
828.6			0.0085	0.0021	4	992.83	0.06	0.055	0.0148	0.0017	3
829.35	0.18				4	993.05			0.0039	0.0018	4
832.09	0.05	0.081	0.0233	0.0027	4	1021.8			0.0026	0.0010	4
837.40	0.03	0.130	0.0311	0.0029	4	1022.78	0.03	0.44	0.104	0.009	1
842.847	0.023	0.20	0.052	0.006	3	1027.18	0.04		0.0088	0.0016	4
849.926	0.025	0.09	0.0218	0.0020	4	1031.77	0.08		0.0044	0.0013	4
854.74			0.0044	0.0010	4	1041.95	0.03	0.098	0.0285	0.0028	3
859.42	0.05				4	1051.90	0.11		0.0044	0.0013	4
861.54	0.03		0.0176	0.0019	4	1075.95	0.04	0.09	0.0207	0.0027	3
864.9			0.0034	0.0013	4	1078.76	0.03	0.25	0.063	0.007	1
865.00	0.05		0.013	0.006	4	1100.77	0.03	0.22	0.049	0.006	1
871.375	0.023	0.14	0.0337	0.0029	4	1123.47	0.08	0.06	0.0150	0.0024	3
874.00	0.08		0.0047	0.0011	4	1125.32	0.05	0.11	0.030	0.004	1
877.9	0.3		0.0021	0.0016	4	1128.56	0.11		0.0031	0.0008	4
886.59	0.08		0.0054	0.0011	4	1135.94	0.09		0.0021	0.0008	4
893.3			0.0044	0.0010	4	1141.77	0.08	0.014	0.0026	0.0010	3
896.65	0.14		0.0039	0.0013	4	1141.77	0.08		0.0026	0.0010	3
907.69	0.07		0.0044	0.0008	4	1150.08	0.08	0.012	0.0231	0.0025	3
911.3			0.0155	0.0006	4	1156.3	0.4		0.0010	0.0005	4
915.35	0.09		0.0021	0.0010	4	1171.97	0.10	0.018	0.0039	0.0008	3
920.30	0.20		0.0039	0.0016	4	1175.75	0.06	0.019	0.0034	0.0008	3
923.874	0.023	0.42	0.101	0.009	2	1190.28	0.07	0.012	0.0023	0.0005	3
929.2			0.0104	0.0004	4	1197.84	0.06	0.028	0.0067	0.0011	3
929.8	0.3		0.0109	0.0014	4						

GAMMA-RAY ENERGIES AND INTENSITIES (page 4 of 4)

Nuclide: ^{149}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

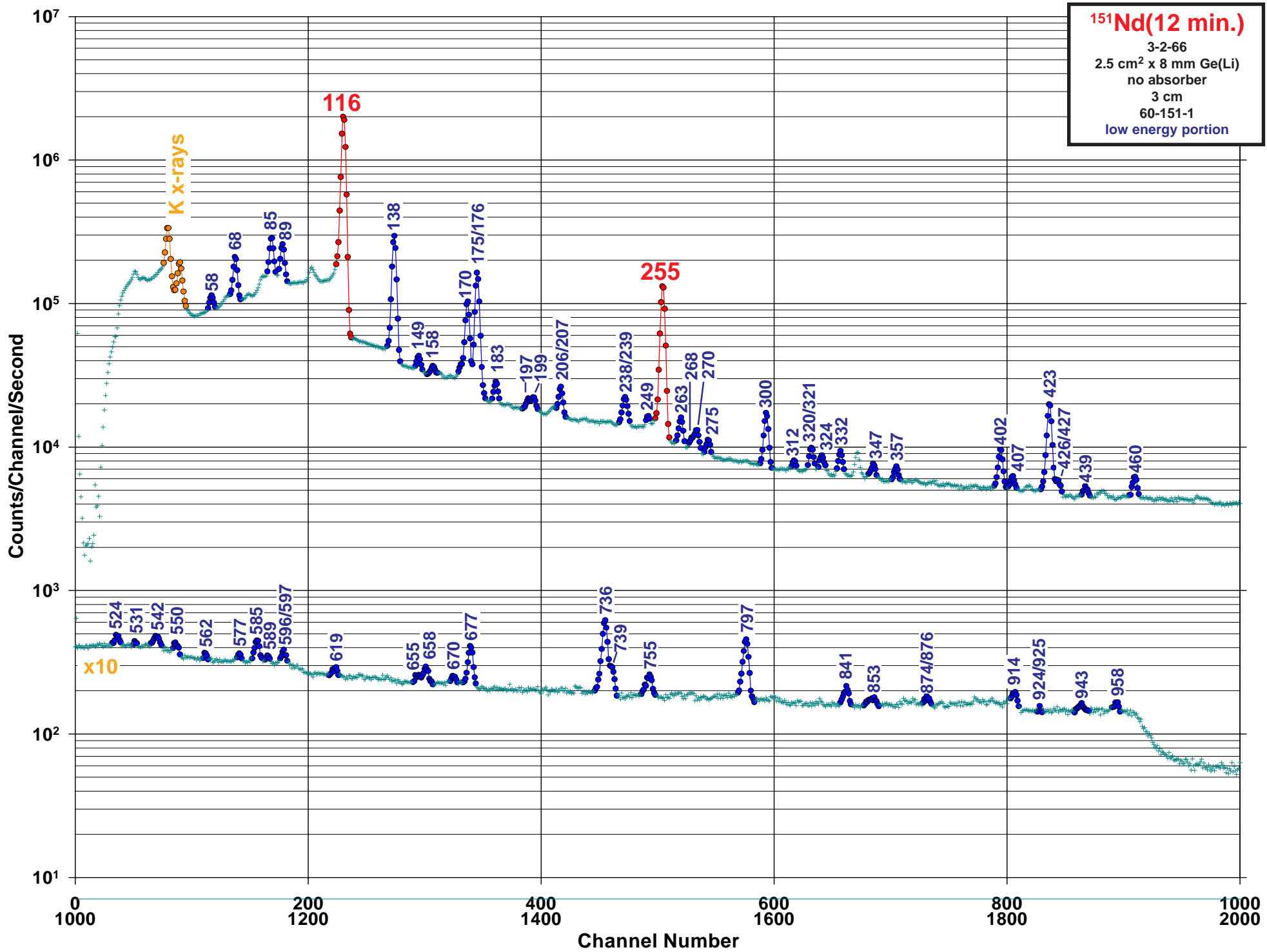
Half Life: 1.728(1) hr.

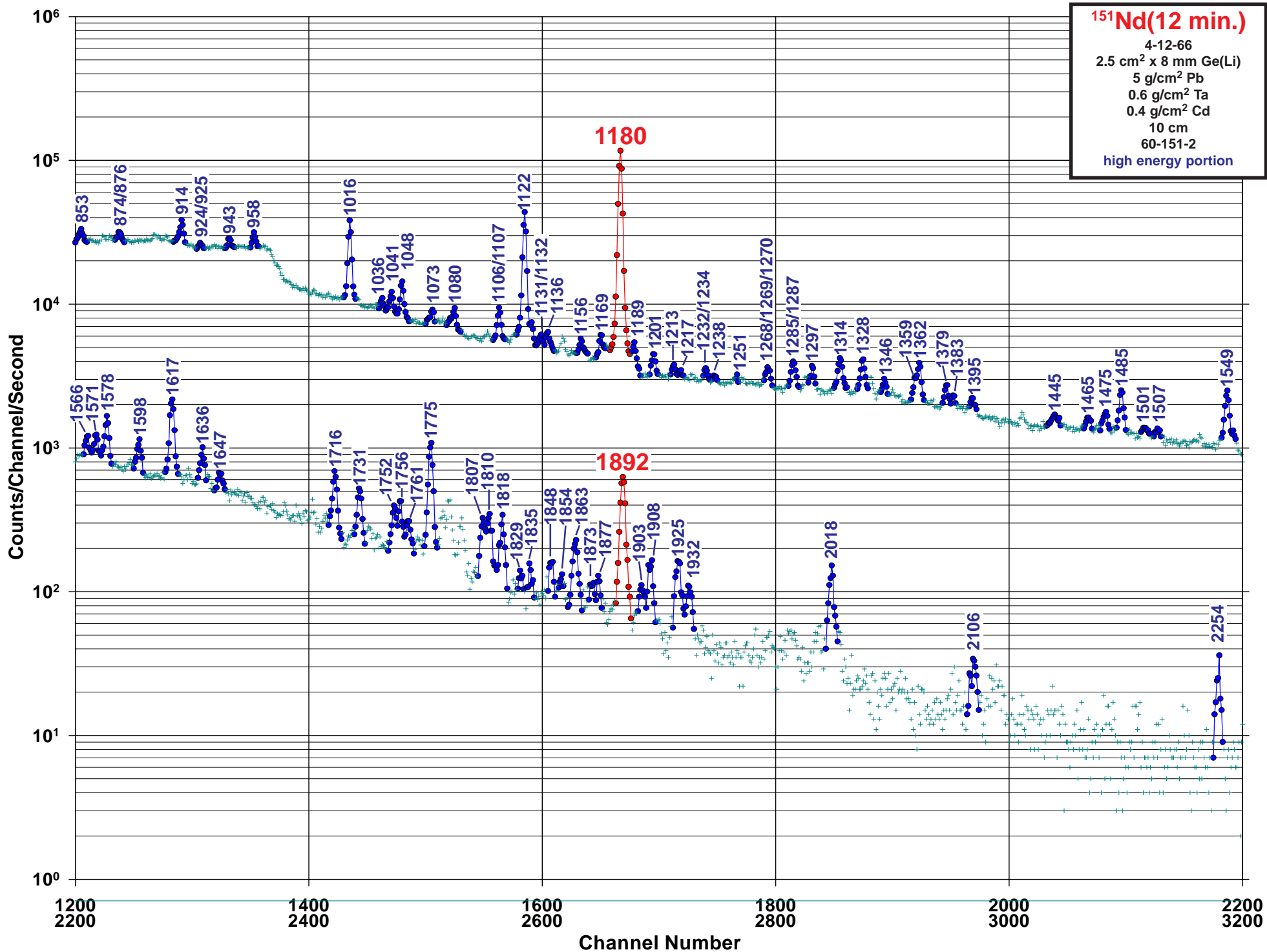
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{148}\text{Nd}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1202.29	0.10		0.0016	0.0005	4
1225.67	0.11		0.0016	0.0005	4
1234.12	0.04	1.07	0.0259	0.0035	1
1239.5	0.3		0.0018	0.0005	4
1259.62	0.07	0.014	0.0041	0.0008	3
1264.02	0.06	0.026	0.0075	0.0013	2
1280.28	0.12		0.0010	0.0005	4
1284.49	0.13		0.0016	0.0005	4
1290.11	0.06	0.016	0.0041	0.0008	3
1298.32	0.10	0.0064	0.0008	0.0005	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1307.6			0.0010	0.0005	4
1312.13	0.06	0.029	0.0073	0.0011	1
1357.26	0.11	0.009	0.0021	0.0005	2
1381.42	0.08	0.0089	0.0021	0.0005	2
1448.07	0.19	0.0017	0.0005	0.0003	3
1454.29	0.12	0.0046	0.0013	0.0005	2
1473.8	0.3				4
1495.80	0.14	0.003	0.0016	0.0005	3
1568.43	0.18	0.002	0.0005	0.0003	3







12 min.

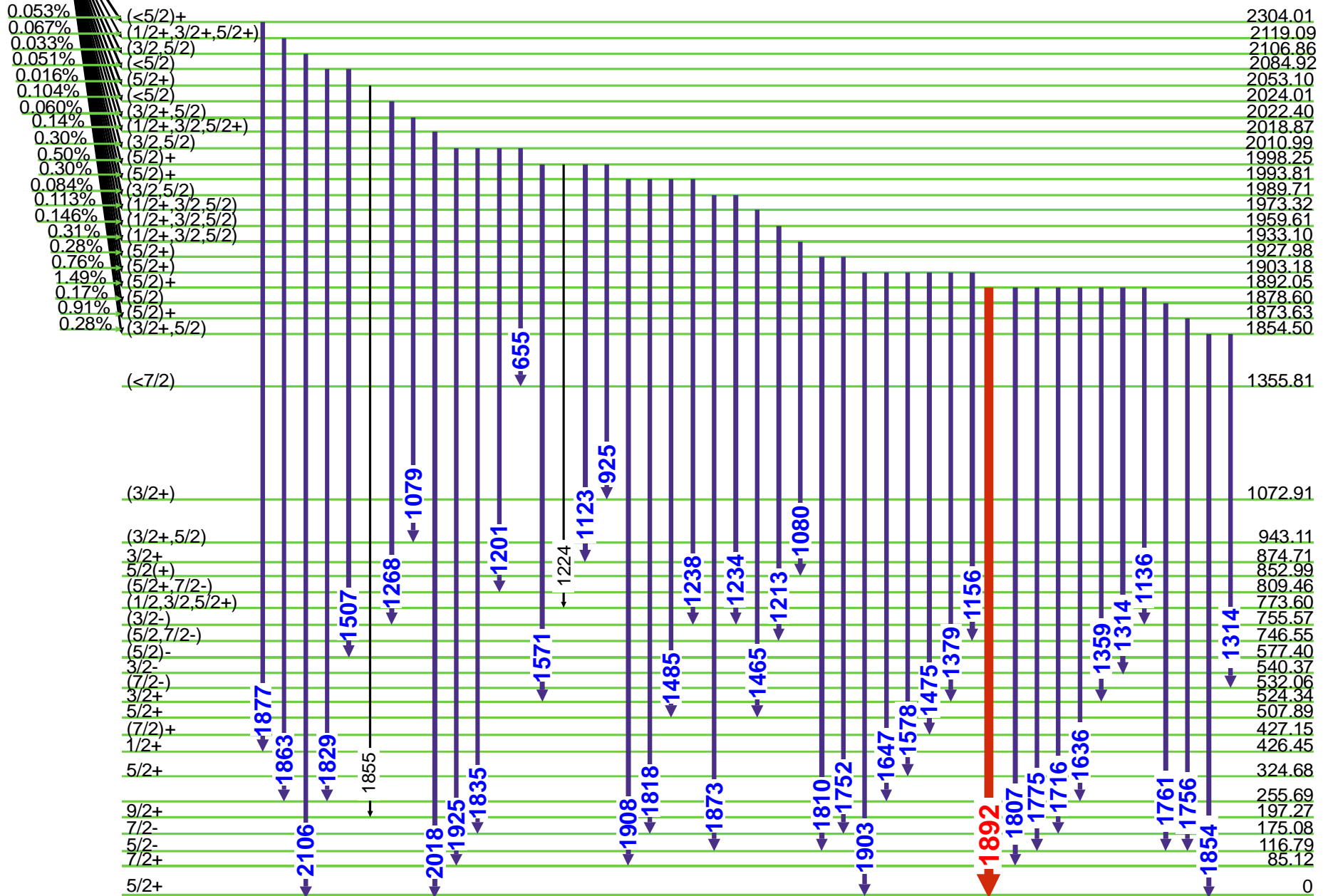
(3/2)+ 0

¹⁵¹₆₀Nd

Q=2442

¹⁵¹Nd(12 min.) Decay Scheme

gamma-rays emitted from high energy levels



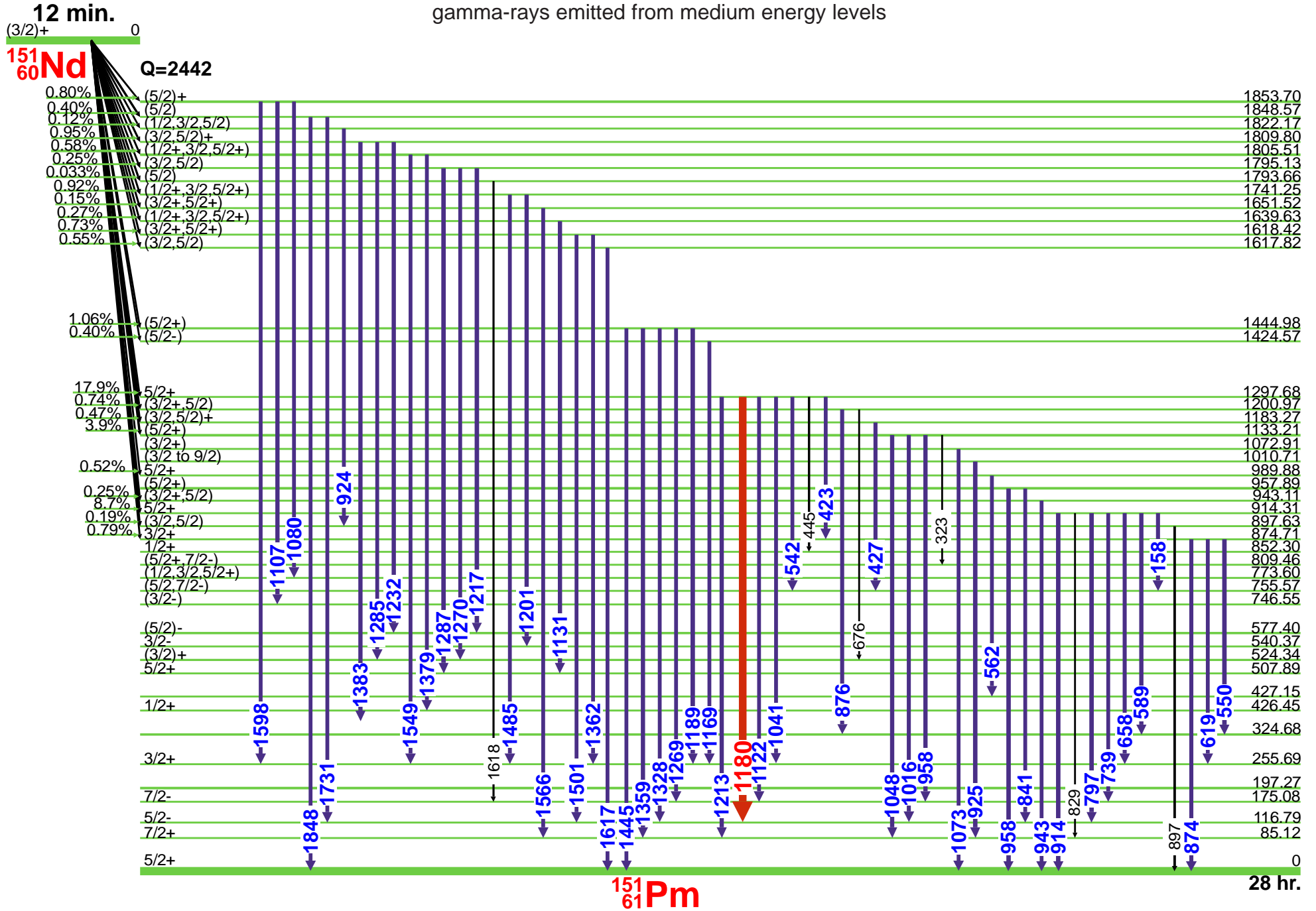
¹⁵¹₆₁Pm

28 hr.



¹⁵¹Nd(12 min.) Decay Scheme

gamma-rays emitted from medium energy levels



12 min.

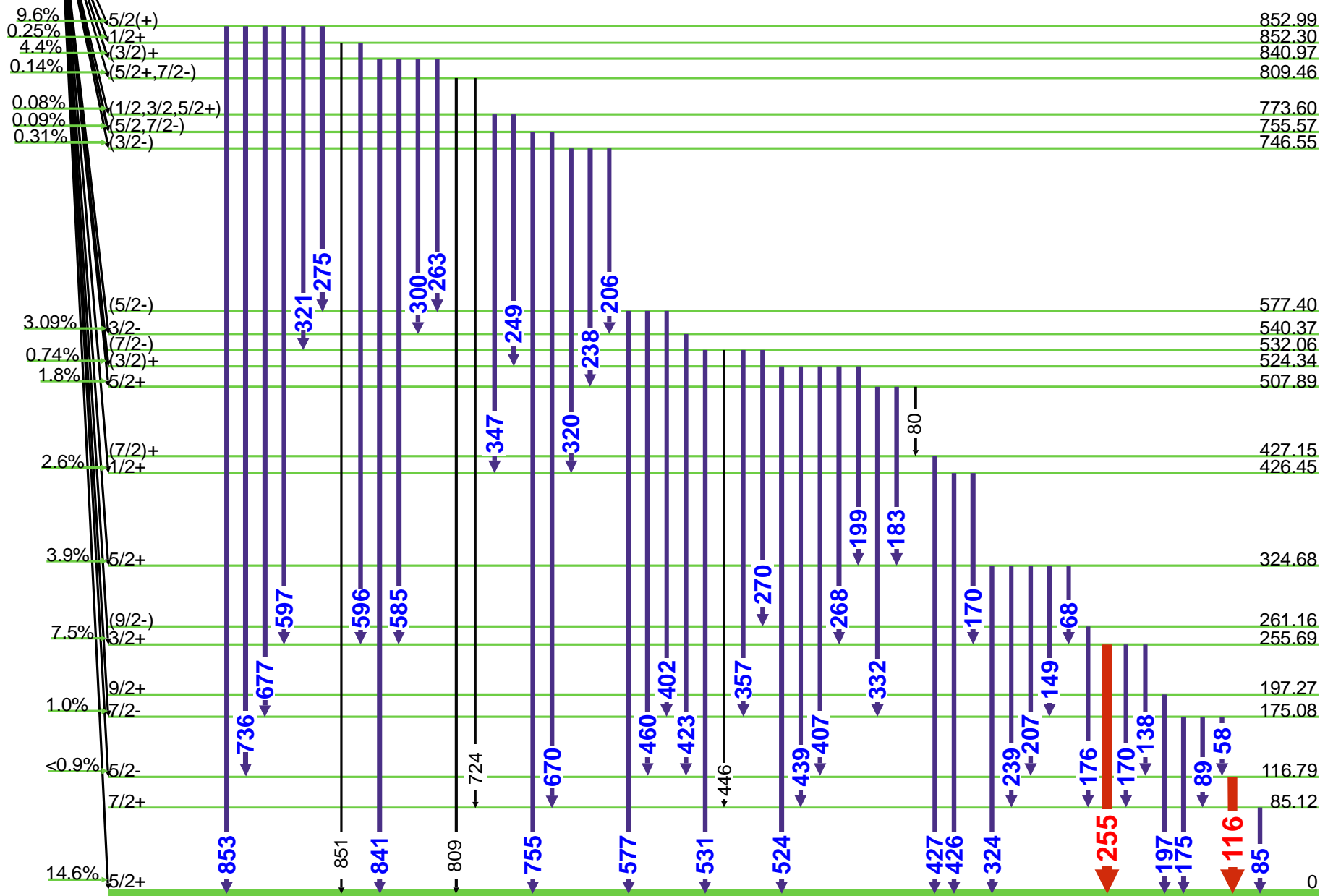
¹⁵¹Nd(12 min.) Decay Scheme

gamma-rays emitted from low energy levels

(3/2)⁺ 0

¹⁵¹₆₀Nd

Q=2442



¹⁵¹₆₁Pm

28 hr.



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GAMMA-RAY ENERGIES AND INTENSITIES (Page 1 of 7)

Nuclide: ¹⁵¹NdE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁵⁰Nd(n,γ)

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
16.5					4
31.67	0.03		0.45	0.06	4
58.280	0.010	1.07	0.37	0.03	4
63.81	0.06		0.035	0.015	4
67.02	0.05		0.019	0.005	4
68.980	0.010	3.89	1.26	0.09	3
80.74	0.03	1.50	0.239	0.020	4
85.120	0.010	6.07	2.05	0.13	3
86.08	0.10		0.053	0.027	4
89.960	0.010	4.91	1.53	0.11	3
94.40	0.15		0.0160	0.0028	4
97.87	0.05		0.015	0.008	4
100.10	0.20		0.035	0.014	4
102.450	0.020		0.49	0.04	4
104.9	0.6		0.040	0.014	4
112.15	0.05		0.117	0.021	4
113.88	0.19		0.093	0.027	4
116.800	0.010	100.	39.0	2.4	1
125.74	0.08		0.024	0.015	4
138.890	0.010	19.4	7.0	0.5	2
149.610	0.010	1.0	0.293	0.022	4
158.79	0.06	1.53	0.093	0.011	4
163.60	0.20		0.020	0.007	4
165.99	0.04		0.061	0.010	4
167.88	0.07		0.105	0.012	4
169.20	0.06		0.074	0.012	4
D 170.76		10.4	0.40	0.07	3
170.760	0.020		2.87	0.20	
171.40	0.10		0.15	0.04	4
D 175.070	0.010	18.8	6.3	0.4	2
176.09	0.08		0.279	0.021	
183.190	0.020	1.1	0.45	0.03	4
197.270	0.010	0.83	0.213	0.018	4
199.680	0.020	0.92	0.266	0.021	4
206.16	0.10		0.043	0.005	4
207.70	0.10	0.95	0.045	0.007	4
211.36	0.08		0.068	0.011	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
222.18	0.06		0.046	0.014	4
229.90	0.05		0.033	0.010	4
232.92	0.13		0.033	0.010	4
D 238.630	0.020	2.54	0.48	0.04	4
239.60	0.06		0.37	0.03	
249.29	0.03	0.49	0.33	0.03	4
252.23	0.04		0.133	0.016	4
255.680	0.010	40.8	14.8	0.9	1
258.0	0.3		0.029	0.007	4
263.560	0.020	2.05	0.78	0.06	4
268.67	0.04		0.160	0.016	4
270.89	0.03		0.32	0.03	4
275.52	0.03		0.23	0.03	4
284.70	0.10		0.043	0.012	4
292.15	0.11		0.056	0.014	4
297.3			0.011	0.007	4
300.580	0.020	4.85	1.82	0.12	3
301.80	0.20		0.064	0.018	4
310.40	0.11		0.029	0.011	4
312.63	0.03	0.77	0.24	0.03	4
316.56	0.07		0.046	0.010	4
D 320.09	0.03	1.9	0.61	0.05	4
321.06	0.05		0.200	0.018	
323.8		1.47	0.013	0.007	4
D 324.680	0.020		0.48	0.04	
326.30	0.20		0.028	0.010	4
332.780	0.020	1.9	0.69	0.06	4
334.65	0.14		0.048	0.016	4
337.12	0.16		0.041	0.012	4
341.95	0.07		0.058	0.011	4
344.99	0.10		0.040	0.010	4
347.130	0.020	1.2	0.40	0.04	4
357.000	0.020	1.2	0.39	0.04	4
362.70	0.20		0.023	0.009	4
365.35	0.11		0.084	0.014	4
366.9	0.3		0.027	0.011	4
373.57			0.027	0.013	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 2 of 7)

Nuclide: ¹⁵¹NdE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁵⁰Nd(n,γ)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	373.57	0.11		0.081	0.017	4		490.78	0.11		0.097	0.011	4
	377.73	0.09		0.054	0.012	4		492.24	0.10		0.100	0.011	4
	380.10	0.20		0.032	0.012	4		498.0	0.5		0.007	0.004	4
	383.2	0.3		0.024	0.011	4		503.8	0.3		0.009	0.005	4
	391.130	0.020		0.046	0.015	4		507.84	0.12		0.084	0.013	4
	391.7			0.013	0.007	4		516.21	0.15		0.072	0.013	4
	394.60	0.20		0.029	0.012	4		518.00	0.20		0.053	0.011	4
	402.330	0.020	4.32	0.25	0.04	3		522.10	0.20		0.016	0.008	4
	407.550	0.020	1.4	0.51	0.03	4		524.31	0.04	1.3	0.51	0.03	4
	413.5	0.3		0.040	0.014	4		527.6	0.3		0.025	0.008	4
	414.63	0.08		0.173	0.017	4		531.97	0.06	0.49	0.121	0.012	4
	415.2	0.3		0.027	0.013	4		535.7	0.4		0.007	0.004	4
	418.40	0.20		0.053	0.010	4		540.6	0.3		0.044	0.010	4
	421.80	0.20		0.13	0.05	4		542.06	0.03	1.4	0.51	0.03	4
	422.60	0.20		0.37	0.06	4		544.61	0.16		0.056	0.010	4
	423.56			0.106	0.008			550.04	0.03	2.15	0.61	0.04	4
D	423.560	0.020	16.3	5.9	0.4	2		551.1			0.013	0.007	4
	426.47	0.03		0.39	0.05			557.4	0.4		0.020	0.008	4
D	427.20	0.20	1.5	0.11	0.04	4		562.73	0.05	0.64	0.213	0.018	4
	427.65	0.05		0.19	0.04			573.0	0.5		0.016	0.008	4
	430.2	0.3		0.027	0.008	4		577.36	0.04	0.80	0.359	0.025	4
	435.9			0.013	0.007	4		580.2	0.3		0.016	0.008	4
	439.22	0.03	1.1	0.319	0.023	4		585.22	0.03	3.35	1.30	0.13	4
	444.7			0.013	0.013	4		589.61	0.03	0.92	0.293	0.022	4
	445.53	0.11		0.105	0.015	4		592.40	0.20		0.024	0.008	4
	446.88	0.07		0.186	0.017	4		596.64	0.08	1.80	0.43	0.04	4
	449.20	0.20		0.032	0.012	4	D	597.60	0.20		0.21	0.03	4
	454.60	0.20		0.041	0.008	4		600.8	0.3		0.025	0.009	4
	456.68	0.11		0.072	0.009	4		602.40	0.20		0.039	0.019	4
	459.8			0.0053	0.0027	4		605.8	0.3		0.024	0.008	4
	460.59	0.02	2.3	0.96	0.06	4		612.22	0.07		0.074	0.010	4
	465.6	0.5		0.023	0.011	4		615.9	0.3		0.017	0.008	4
	476.5	0.3		0.016	0.007	4		619.01	0.04	1.1	0.33	0.03	4
	479.3	0.3		0.011	0.007	4		621.30	0.20		0.032	0.010	4
	481.92	0.13		0.054	0.010	4		625.60	0.20		0.031	0.008	4
	486.98	0.19		0.068	0.011	4		629.74	0.05		0.146	0.016	4
	488.18	0.12		0.114	0.013	4		634.0	0.3		0.027	0.007	4

GAMMA-RAY ENERGIES AND INTENSITIES (Page 3 of 7)

Nuclide: ¹⁵¹NdE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁵⁰Nd(n,γ)

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
636.40	0.20		0.031	0.007	4
639.0	0.5		0.021	0.009	4
643.11	0.13		0.066	0.009	4
648.4	0.3		0.007	0.004	4
650.8	0.3		0.007	0.004	4
655.00	0.20		0.039	0.008	4
658.61	0.03	2.0	0.73	0.05	4
665.21	0.11		0.093	0.012	4
668.10	0.20		0.027	0.008	4
670.39	0.06	0.67	0.332	0.024	4
673.22	0.17		0.093	0.013	4
676.8	0.5	6.81	0.053	0.027	3
677.88	0.03		2.38	0.15	
679.6	0.3		0.044	0.014	4
682.0	0.5		0.032	0.012	4
687.5	0.3		0.021	0.007	4
695.7	0.5		0.033	0.016	4
702.8	0.4		0.020	0.008	4
705.85	0.12		0.076	0.009	4
709.3			0.008	0.007	4
715.70	0.20		0.044	0.012	4
717.60	0.15		0.129	0.017	4
719.6	0.3		0.046	0.014	4
720.3			0.027	0.013	4
724.28	0.07		0.106	0.027	4
724.28	0.07		0.186	0.029	4
727.5	0.5		0.011	0.008	4
731.9	0.4		0.020	0.008	4
734.00	0.20		0.101	0.027	4
736.23	0.03	18.2	5.9	0.4	3
739.20	0.03	5.25	1.52	0.10	4
741.70	0.20		0.046	0.011	4
744.0			0.027	0.013	4
746.5			0.008	0.005	4
751.0			0.013	0.007	4
753.00	0.20		0.060	0.016	4
753.8			0.027	0.013	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
755.57	0.03	3.31	1.17	0.08	4
757.9	0.3		0.037	0.015	4
765.40	0.06		0.173	0.017	4
767.89	0.06		0.266	0.021	4
773.62	0.09		0.066	0.014	4
773.62	0.09		0.27	0.03	4
777.1	0.3		0.020	0.008	4
780.7	0.3		0.036	0.010	4
783.4	0.3		0.032	0.010	4
785.28	0.08		0.146	0.016	4
787.2	0.5		0.019	0.008	4
789.95	0.09		0.053	0.014	4
789.95	0.07		0.106	0.015	4
792.4	0.4		0.039	0.011	4
797.530	0.020	14.3	4.7	0.3	3
798.2	0.5		0.15	0.04	4
801.0	0.3		0.024	0.009	4
809.23	0.10		0.23	0.03	4
812.60	0.20		0.125	0.021	4
815.4	0.3		0.043	0.014	4
819.75	0.08		0.108	0.014	4
823.2	0.4		0.023	0.011	4
829.16	0.05		0.226	0.019	4
837.5	0.4		0.011	0.005	4
841.07		2.94	0.160	0.028	4
841.07	0.04		0.76	0.08	
847.12	0.06		0.088	0.013	4
848.0			0.027	0.013	4
851.8			0.12	0.04	
851.8	0.3		0.170	0.027	
853.30	0.12		0.21	0.04	4
854.0	0.5		0.053	0.027	4
858.30	0.20		0.105	0.017	4
865.9	0.5		0.040	0.014	4
866.4	0.3		0.020	0.013	4
866.4	0.3		0.074	0.026	4
867.6	0.5		0.066	0.014	4

GAMMA-RAY ENERGIES AND INTENSITIES (Page 4 of 7)

Nuclide: ¹⁵¹Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁵⁰Nd(n, γ)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	870.70	0.11		0.085	0.014	4
	870.70	0.11		0.106	0.015	4
	872.5			0.013	0.013	4
	873.1			0.013	0.013	4
D	874.50	0.20		0.104	0.014	4
	876.39	0.07		0.386	0.027	
	881.14	0.16		0.061	0.010	4
	886.8	0.3		0.041	0.010	4
	889.1	0.3		0.045	0.010	4
	892.70	0.20		0.065	0.013	4
	897.65	0.09		0.279	0.021	4
	900.20	0.10		0.146	0.016	4
	904.70	0.20		0.093	0.027	4
	904.70	0.20		0.106	0.027	4
	905.3	0.5		0.040	0.014	4
	912.50	0.20		0.106	0.027	4
	912.50	0.20		0.106	0.027	4
	914.28	0.04	3.71	0.92	0.10	4
	919.93	0.12		0.092	0.014	4
	924.4			0.013	0.013	4
D	925.50	0.10		0.027	0.013	
	925.50	0.10		0.106	0.006	
	930.4	0.5		0.040	0.014	4
	934.04	0.09		0.117	0.020	4
	935.1			0.013	0.013	4
	936.8	0.3		0.044	0.019	4
	943.17	0.07		0.372	0.026	4
	945.5	0.5		0.013	0.013	4
	949.05	0.15		0.066	0.014	4
	950.8			0.013	0.013	4
	951.85	0.20		0.052	0.012	4
	954.4	0.3		0.023	0.011	4
D	958.18			0.053	0.027	4
	958.18	0.04		0.59	0.04	
	960.5	0.3		0.057	0.016	4
	964.74	0.13		0.186	0.017	4
	967.58	0.12		0.020	0.007	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	967.58	0.12		0.186	0.017	4
	969.2	0.4		0.008	0.005	4
	969.2	0.4		0.065	0.015	4
	973.23	0.10		0.172	0.017	4
	979.65	0.21		0.056	0.012	4
	983.50	0.20		0.025	0.011	4
	985.3	0.3		0.024	0.011	4
	989.71	0.16		0.052	0.009	4
	994.64	0.10		0.056	0.005	4
	999.5	0.3		0.025	0.011	4
	1003.24	0.13		0.062	0.010	4
	1008.6	1.0		0.039	0.008	4
	1010.8	0.3		0.020	0.013	4
	1012.7			0.011	0.007	4
	1016.40	0.03	8.60	2.50	0.16	3
	1021.05			0.027	0.013	4
	1021.05	0.11		0.066	0.014	4
	1029.05	0.20		0.036	0.008	4
	1030.5			0.013	0.013	4
	1032.40	0.20		0.027	0.013	4
	1032.40	0.20		0.040	0.014	4
	1035.4			0.013	0.007	4
	1036.16	0.07		0.178	0.014	4
	1040.40	0.20		0.065	0.011	4
	1041.91	0.08		0.319	0.023	4
	1044.3			0.0053	0.0027	4
	1045.0			0.008	0.005	4
	1048.11	0.05	2.06	0.61	0.05	4
	1049.50	0.20		0.080	0.014	4
	1051.0	0.5		0.027	0.013	4
	1057.8	0.5		0.011	0.007	4
	1064.00	0.20		0.056	0.008	4
	1066.57	0.06		0.027	0.013	4
	1066.57	0.06		0.16	0.09	4
	1070.03	0.13		0.064	0.009	4
	1073.10	0.10		0.108	0.011	4
	1074.0	0.5		0.040	0.020	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 5 of 7)

Nuclide: ¹⁵¹NdE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁵⁰Nd(n,γ)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	1077.12	0.10		0.118	0.013	4
	1079.5			0.013	0.007	
D	1080.09	0.05	0.90	0.027	0.013	4
	1080.09	0.05		0.213	0.018	
	1082.7	0.5		0.027	0.013	4
	1084.0	0.3		0.025	0.007	4
	1092.00	0.20		0.031	0.007	4
	1099.95	0.13		0.097	0.014	4
D	1106.00	0.20	1.35	0.101	0.018	4
	1107.16	0.05		0.426	0.029	
	1111.0	0.4		0.019	0.007	4
	1115.4	0.3		0.054	0.010	4
	1118.2	0.3		0.013	0.013	4
	1118.2	0.3		0.053	0.010	4
D	1122.63	0.03	13.69	4.08	0.26	2
	1123.5	0.5		0.027	0.013	
	1125.4	0.5		0.027	0.013	4
	1127.11	0.07		0.186	0.017	4
	1128.7	0.4		0.011	0.004	4
D	1131.60	0.20	0.55	0.057	0.016	4
	1132.55	0.10		0.092	0.017	
	1136.58	0.08	0.61	0.181	0.014	4
	1139.00	0.20		0.056	0.009	4
	1145.50	0.20		0.053	0.014	4
	1145.90	0.10		0.066	0.014	4
	1147.8	0.5		0.013	0.007	4
	1151.8	0.3		0.046	0.010	4
D	1156.9		0.64	0.066	0.027	4
	1156.90	0.15		0.112	0.027	
	1159.4	0.3		0.052	0.011	4
	1165.5			0.009	0.004	4
	1169.2	0.5		0.226	0.019	4
	1172.53	0.13		0.106	0.010	4
	1174.90	0.10		0.035	0.010	4
	1177.7	0.5		0.031	0.016	4
	1180.89	0.02	45.0	13.3	0.8	1
	1184.2	0.3		0.093	0.014	4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	1186.0			0.027	0.007	4
	1186.70	0.20		0.074	0.007	4
	1189.24	0.09		0.266	0.021	4
	1191.1	0.4		0.039	0.011	4
D	1201.03		0.61	0.027	0.013	4
	1201.03	0.06		0.169	0.017	
	1206.6			0.0053	0.0027	4
D	1213.18		0.28	0.020	0.013	4
	1213.18	0.08		0.085	0.008	
	1217.71	0.14	0.14	0.060	0.009	4
	1224.45	0.15		0.032	0.007	4
D	1232.60	0.10	0.34	0.088	0.010	4
	1234.1	0.5		0.013	0.007	
	1238.35	0.08	0.55	0.049	0.007	4
	1251.60	0.15		0.050	0.007	4
	1255.40	0.20		0.041	0.007	4
	1260.86	0.27		0.017	0.004	4
	1264.30	0.20		0.020	0.004	4
	1268.50	0.20	0.58	0.054	0.003	4
D	1269.60	0.20		0.068	0.019	
	1270.90	0.20		0.064	0.018	
	1271.3	0.5		0.0266	0.0016	4
	1276.9	0.3		0.025	0.007	4
	1282.2	0.4		0.021	0.007	4
D	1285.63	0.16	0.80	0.164	0.018	4
	1287.20	0.10		0.106	0.015	
	1293.61	0.05		0.306	0.023	4
	1296.40	0.20		0.056	0.009	4
	1297.61	0.05		0.200	0.018	4
	1308.5	0.4		0.024	0.006	4
D	1314.2	0.5	0.95	0.093	0.010	4
	1314.20	0.20		0.160	0.028	
	1316.30	0.20		0.133	0.016	4
	1325.9	0.3		0.032	0.008	4
D	1328.22	0.08	0.95	0.25	0.03	4
	1329.50	0.20		0.052	0.009	
	1332.3			0.013	0.008	4

GAMMA-RAY ENERGIES AND INTENSITIES (Page 6 of 7)

Nuclide: ^{151}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{150}\text{Nd}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1333.10	0.12		0.102	0.011	4
	1338.4	0.3		0.029	0.013	4
	1341.58	0.08		0.120	0.012	4
D	1346.55	0.15		0.013	0.007	4
	1346.55	0.15		0.023	0.007	
	1349.3	0.5		0.024	0.009	4
	1350.4	0.5		0.011	0.008	4
	1350.4	0.4		0.015	0.008	4
	1351.7			0.0027	0.0013	4
	1357.0			0.0066	0.0027	4
D	1359.94	0.09	0.46	0.132	0.011	3
	1359.94	0.09		0.132	0.011	
	1362.78	0.04	0.95	0.306	0.023	4
	1366.1			0.015	0.004	4
	1371.40	0.10		0.029	0.006	4
	1379.12			0.048	0.008	4
	1379.12	0.07		0.104	0.009	4
	1383.37	0.09		0.077	0.007	4
	1387.1	0.4		0.023	0.006	4
	1393.0	0.3		0.011	0.005	4
	1395.0	0.3	0.34	0.098	0.018	4
	1408.30	0.20		0.0093	0.0027	4
	1414.9	0.3		0.0093	0.0027	4
	1425.29	0.08		0.045	0.007	4
	1427.6	0.3		0.011	0.007	4
	1434.4	0.5		0.0186	0.0029	4
	1439.0			0.012	0.008	4
	1442.4	1.0		0.017	0.004	4
	1445.40	0.20		0.049	0.005	4
	1446.4			0.008	0.005	4
	1451.5			0.0040	0.0027	4
	1457.6			0.0027	0.0027	4
	1461.6			0.009	0.007	4
	1465.41	0.08	0.024	0.064	0.007	4
	1470.80	0.20		0.016	0.004	4
	1473.6	0.3		0.020	0.004	4
	1475.78	0.09	0.34	0.066	0.010	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	1485.45		0.86	0.0399	0.0027	3
	1485.45	0.07		0.200	0.012	
	1490.93	0.18		0.0093	0.0027	4
	1498.95	0.15		0.032	0.004	4
	1501.80	0.20		0.032	0.004	4
	1507.48	0.08		0.043	0.005	4
	1533.60	0.20		0.021	0.003	4
	1540.0	0.4		0.0040	0.0027	4
	1548.9	0.3		0.053	0.014	4
	1549.75	0.05	1.10	0.266	0.021	3
	1553.84	0.13		0.068	0.008	4
	1559.8	0.6		0.008	0.004	4
	1566.41	0.10		0.090	0.009	4
	1571.84	0.07		0.098	0.009	4
	1578.36	0.06	0.64	0.161	0.012	4
	1584.60	0.20		0.0093	0.0027	4
	1585.8	0.4		0.0040	0.0027	4
	1592.50	0.20		0.021	0.003	4
	1598.04	0.07	0.37	0.092	0.009	4
	1611.5	0.3		0.0040	0.0027	4
D	1617.94	0.06	1.26	0.33	0.03	3
	1618.60	0.20		0.027	0.013	
	1622.8	1.0		0.0093	0.0027	4
	1627.97	0.13		0.028	0.003	4
	1636.34	0.06	0.31	0.088	0.008	4
	1639.79	0.13		0.0200	0.0018	4
	1642.7	0.3		0.0133	0.0016	4
	1647.43	0.08	0.16	0.036	0.004	4
	1658.9	0.3		0.0080	0.0014	4
	1664.6	0.3		0.0080	0.0027	4
	1673.20	0.20		0.0173	0.0029	4
	1678.40	0.20		0.0053	0.0014	4
	1686.30	0.20		0.0146	0.0016	4
	1693.0	0.3		0.012	0.012	4
	1698.42	0.14		0.0186	0.0029	4
	1703.65	0.15		0.0053	0.0027	4
	1703.65	0.15		0.027	0.003	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 7 of 7)

Nuclide: ^{151}Nd E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

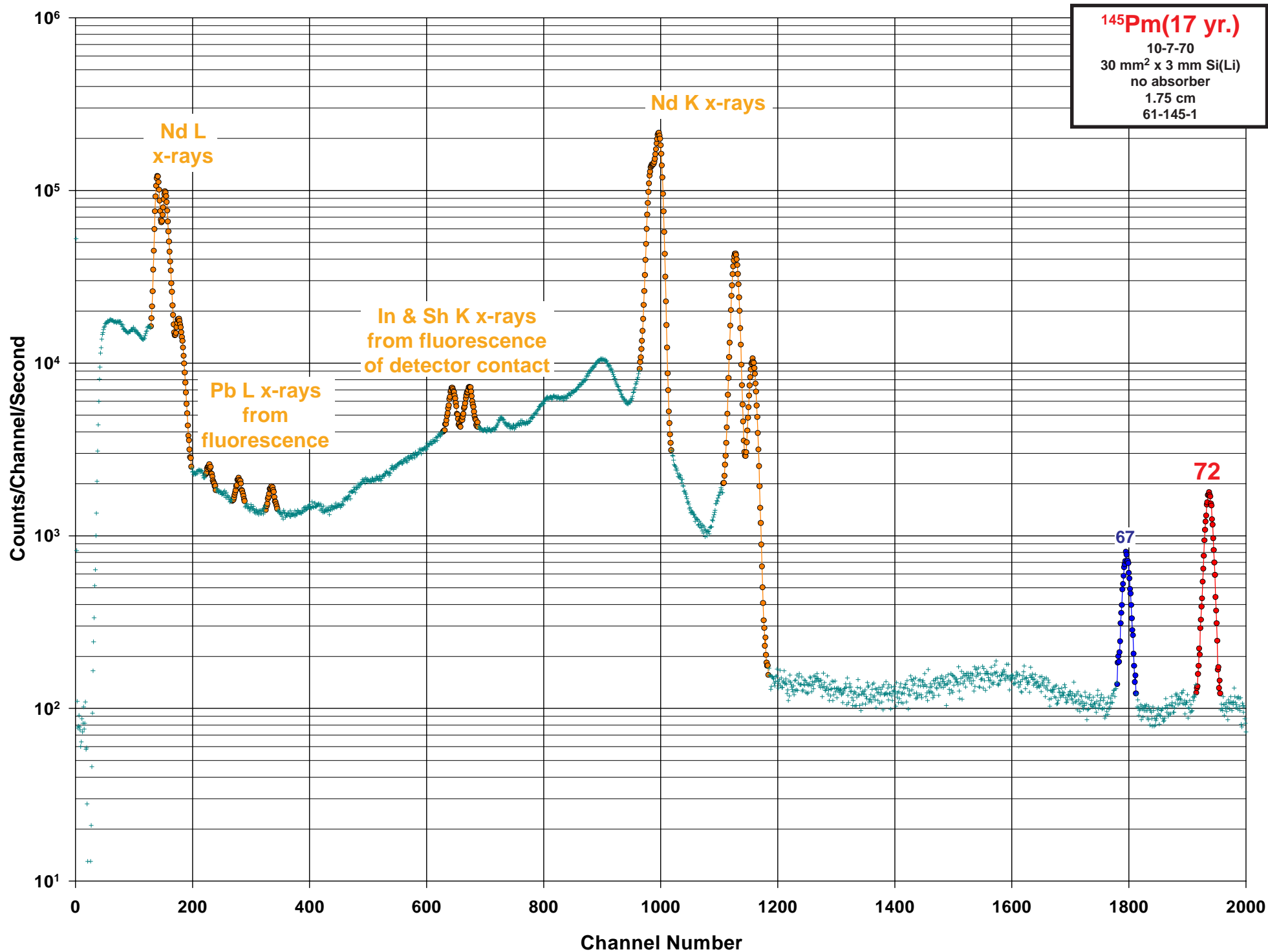
Half Life: 12.44(7) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{150}\text{Nd}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1708.5			0.007	0.004	4
1711.20	0.20		0.024	0.003	4
1716.92	0.07	0.28	0.109	0.008	3
1727.20	0.20		0.0093	0.0014	4
1731.82	0.12	0.15	0.085	0.006	3
1737.75	0.15		0.0160	0.0028	4
1742.40	0.20		0.0133	0.0016	4
1752.99	0.08		0.045	0.005	4
1756.82	0.08		0.049	0.005	4
1761.77	0.08		0.031	0.003	4
1767.45	0.15		0.0093	0.0014	4
1775.26	0.06	0.77	0.239	0.020	2
1782.36	0.13		0.046	0.005	4
1786.51	0.08		0.088	0.008	4
1788.40			0.0146	0.0028	4
1793.84	0.09		0.040	0.004	4
1795.10	0.40		0.0106	0.0027	4
1797.40			0.0040	0.0014	4
1800.90	0.40		0.0027	0.0013	4
1807.00	0.09	0.21	0.062	0.006	4
1810.90	0.10	0.21	0.080	0.007	4
1818.74	0.08	0.20	0.057	0.005	3
1825.4			0.0027	0.0013	4
1829.40	0.20		0.0080	0.0014	4
1835.99	0.14		0.0093	0.0014	4
1848.55	0.10		0.0160	0.0016	4
1854.55	0.15		0.0120	0.0015	4
1855.8	0.4		0.009	0.004	4
1863.37	0.08	0.13	0.044	0.005	3
1873.10	0.20		0.0146	0.0016	4
1877.60	0.20		0.0146	0.0016	4
1892.15	0.06	0.05	0.169	0.014	1
1894.00	0.20		0.025	0.004	4

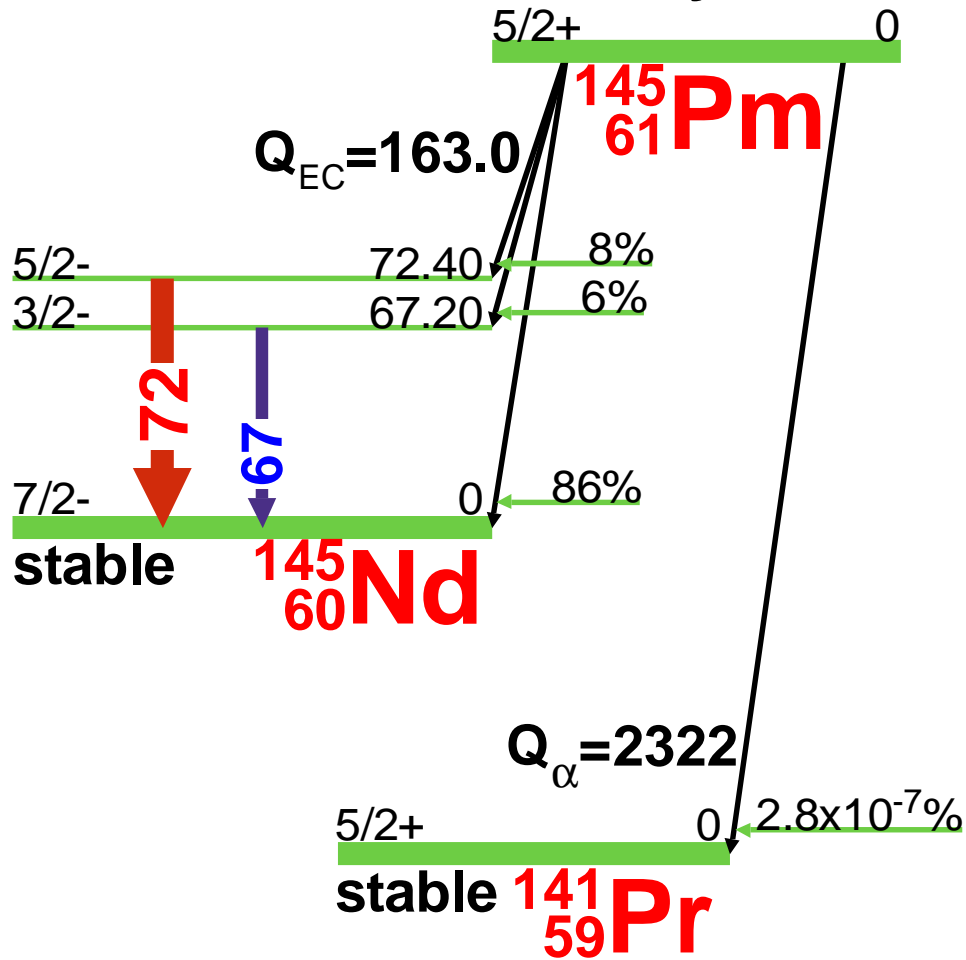
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1903.35	0.14		0.0120	0.0015	4
1908.60	0.20	0.11	0.033	0.003	4
1925.97	0.09	0.13	0.036	0.004	3
1932.50	0.20	0.074	0.023	0.003	4
1938.0			0.0027	0.0013	4
1950.3	0.6		0.0053	0.0014	4
1973.3	0.3		0.0040	0.0014	4
1980.20	0.20		0.0053	0.0014	4
1989.3			0.0027	0.0013	4
1993.8	0.3		0.0053	0.0014	4
1998.1	0.3		0.0040	0.0014	4
2009.0	0.4		0.0040	0.0027	4
2010.92	0.15		0.0106	0.0015	4
2018.85	0.05	0.11	0.046	0.005	2
2023.16	0.18		0.0093	0.0014	4
2038.1	0.3		0.0027	0.0013	4
2053.1	0.3		0.0027	0.0013	4
2062.5	0.3		0.0013	0.0013	4
2093.5	0.3		0.0027	0.0013	4
2106.96	0.15	0.02	0.0066	0.0014	2
2113.4	0.4		0.0013	0.0013	4
2118.94	0.18		0.0066	0.0014	4
2124.7	0.4		0.0013	0.0013	4
2135.3	0.4		0.0013	0.0013	4
2153.8	0.3		0.0040	0.0014	4
2186.2	0.4		0.0027	0.0013	4
2204.20	0.20		0.0040	0.0014	4
2227.4	0.4		0.0013	0.0013	4
2234.6	0.4		0.0013	0.0013	4
2254.90	0.12	0.02	0.0106	0.0015	2
2268.5	0.4		0.0013	0.0013	4
2303.8	0.4		0.0013	0.0013	4





¹⁴⁵Pm(17 yr.) Decay Scheme

17 yr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴⁵Pm

Half Life: 17.7(4) yr.

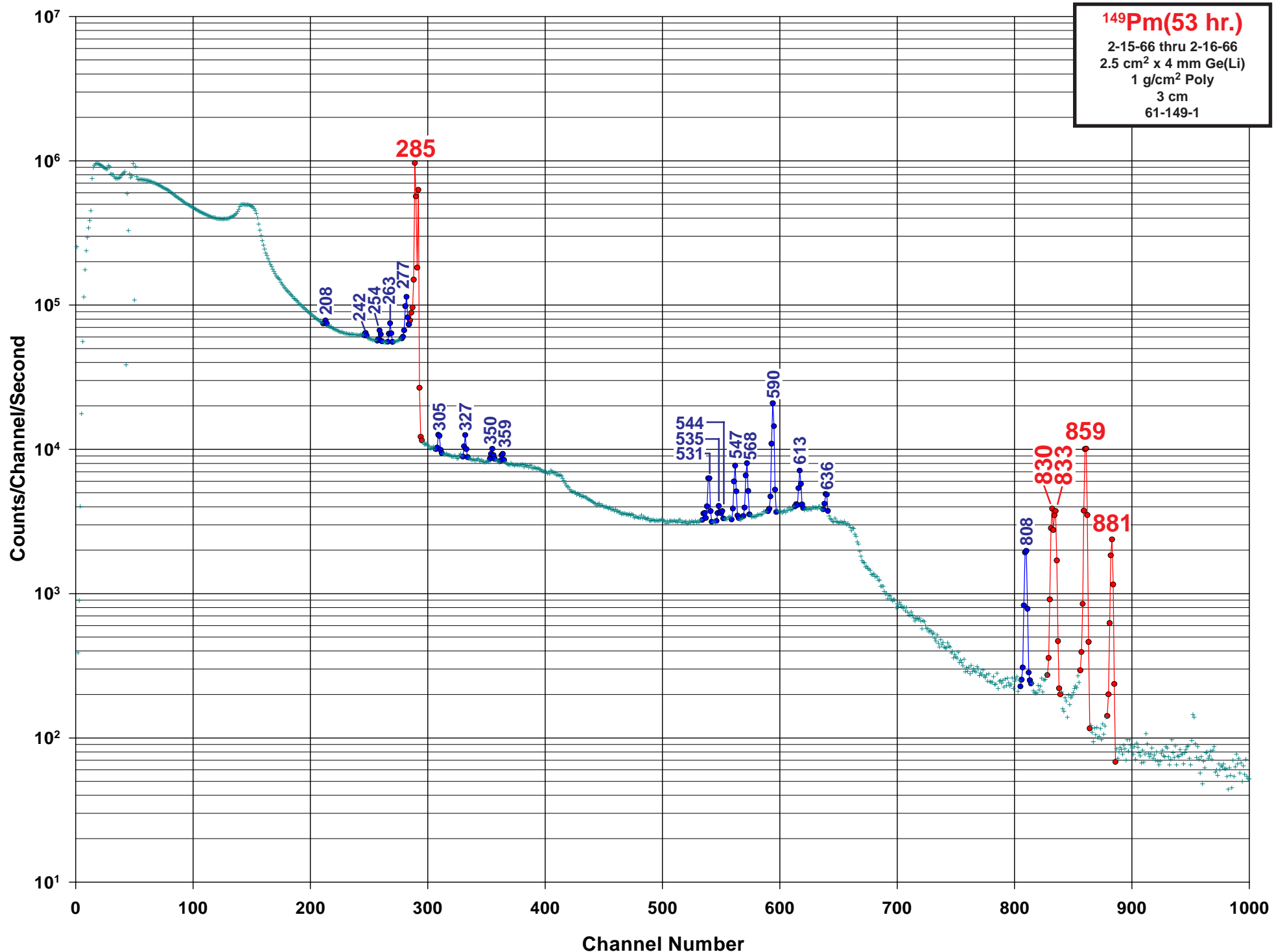
Detector: 30 mm² x 3 mm Si(Li)

Method of Production: ¹⁴⁵Nd(p,xn)

E_{γ} (keV)	σE_{γ}	I_{γ} (rel)	I_{γ} (%)	σI_{γ}	S
67.20	0.10	33.0	0.55	0.06	2
72.40	0.10	100.	1.85	0.20	1

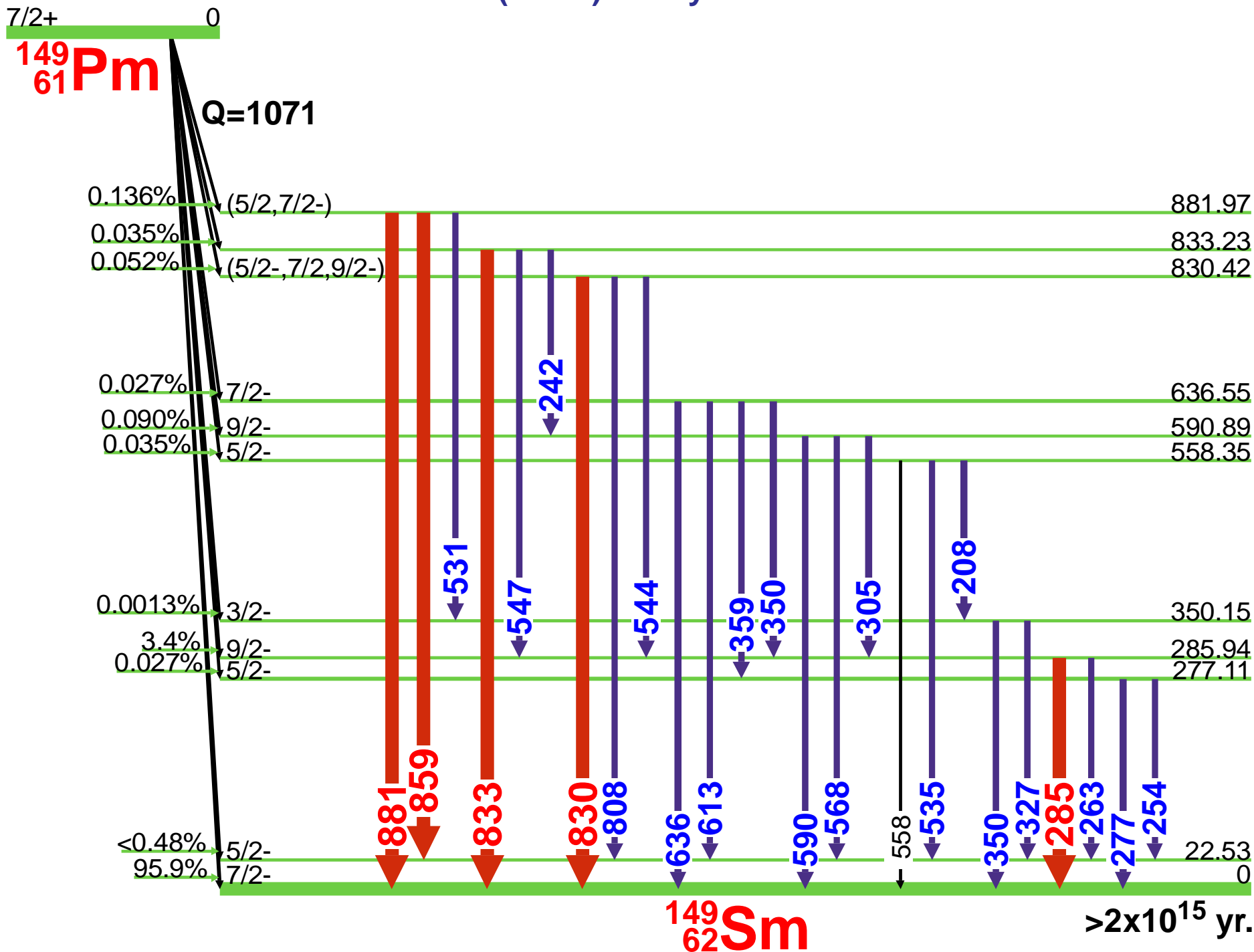
$E_{\gamma}, \sigma E_{\gamma}, I_{\gamma}, \sigma I_{\gamma}$ - 1998 ENSDF Data





53 hr.

¹⁴⁹Pm(53 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{149}Pm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

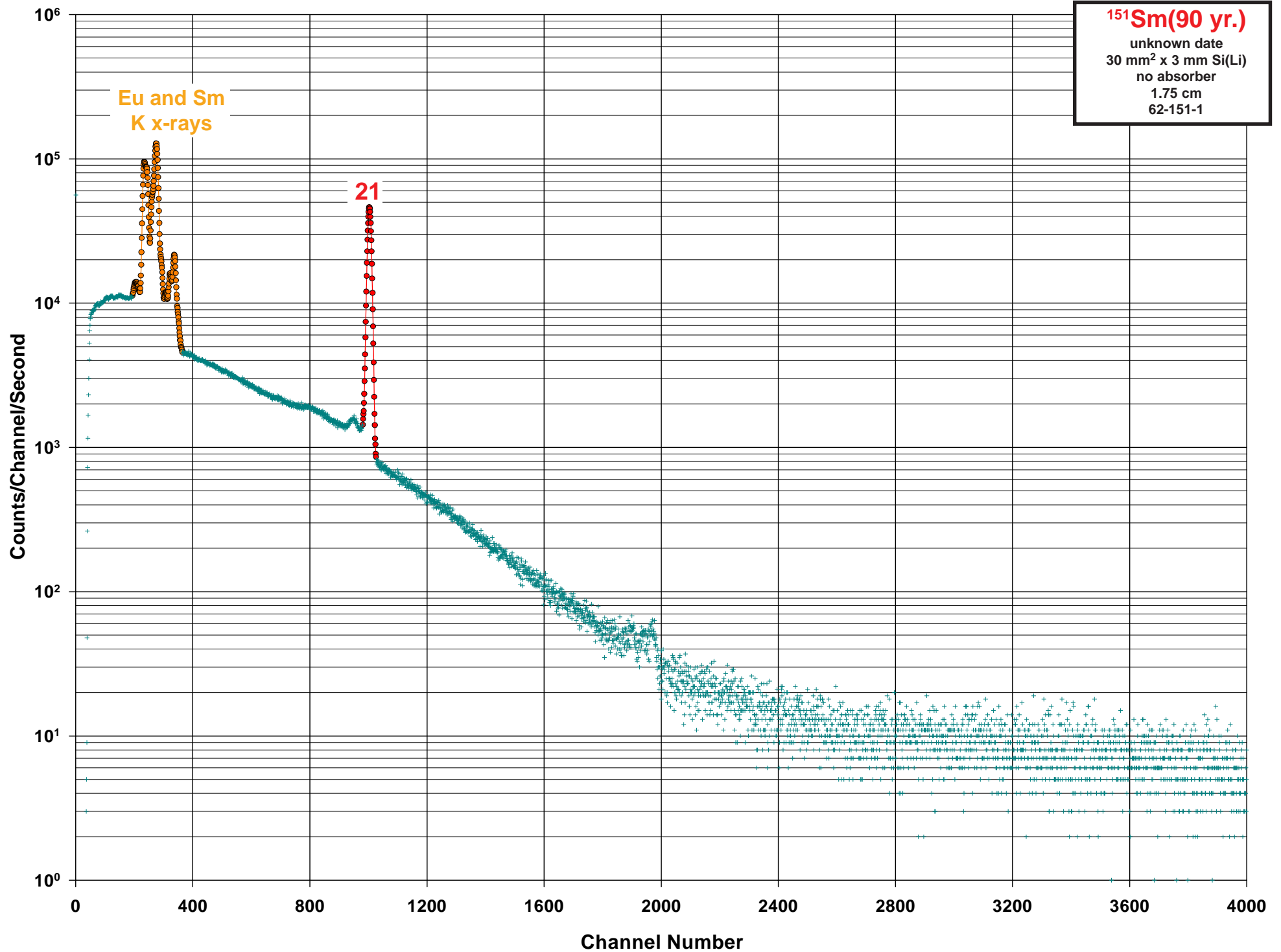
Half Life: 53.08(5) hr.

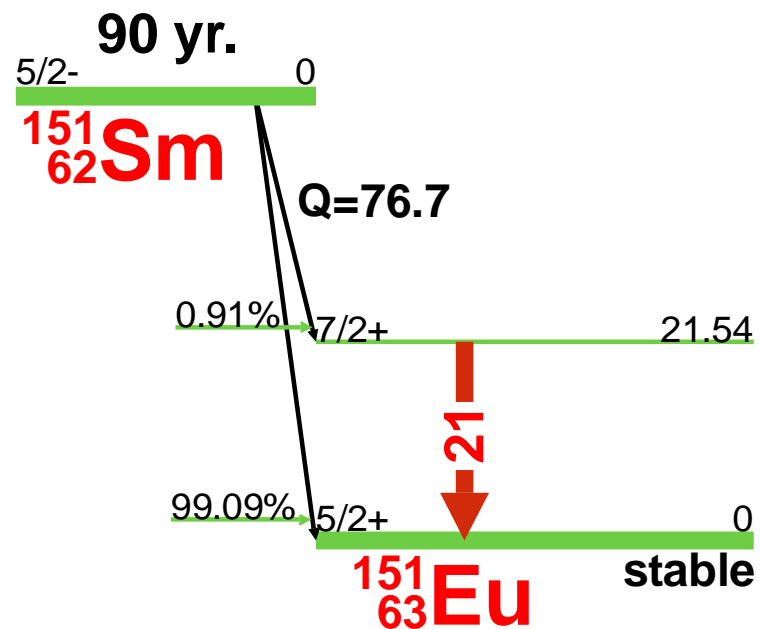
Detector: 2.5 cm² x 4 mm Ge(Li)Method of Production: $^{148}\text{Nd}(n,\gamma)\beta$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
22.520	0.010		0.050	0.003	4
72.98	0.07				4
208.28	0.11	0.008	0.0015	0.0001	4
238.38	0.12		0.0002		4
242.10	0.14	0.009	0.0002		4
254.57	0.08	0.045	0.0053	0.0005	4
257.77	0.11		0.0003		4
263.23	0.04	0.091	0.0096	0.0007	4
277.090	0.020	0.27	0.0288	0.0022	4
281.24	0.03		0.0074	0.0006	4
285.950	0.010	31.0	3.10	0.20	1
305.22	0.08	0.022	0.0026	0.0002	4
314.85	0.15		0.0003		4
323.95	0.09		0.0015	0.0002	4
327.53	0.07	0.034	0.0037	0.0003	4
350.00	0.10	0.023	0.0003		4
350.71	0.07		0.0015	0.0001	4
353.46	0.11		0.0003		4
359.57	0.07	0.022	0.0015	0.0002	4
506.10	0.20		0.0001		4
528.60	0.20		0.0001		4
531.61	0.06	0.012	0.0015	0.0002	4
535.90	0.05	0.13	0.0115	0.0010	3
544.27	0.06	0.025	0.0025	0.0002	4
547.17	0.07	0.019	0.0016	0.0002	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
550.01	0.15		0.0002		4
552.92	0.09		0.0006		4
558.37	0.04	0.14	0.0152	0.0014	3
568.36	0.07	0.18	0.0186	0.0017	3
571.08	0.09		0.0024	0.0003	4
590.880	0.010	0.68	0.069	0.005	2
598.42	0.15		0.0002		4
613.92	0.06	0.13	0.0149	0.0013	3
636.50	0.05	0.062	0.0093	0.0009	4
664.40	0.10		0.0008	0.0001	4
785.23	0.12		0.0004	0.0001	4
808.11	0.05	0.15	0.0164	0.0016	2
812.92	0.11		0.0003		4
824.30	0.20		0.0001		4
830.53	0.07	0.30	0.032	0.003	1
833.40	0.07	0.30	0.033	0.003	1
835.55	0.11		0.0011	0.0001	4
859.46	0.06	1.02	0.108	0.008	1
881.98	0.05	0.23	0.0239	0.0018	1
915.5	0.3				4
930.20	0.20		0.0006	0.0001	4
950.60	0.20		0.0002	0.0001	4
952.80	0.10		0.0009	0.0001	4
964.4	0.5				4
969.6	0.5				4





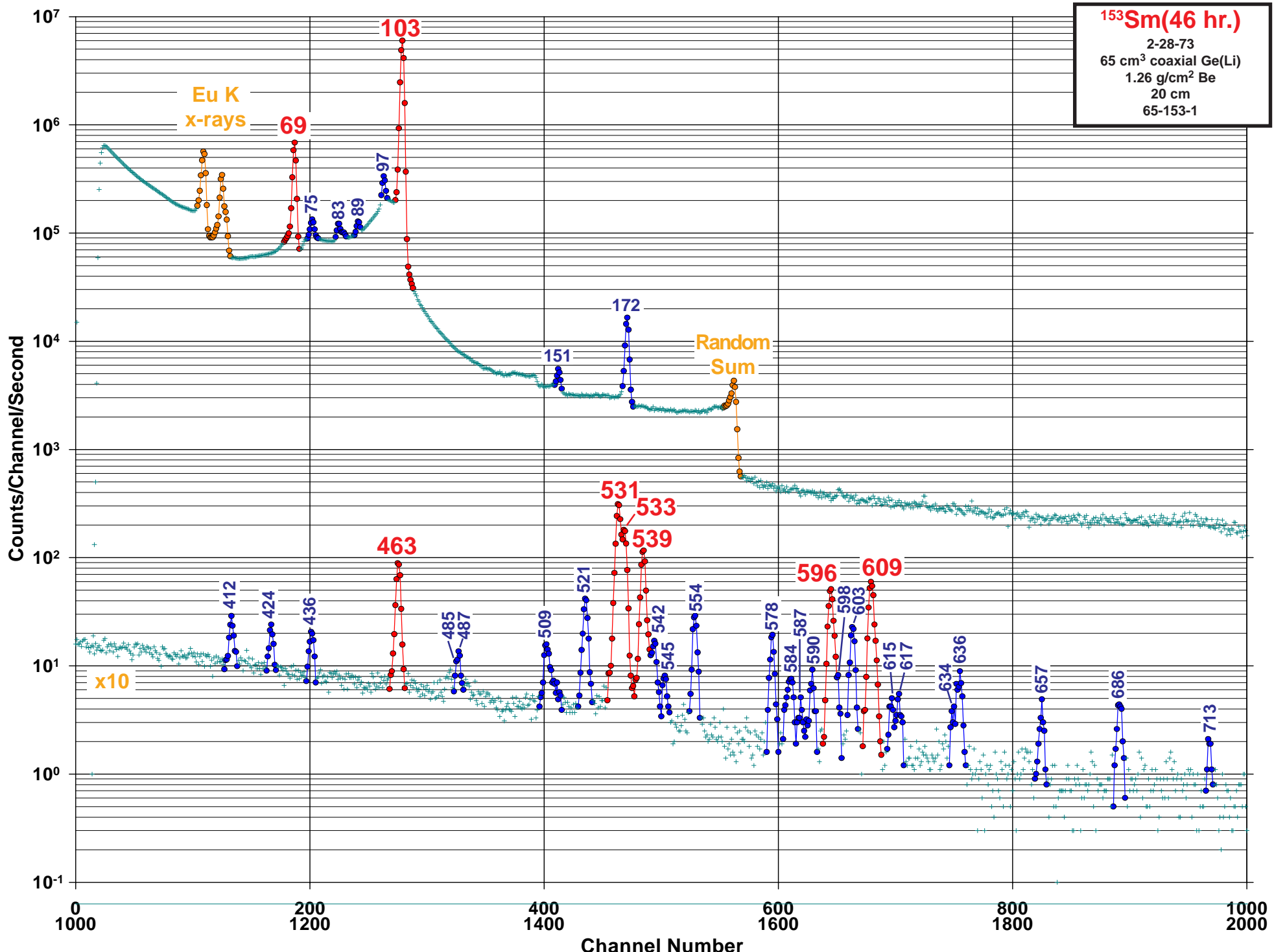
^{151}Sm (90 yr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{151}Sm

Half Life: 90(8) yr.

Detector: 30 mm² x 3 mm Si(Li)Method of Production: $^{150}\text{Sm}(n,\gamma)$

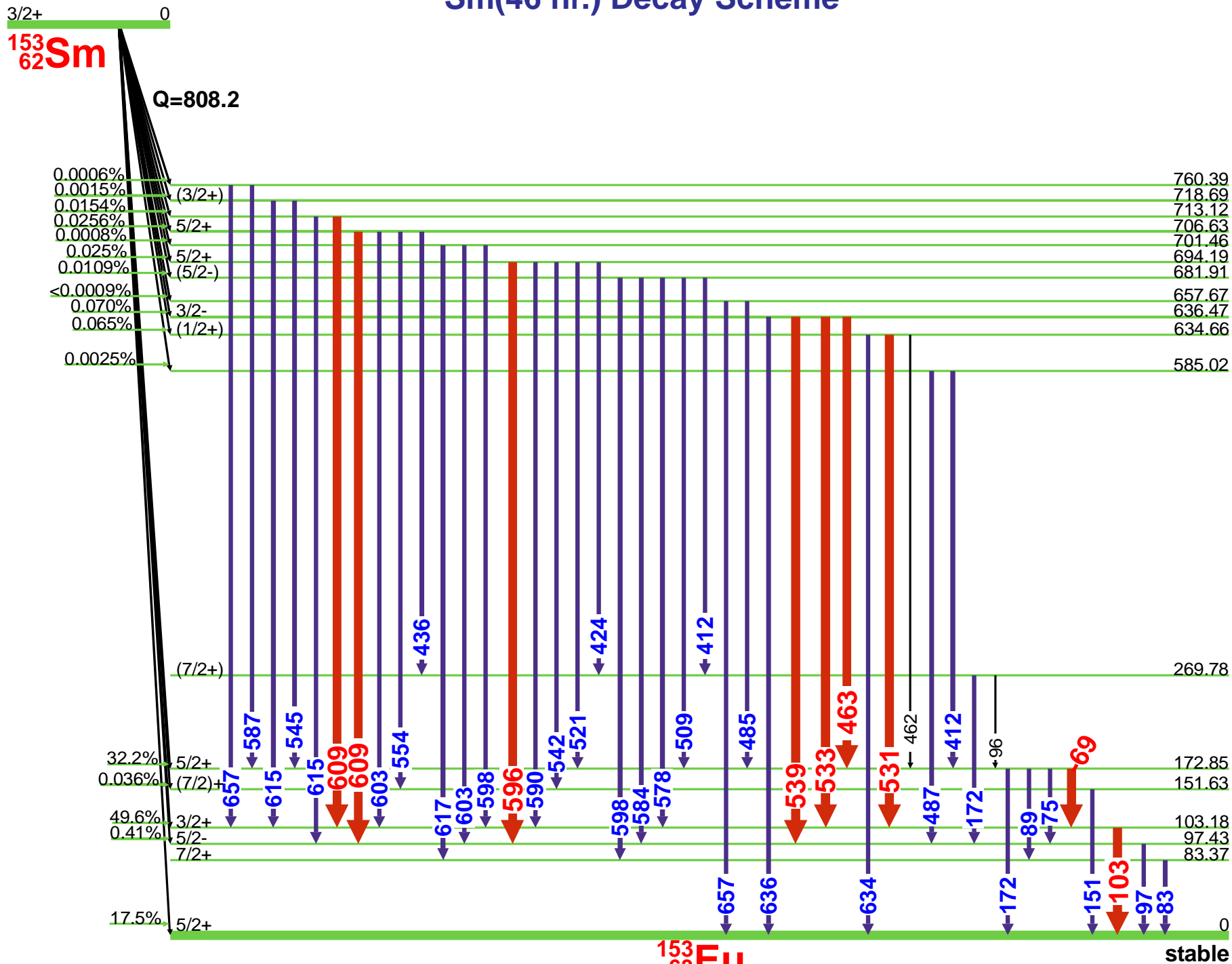
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
21.543	0.003	100.	0.0314	0.0022	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



46 hr.

¹⁵³Sm(46 hr.) Decay Scheme



¹⁵³Eu

stable



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{153}Sm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

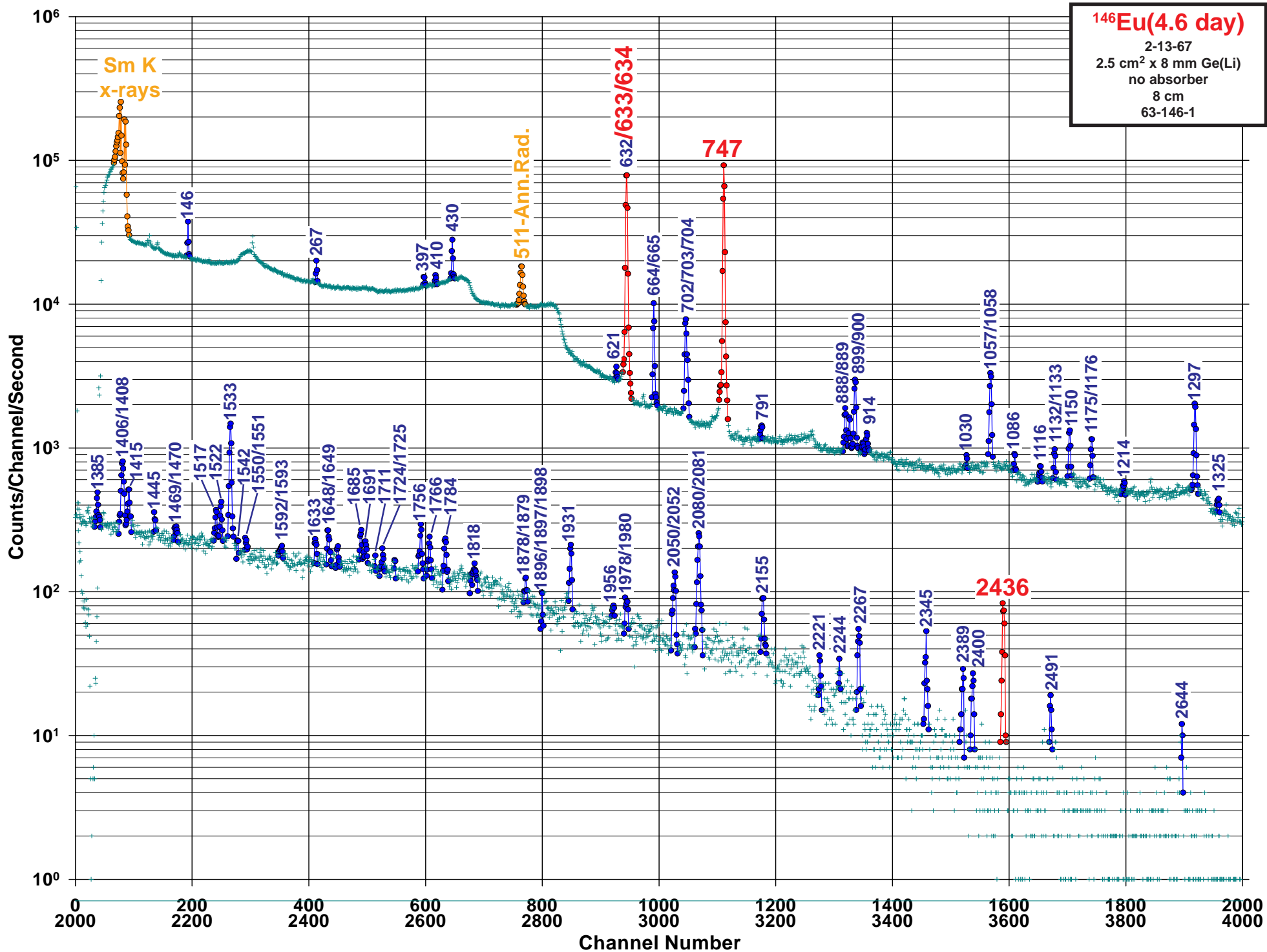
Half Life: 46.284(4) hr.

Detector: 65 cm³ coaxial Ge(Li)Method of Production: $^{152}\text{Sm}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	14.064					4
	19.813					4
	54.193			0.0019	0.0002	4
	68.256			0.0013	0.0004	4
	69.673		16.2	4.85	0.09	1
	75.422		1.1	0.349	0.016	4
	83.367		0.63	0.185	0.018	4
	89.486		0.32	0.167	0.009	4
D	96.882	0.001	2.33	0.0074	0.0001	3
	97.431			0.846	0.016	
	103.18		100.	29.8	0.4	1
	118.112	0.001		0.0002	0.0001	4
	124.9	0.4		0.0092	0.0001	4
	151.624	0.001	0.03	0.0113	0.0015	3
	166.555	0.002		0.0006	0.0001	4
D	172.303	0.002	0.28	0.0004		3
	172.853			0.0805	0.0016	
D	412.05	0.20	0.008	0.0021	0.0002	3
	412.05	0.20				
	424.4	0.3	0.007	0.0021	0.0002	3
	436.9	0.3	0.008	0.0015	0.0002	3
	443.2	0.5		0.0001		4
D	462.0	0.3	0.053	0.0018	0.0006	1
	463.60	0.20		0.0146	0.0015	
	485.00	0.20		0.0004		4
	487.75	0.23		0.0004		4
	509.15	0.20	0.010	0.0021	0.0004	3
	521.3	2.5	0.028	0.0074	0.0009	3
	530.0					4
	531.40	0.15	0.238	0.063	0.006	1
	533.20	0.20	0.119	0.032	0.003	1
	539.10	0.20	0.086	0.0218	0.0012	1
	542.70	0.20	0.014	0.0023	0.0002	3

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	545.75	0.15	0.003	0.0009	0.0001	4
	554.94	0.10	0.020	0.0049	0.0005	2
	574.1	0.3		0.0002	0.0001	4
	578.75	0.20	0.013	0.0034	0.0003	3
	584.55	0.20	0.004	0.0012	0.0001	4
	587.60	0.25	0.002	0.0004	0.0001	4
	590.96	0.20	0.005	0.0011	0.0001	3
	596.70	0.20	0.045	0.0116	0.0012	1
D	598.3	0.3	0.005	0.0021	0.0004	4
	598.3	0.3				
D	603.6	0.4	0.019	0.0046	0.0005	2
	603.6	0.4				
D	609.5	0.3	0.051	0.0146	0.0012	1
	609.5	0.3				
D	615.8	0.4	0.003	0.0006	0.0002	3
	615.8	0.4				
	617.9	0.3	0.003	0.0007	0.0002	3
	630.5	0.4		0.0001		4
	634.8	0.3	0.002	0.0005	0.0001	4
	636.50	0.20	0.007	0.0022	0.0002	3
D	657.55	0.25	0.001	0.0004		4
	657.55	0.25				
	662.4	0.6				4
	677.0	0.3				4
	682.0	0.6				4
	686.0	0.4	0.004	0.0002		3
	694.1	0.3				4
	701.8	0.4				4
	706.8	0.5				4
	713.9	0.3	0.001	0.0002		4
	719.0	0.4				4
	760.5	0.4				4
	763.8	0.6				4



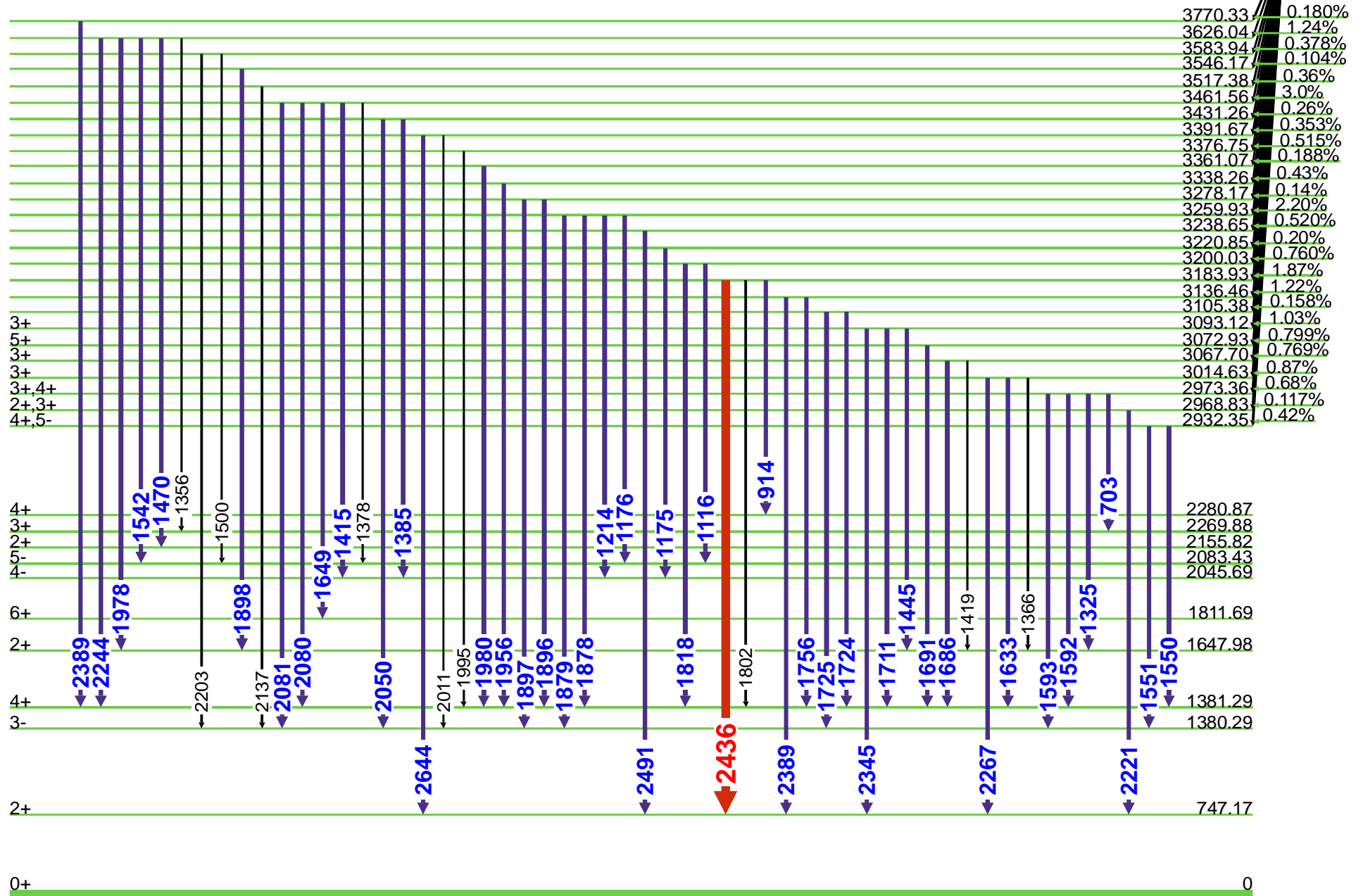


¹⁴⁶Eu(4.6 day) Decay Scheme

gamma-rays emitted from high energy levels

4.6 day

Q=3878 ¹⁴⁶Eu



¹⁴⁶Sm

1.0x10⁸ yr.

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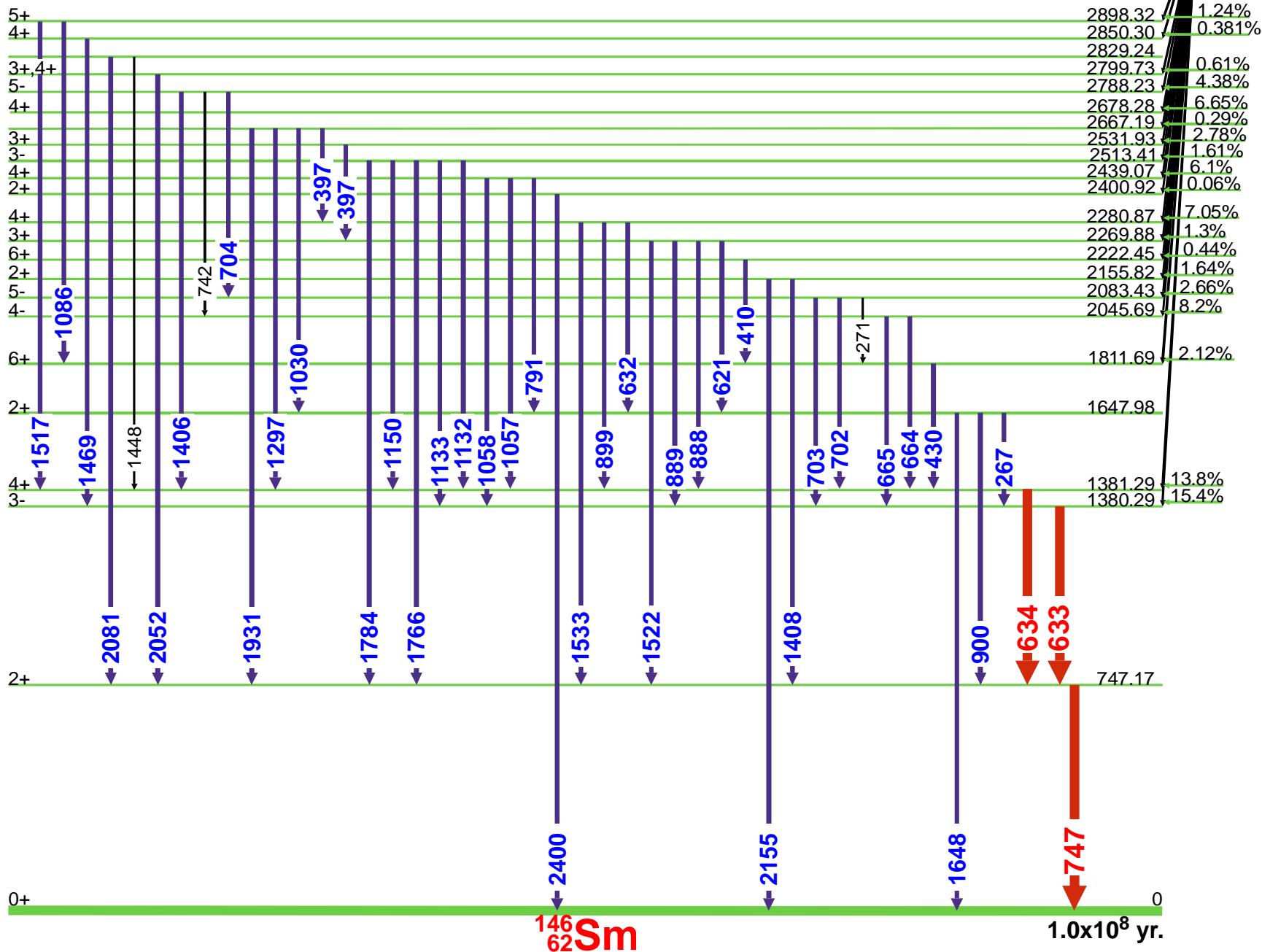


¹⁴⁶Eu(4.6 day) Decay Scheme

gamma-rays emitted from low energy levels

4.6 day
4- 0

Q=3878 ¹⁴⁶₆₃Eu



¹⁴⁶₆₂Sm

1.0x10⁸ yr.

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
67.40	0.10				4	261.53	0.18		0.0057	0.0012	4
68.60	0.10				4	265.2	0.4				4
71.00	0.10				4	267.59	0.03	0.11	0.098	0.008	4
75.10	0.10				4	271.683	0.021	0.72	0.873	0.024	4
95.0	0.5				4	295.59	0.25		0.022	0.005	4
122.10	0.20				4	296.59	0.25		0.0067	0.0015	4
123.9	0.5				4	300.4	0.5				4
134.60	0.20				4	308.3	0.5				4
140.0	2.0				4	318.75	0.23		0.0055	0.0015	4
143.00	0.20				4	324.63	0.25		0.0069	0.0013	4
144.10	0.20				4	348.9	0.3		0.007	0.003	4
144.80	0.20				4	355.50	0.10		0.043	0.003	4
146.21	0.05	0.10	0.0318	0.0018	4	357.45	0.16		0.0175	0.0025	4
146.90	0.20					358.2	0.5				
148.20	0.20				4	360.1					4
151.10	0.20				4	361.1	0.3		0.0058	0.0022	4
152.70	0.20				4	364.7	0.5				4
158.5	0.8		0.018	0.010	4	368.94	0.21		0.0125	0.0018	4
165.20	0.20				4	370.5	0.6				4
169.11	0.09		0.0091	0.0010	4	372.67	0.23		0.070	0.023	4
172.1	0.3				4	376.11	0.04		0.055	0.009	4
174.73	0.19		0.0143	0.0015	4	380.91	0.07		0.10	0.04	4
175.4	0.3				4	387.36	0.14		0.187	0.020	4
186.8	0.3				4	390.7	0.6				4
201.24	0.22		0.0104	0.0025	4	394.0	0.6				4
202.2	0.4		0.0099	0.0020	4	394.7	1.5		0.12	0.04	4
210.5	0.4		0.0059	0.0020	4	397.31	0.06	0.79	0.18	0.07	4
222.33	0.10		0.0143	0.0010	4	397.325	0.019		0.669	0.015	
224.05	0.03		0.042	0.003	4	399.81	0.10		0.014	0.004	4
235.02	0.07		0.0218	0.0014	4	403.86	0.06		0.073	0.008	4
246.3	0.4				4	410.766	0.019	0.60	0.646	0.019	4
251.2	0.4				4	415.52	0.16		0.0058	0.0020	4
252.7	0.4				4	422.3	0.3		0.013	0.004	4
255.8	0.4				4	430.386	0.018	4.6	4.72	0.13	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	434.3	0.5		0.13	0.05	4		624.75	0.14		0.0808	0.010	4
	441.43	0.12		0.027	0.003	4		632.89	0.04	83.7	1.28	0.03	1
	445.0	0.3		0.20	0.04	4	D	633.083	0.023		35.9	1.0	
	449.2	0.5		0.13	0.05	4		634.137	0.021		45.0	1.3	
	459.35	0.06		0.21	0.06	4		636.22	0.13		0.19	0.08	4
	463.32	0.07		0.0228	0.0025	4		651.68	0.24		0.045	0.006	4
	467.762	0.025		0.067	0.004	4		653.0	0.3		0.024	0.008	4
	471.67	0.04		0.0360	0.0019	4		664.65	0.14	7.24	3.3	0.8	2
	482.3	0.5		0.0335	0.0006	4	D	665.424	0.015		7.23	0.20	
	488.3	0.7				4		667.3	1.0		0.19	0.07	4
	501.8	0.8				4		673.40	0.09		0.030	0.003	4
Ann.	511.006			9.1	0.6	3		686.54	0.10		0.0317	0.0024	4
	519.25	0.09		0.042	0.003	4		692.55	0.11		0.048	0.004	4
	522.00	0.03		0.137	0.005	4		702.099	0.019	7.59	3.82	0.13	2
	529.15	0.15		0.032	0.003	4		703.089	0.022	2.17	3.74	0.13	3
	532.87	0.07		0.131	0.008	4	D	703.46	0.06		0.106	0.020	
	534.26	0.09		0.13	0.04	4		704.774	0.019		1.88	0.05	
	544.32	0.13		0.14	0.06	4		712.0	1.1				4
	548.4	1.0		0.014	0.004	4		713.6	1.1				4
	549.1	1.0		0.14	0.03	4		715.1	1.1				4
	550.4	0.3		0.034	0.006	4		721.24	0.08		0.053	0.004	4
	553.35	0.11		0.37	0.07	4		733.97	0.13		0.047	0.006	4
	553.8	1.0		0.026	0.008	4		736.55	0.11		0.079	0.008	4
	559.3	0.8				4		738.5	1.1		0.096	0.008	4
	567.5	0.5				4		742.65	0.15		0.71	0.10	4
	569.11	0.10		0.020	0.006	4		747.159	0.016	100.	98.5	2.7	1
	569.53	0.05		0.098	0.007	4		749.8	1.5		0.049	0.005	4
	575.64	0.16		0.021	0.006	4		753.80	0.08		0.027	0.003	4
	583.76	0.03		0.112	0.006	4		760.963	0.023		0.093	0.004	4
	593.15	0.20		0.019	0.004	4		766.838	0.023		0.0908	0.0029	4
	600.4	1.0		0.20	0.04	4		769.7	1.2				4
	606.22	0.22		0.017	0.004	4		775.533	0.025		0.096	0.004	4
	611.46	0.25		0.015	0.004	4		783.9	0.3		0.0473	0.0022	4
	621.85	0.03	0.52	0.547	0.018	4							



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
783.96	0.03		0.0477	0.0021	4	937.29	0.04		0.034	0.004	4
791.107	0.019	0.54	0.456	0.013	4	937.33	0.08		0.22	0.04	4
797.56	0.22		0.040	0.005	4	937.68	0.08		0.043	0.016	4
804.67	0.06		0.094	0.004	4	941.30	0.03		0.159	0.006	4
812.21	0.03		0.0790	0.0029	4	948.14	0.15		0.0080	0.0013	4
814.70	0.25		0.0087	0.0016	4	968.84	0.10		0.046	0.003	4
818.7	1.2				4	971.47	0.06		0.066	0.004	4
821.1	1.2				4	972.5	1.5				4
823.21	0.03		0.0554	0.0022	4	974.77	0.08		0.149	0.025	4
826.32	0.12		0.0136	0.0020	4	976.51	0.05		0.19	0.07	4
833.11	0.09		0.0122	0.0013	4	979.09	0.10		0.044	0.003	4
837.72	0.08		0.0060	0.0008	4	989.49	0.04		0.0651	0.0025	4
838.02	0.15		0.0048	0.0010	4	998.7	0.3		0.0045	0.0013	4
840.94	0.10		0.0202	0.0012	4	1004.3	0.4		0.010	0.003	4
843.72	0.09		0.0033	0.0007	4	1009.27	0.11		0.0117	0.0012	4
844.72	0.15		0.054	0.020	4	1017.08	0.16		0.0172	0.0021	4
845.81	0.10		0.036	0.008	4	1022.05	0.09		0.023	0.007	4
848.85	0.10		0.14	0.03	4	1027.26	0.05		0.072	0.003	4
848.9	0.3		0.018	0.007	4	1028.10	0.05		0.021	0.003	4
850.49	0.10		0.232	0.014	4	1030.2	0.3	0.30	0.0131	0.0020	4
852.27	0.09		0.038	0.009	4	1036.71	0.10		0.051	0.003	4
865.353	0.023		0.137	0.004	4	1038.35	0.20		0.024	0.003	4
870.55	0.06		0.011	0.004	4	1047.36	0.05		0.0490	0.0018	4
881.55	0.03		0.0350	0.0017	4	1053.0	0.3		0.10	0.03	4
888.46	0.15	1.80	1.08	0.25	3	1057.62	0.10	7.29	2.3	0.4	3
889.44	0.15		0.58	0.17		1058.71	0.10		3.9	0.4	
891.29	0.20		0.12	0.03	4	1063.6	0.7		0.009	0.003	4
899.486	0.022	4.24	1.36	0.10	3	1068.32	0.07		0.0338	0.0018	4
900.797	0.018		2.95	0.21		1078.29	0.07		0.0374	0.0015	4
903.98	0.25		0.050	0.013	4	1081.2	1.6				4
914.031	0.016	0.75	0.621	0.018	4	1086.637	0.015	0.60	0.564	0.016	4
918.94	0.06		0.070	0.003	4	1088.83	0.08		0.032	0.003	4
927.78	0.17		0.0148	0.0020	4	1090.844	0.021		0.215	0.006	4
930.39	0.11		0.020	0.005	4	1094.10	0.11		0.0271	0.0024	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 4 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1094.10	0.04		0.058	0.022	4
	1102.64	0.15		0.0111	0.0023	4
	1107.20	0.08		0.043	0.003	4
	1110.03	0.16		0.022	0.003	4
	1110.79	0.05		0.013	0.003	4
	1116.566	0.015	0.43	0.423	0.012	4
	1118.0	1.7				4
	1120.79	0.09		0.0262	0.0016	4
D	1132.05	0.07	1.12	0.12	0.03	4
	1133.11	0.07		0.69	0.03	
	1137.66	0.13		0.043	0.003	
	1150.626	0.015	2.23	2.12	0.06	3
	1155.08	0.04		0.189	0.007	4
	1161.75	0.14		0.0124	0.0015	4
	1164.7	1.7				4
	1166.67	0.10		0.017	0.003	4
D	1175.09	0.11	1.92	0.14	0.03	3
	1176.522	0.023		1.62	0.05	
	1184.93	0.03		0.166	0.006	4
	1186.98	0.10		0.0310	0.0019	4
	1190.1	0.3		0.0631	0.0024	4
	1191.01	0.10		0.013	0.004	4
	1199.15	0.13		0.008	0.007	4
	1202.6	0.3		0.0071	0.0020	4
	1208.82	0.08		0.0293	0.0020	4
	1214.209	0.021		0.314	0.009	4
	1225.39	0.11		0.0134	0.0014	4
	1231.03	0.10		0.0164	0.0016	4
	1239.86	0.20		0.0081	0.0019	4
	1251.8	1.9				4
	1255.72			0.010	0.004	4
	1260.89	0.09		0.0235	0.0018	4
	1266.0	0.5				4
	1273.6	1.9		0.098	0.020	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1277.55	0.06		0.0427	0.0020	4
	1293.48	0.13		0.114	0.011	4
	1297.028	0.016	5.72	5.39	0.15	2
	1303.46	0.04		0.078	0.004	4
	1325.35	0.04	0.52	0.089	0.003	4
	1330.33	0.20		0.030	0.004	4
	1332.74	0.04		0.190	0.008	4
	1335.52	0.09		0.132	0.006	4
	1336.01	0.09		0.043	0.003	4
	1345.176	0.022		0.155	0.005	4
	1347.79	0.06		0.0043	0.0002	4
	1356.145	0.017	0.31	0.316	0.009	4
	1362.93	0.12		0.0212	0.0020	4
	1366.69	0.09	0.43	0.034	0.010	4
	1371.33	0.10		0.008	0.003	4
	1373.29	0.15		0.014	0.005	4
	1373.6	2.0				4
	1378.135	0.019	0.74	0.534	0.016	4
	1385.60	0.06	0.27	0.12	0.07	4
	1402.20	0.19		0.037	0.009	4
D	1406.98	0.03	3.20	1.72	0.05	3
	1408.66	0.03		1.23	0.04	
	1415.859	0.021	1.12	0.216	0.006	4
	1419.70	0.03		0.129	0.006	4
	1434.42	0.18		0.0140	0.0015	4
	1445.136	0.023	0.45	0.365	0.012	4
	1448.10	0.20		0.18	0.07	4
	1448.21	0.06		0.092	0.003	4
	1452.67	0.13		0.0277	0.0020	4
	1458.8	2.2				4
D	1469.86	0.07		0.096	0.004	4
	1470.21	0.04		0.020	0.006	
	1471.64	0.09		0.068	0.003	4
	1475.3	0.3		0.011	0.003	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 5 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1477.83	0.17		0.030	0.010	4	1686.397	0.021	0.8	0.627	0.018	4
1484.72	0.08		0.081	0.004	4	1691.643	0.022	0.74	0.413	0.012	4
1488.48	0.13		0.034	0.004	4	1711.844	0.022	0.24	0.208	0.006	4
1491.16	0.03		0.026	0.003	4	1716.1	0.5				4
1496.39	0.10		0.01	0.03	4	1724.07	0.06		0.069	0.010	4
1498.35	0.14		0.0079	0.0023	4	1725.08	0.06		0.059	0.010	4
1500.44	0.03		0.126	0.005	4	1728.76	0.07		0.012	0.003	4
1517.000	0.020	0.80	0.670	0.019	4	1743.69	0.03		0.0372	0.0019	4
1522.712	0.019	0.97	0.884	0.025	4	1746.9					4
1530.7	2.3				4	1754.17	0.25		0.053	0.018	4
1533.711	0.018	6.28	6.08	0.19	2	1756.08	0.03	0.90	0.92	0.03	3
1535.93	0.05		0.173	0.015	4	1766.277	0.021	0.62	0.668	0.019	4
1537.9	0.5		0.024	0.004	4	1784.762	0.024	0.88	0.711	0.021	3
1542.56	0.03		0.104	0.004	4	1793.	3.		0.07	0.03	4
1550.98	0.11	0.34	0.13	0.04	4	1796.89	0.08		0.0343	0.0019	4
1551.99	0.11		0.13	0.04		1802.76	0.07		0.154	0.008	4
1565.02	0.20		0.0118	0.0002	4	1804.79	0.24		0.036	0.011	4
1568.93	0.10		0.037	0.005	4	1818.78	0.03	0.26	0.123	0.004	4
1580.16	0.18		0.0126	0.0017	4	1823.90	0.10		0.0086	0.0019	4
1587.53	0.08		0.011	0.007	4	1833.	3.				4
1588.53	0.08		0.014	0.007	4	1840.52	0.06		0.020	0.008	4
1592.04	0.06		0.17	0.03	4	1857.33	0.05		0.051	0.010	4
1593.05	0.06		0.17	0.03		1857.92	0.05		0.092	0.010	4
1596.66	0.07		0.098	0.004	4	1858.34	0.05		0.058	0.010	4
1605.9	2.4				4	1859.75	0.14		0.045	0.003	4
1619.2	2.4				4	1863.29	0.17		0.0142	0.0013	4
1633.30	0.03	0.23	0.412	0.012	4	1869.86	0.25		0.0072	0.0016	4
1638.39	0.06		0.0460	0.0025	4	1878.62	0.03	0.33	0.148	0.010	4
1648.00	0.03	0.8	0.574	0.021	4	1879.63	0.03		0.079	0.010	
1649.76	0.10		0.133	0.017	4	1896.85	0.19		0.008	0.004	4
1653.72	0.08		0.0564	0.0023	4	1897.85	0.19		0.008	0.004	
1663.42	0.06		0.082	0.019	4	1898.17	0.08		0.015	0.004	
1667.0	0.7		0.014	0.006	4	1902.45	0.06		0.0386	0.0018	4
1681.94	0.13		0.0215	0.0017	4	1917.	3.				4



GAMMA-RAY ENERGIES AND INTENSITIES (page 6 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1931.09	0.03	1.14	1.19	0.04	3		2155.76	0.03	0.60	0.521	0.016	3
	1937.57	0.11		0.075	0.005	4		2158.92	0.13		0.0051	0.0022	4
	1944.3	0.3		0.0080	0.0019	4		2164.86	0.05		0.0544	0.0019	4
	1948.65	0.06		0.074	0.003	4		2178.	3.				4
	1956.97	0.04		0.122	0.004	4		2189.3	0.3				4
	1963.01	0.10		0.0180	0.0013	4		2193.2	0.5		0.0018	0.0016	4
	1966.1	0.3		0.26	0.04	4		2196.3	0.4		0.0050	0.0014	4
D	1978.20	0.06	0.28	0.0504	0.0020	4		2203.73	0.03		0.171	0.005	4
	1980.79	0.03		0.146	0.006			2210.35	0.06		0.0590	0.0024	4
	1987.44	0.15		0.012	0.007	4		2213.4	0.5		0.0064	0.0014	4
	1988.45	0.15		0.017	0.007	4		2221.64	0.05	0.10	0.093	0.004	4
	1994.0	1.0		0.014	0.004	4		2224.98	0.15		0.051	0.003	4
	1995.75	0.09		0.287	0.012	4		2227.54	0.20		0.0099	0.0002	4
	1998.00	0.15		0.088	0.012	4		2244.71	0.04		0.159	0.005	4
	2004.25	0.11		0.0293	0.0024	4		2267.49	0.04	0.43	0.437	0.014	3
	2010.37	0.04		0.059	0.010	4		2273.4	1.5		0.047	0.005	4
	2011.38	0.04		0.138	0.010	4		2279.59	0.22		0.0054	0.0014	4
	2017.40	0.13		0.0230	0.0017	4		2300.4	0.4		0.0037	0.0010	4
	2032.15	0.21		0.0086	0.0013	4		2310.81	0.08		0.0205	0.0011	4
	2037.86	0.07		0.0717	0.0027	4		2320.54	0.04		0.096	0.003	4
	2049.96	0.08		0.028	0.004	4		2345.91	0.3	0.38	0.394	0.012	2
D	2050.97	0.08	0.92	0.114	0.015	3		2358.17	0.13		0.0300	0.0019	4
	2052.71	0.05		0.663	0.026			2360.49	0.14		0.0295	0.0019	4
	2072.50	0.15		0.0075	0.0009	4		2368.93	0.22		0.0077	0.0009	4
	2080.02	0.15	2.42	0.65	0.26	2		2379.90	0.20		0.0092	0.0011	4
D	2081.11	0.15		1.49	0.26			2389.00	0.17	0.20	0.0561	0.0015	3
	2081.7	0.3		0.0985	0.0019			2389.13	0.04		0.156	0.005	
	2095.64	0.20		0.023	0.003	4		2400.94	0.04	0.25	0.241	0.009	3
	2096.64	0.20		0.023	0.003	4		2404.74	0.22		0.0124	0.0011	4
	2103.16	0.05		0.074	0.003	4		2436.74	0.04	1.10	0.932	0.027	1
	2113.62	0.05		0.0104	0.0007	4		2484.39	0.08		0.0199	0.0009	4
	2132.09	0.10		0.0234	0.0012	4		2491.51	0.04	0.20	0.179	0.006	3
	2137.08	0.04		0.118	0.004	4		2497.46	0.05		0.0623	0.0021	4
	2149.2	0.3		0.030	0.010	4		2544.21	0.06		0.0485	0.0017	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 7 of 7)

Nuclide: ^{146}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 4.61(3) day

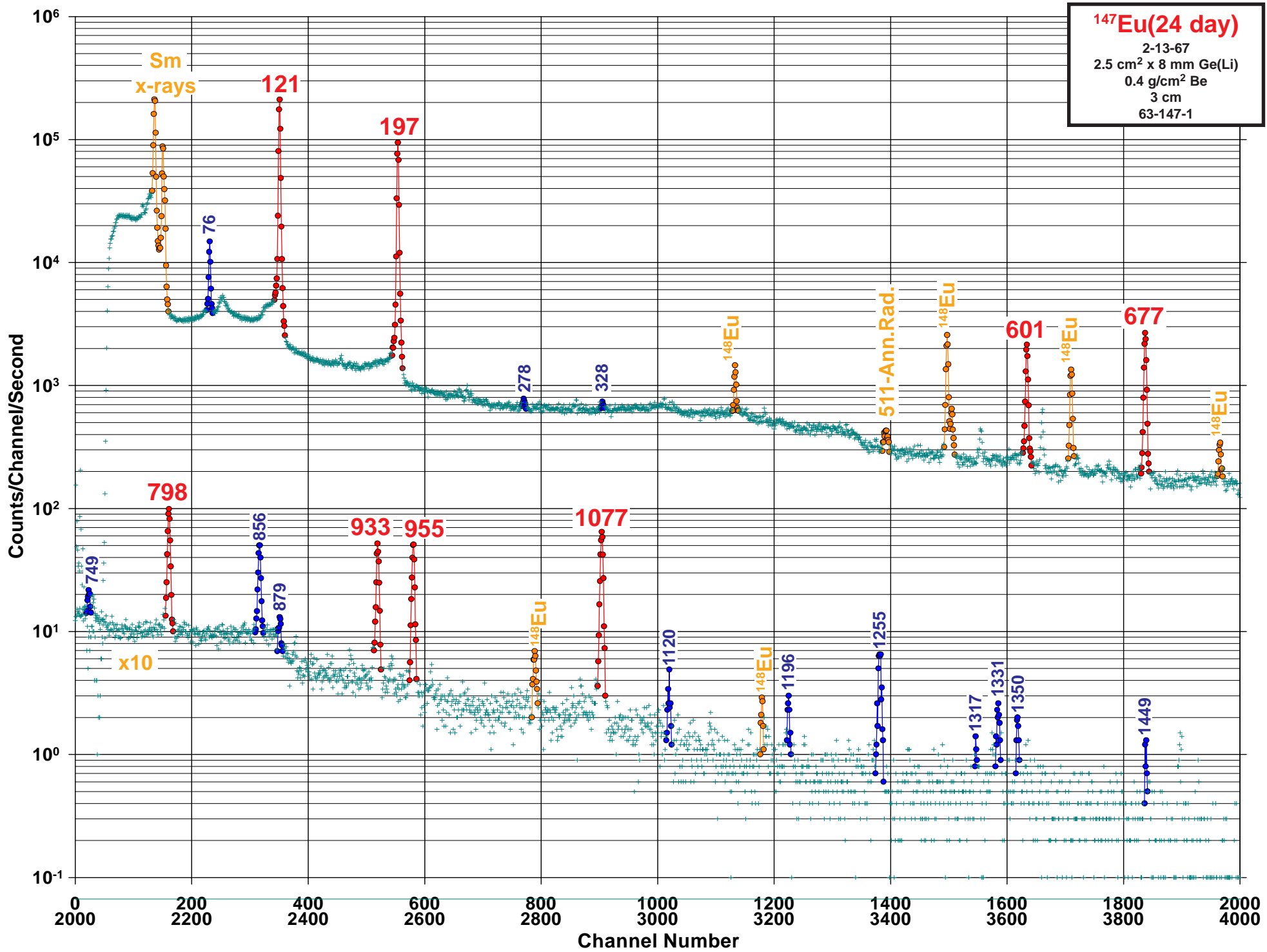
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2544.21	0.06		0.0485	0.0017	4
2582.51	0.11		0.0098	0.0007	4
2591.11	0.08		0.0189	0.0007	4
2621.56	0.11		0.0096	0.0006	4
2629.50	0.05		0.0655	0.0021	4
2644.43	0.05	0.15	0.106	0.004	3
2650.35	0.17		0.0077	0.0006	4
2650.35	0.17		0.0077	0.0006	4
2671.65	0.05		0.0391	0.0013	4
2680.57	0.07		0.0175	0.0007	4
2711.8	2.1		0.0128	0.0002	4
2724.70	0.06		0.0303	0.0011	4
2740.8	0.3		0.0013	0.0002	4
2762.04	0.08		0.0144	0.0007	4
2770.12	0.08		0.0189	0.0008	4
2798.97	0.06		0.0352	0.0013	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2845.0	0.3		0.0010	0.0003	4
2851.0	0.3		0.0011	0.0002	4
2858.2	0.3		0.0020	0.0005	4
2860.4	0.4		0.0012	0.0004	4
2878.76	0.10		0.0064	0.0005	4
2904.87	0.09		0.0387	0.0025	4
2906.99	0.13		0.0154	0.0022	4
2946.10	0.10		0.0081	0.0009	4
2968.41	0.18		0.0029	0.0002	4
2973.3	0.4		0.0008	0.0002	4
2993.61	0.24		0.002	0.0002	4
3002.24	0.12		0.0061	0.0003	4
3038.50	0.23		0.0009	0.0001	4
3042.85	0.08		0.0026	0.0005	4
3082.0	0.5		0.0006	0.0002	4





¹⁴⁷Eu(24 day) Decay Scheme

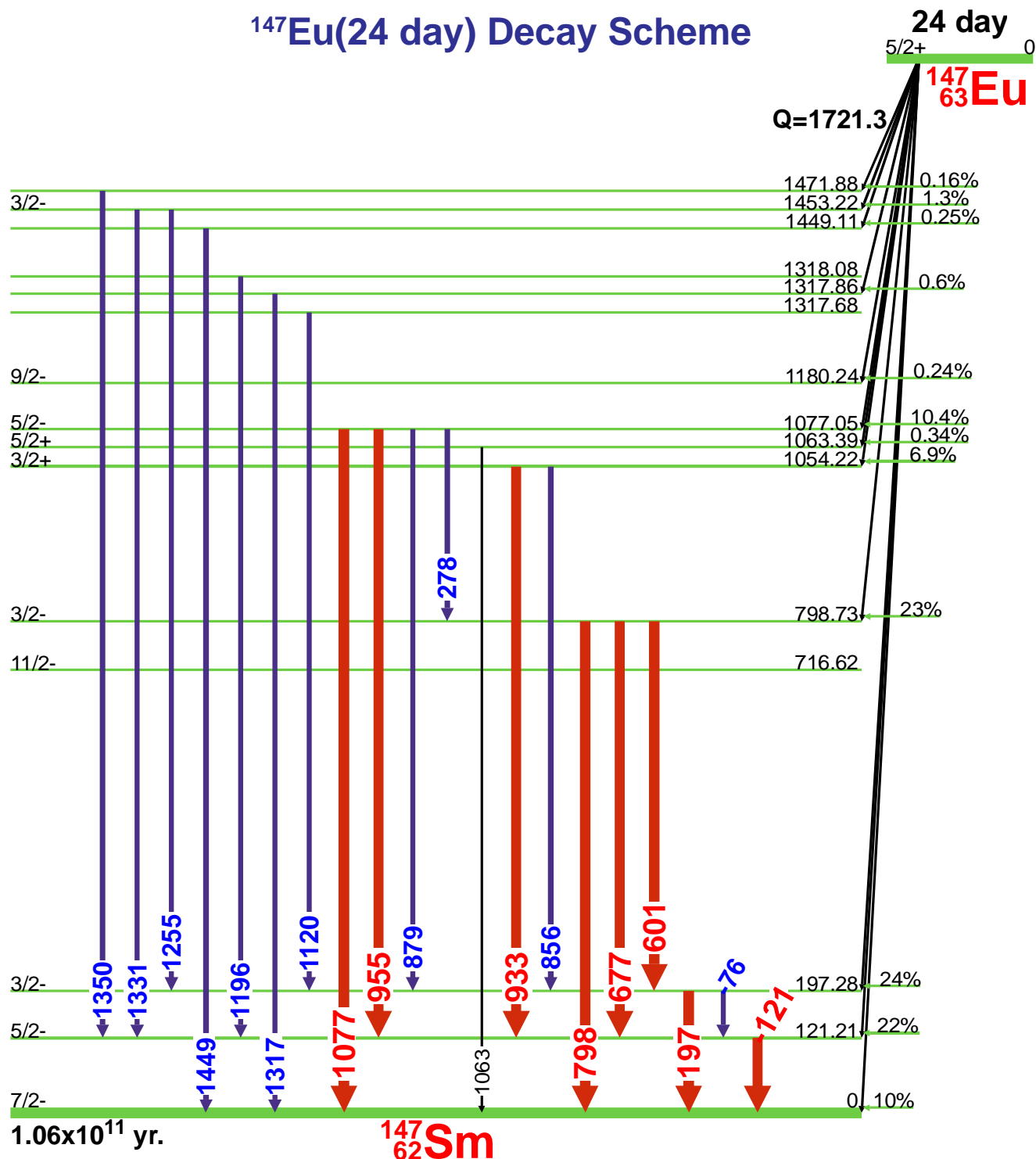


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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{147}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 24.1(6) day

Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
76.073	0.010	3.8	0.91	0.05	2	809.380	0.016		0.0413	0.0023	4
121.220	0.017	95.	22.9	1.3	1	829.0	0.7				4
165.558	0.028	0.10	0.0111	0.0007	4	846.242	0.011		0.0692	0.004	4
197.299	0.012	100.	26.5	1.1	1	856.929	0.005	12.2	2.70	0.14	2
212.40	0.15		0.0014	0.0002	4	867.9	0.7				4
244.832	0.017		0.0239	0.0015	4	879.761	0.008	0.84	0.196	0.010	4
254.09	0.04		0.0095	0.0007	4	922.36	0.12		0.0027	0.0005	4
255.75	0.16		0.0020	0.0003	4	933.005	0.008	15.5	3.44	0.18	1
267.74	0.03		0.0117	0.0007	4	942.177	0.007	0.90	0.186	0.009	4
273.14	0.16		0.0021	0.0005	4	955.832	0.005	16.8	3.84	0.19	1
278.352	0.014	0.2	0.0517	0.0027	4	964.0	0.8				4
286.28	0.02		0.0133	0.0008	4	982.98	0.05		0.0090	0.0006	4
295.40	0.06		0.0032	0.0005	4	985.28	0.10		0.0042	0.0003	4
328.828	0.013	0.15	0.0368	0.0019	4	1022.46	0.04		0.0090	0.0006	4
368.360	0.012		0.076	0.004	4	1054.35	0.24		0.0021	0.0013	4
385.69	0.10		0.0024	0.0005	4	1059.041	0.012		0.073	0.004	4
390.02	0.06		0.0040	0.0006	4	1063.380	0.009	0.6	0.156	0.008	4
420.900	0.020		0.0337	0.0019	4	1077.043	0.006	27.5	6.1	0.3	1
428.24	0.07		0.0034	0.0001	4	1106.863	0.017		0.0313	0.0017	4
471.600	0.012		0.056	0.003	4	1120.387	0.009	0.80	0.183	0.009	3
494.419	0.016		0.0398	0.0021	4	1152.330	0.026		0.0085	0.0006	4
505.121	0.011		0.093	0.005	4	1158.2	0.9		0.008	0.005	4
Ann. 511.006			0.71	0.10	4	1172.81	0.12		0.0040	0.0006	4
518.96	0.03		0.0180	0.0013	4	1180.231	0.010	0.64	0.183	0.009	3
537.22	0.16		0.0024	0.0008	4	1196.858	0.011	0.74	0.260	0.013	3
601.450	0.004	26.4	5.9	0.3	1	1251.841	0.024		0.077	0.004	4
654.55	0.11		0.0042	0.0006	4	1255.930	0.008	3.83	0.91	0.05	2
677.516	0.007	42.8	9.8	0.5	1	1274.592	0.014		0.0493	0.0026	4
688.15	0.04		0.0103	0.0009	4	1317.853	0.013	0.34	0.143	0.008	4
716.45	0.05		0.0077	0.0006	4	1327.98	0.05		0.0133	0.0019	4
732.33	0.05		0.0077	0.0006	4	1331.997	0.013	0.5	0.329	0.017	4
749.895	0.017		0.2597	0.0134	4	1350.198	0.014		0.138	0.008	4
798.729	0.005	21.7	4.85	0.26	1	1427.408	0.017		0.117	0.006	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{147}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 24.1(6) day

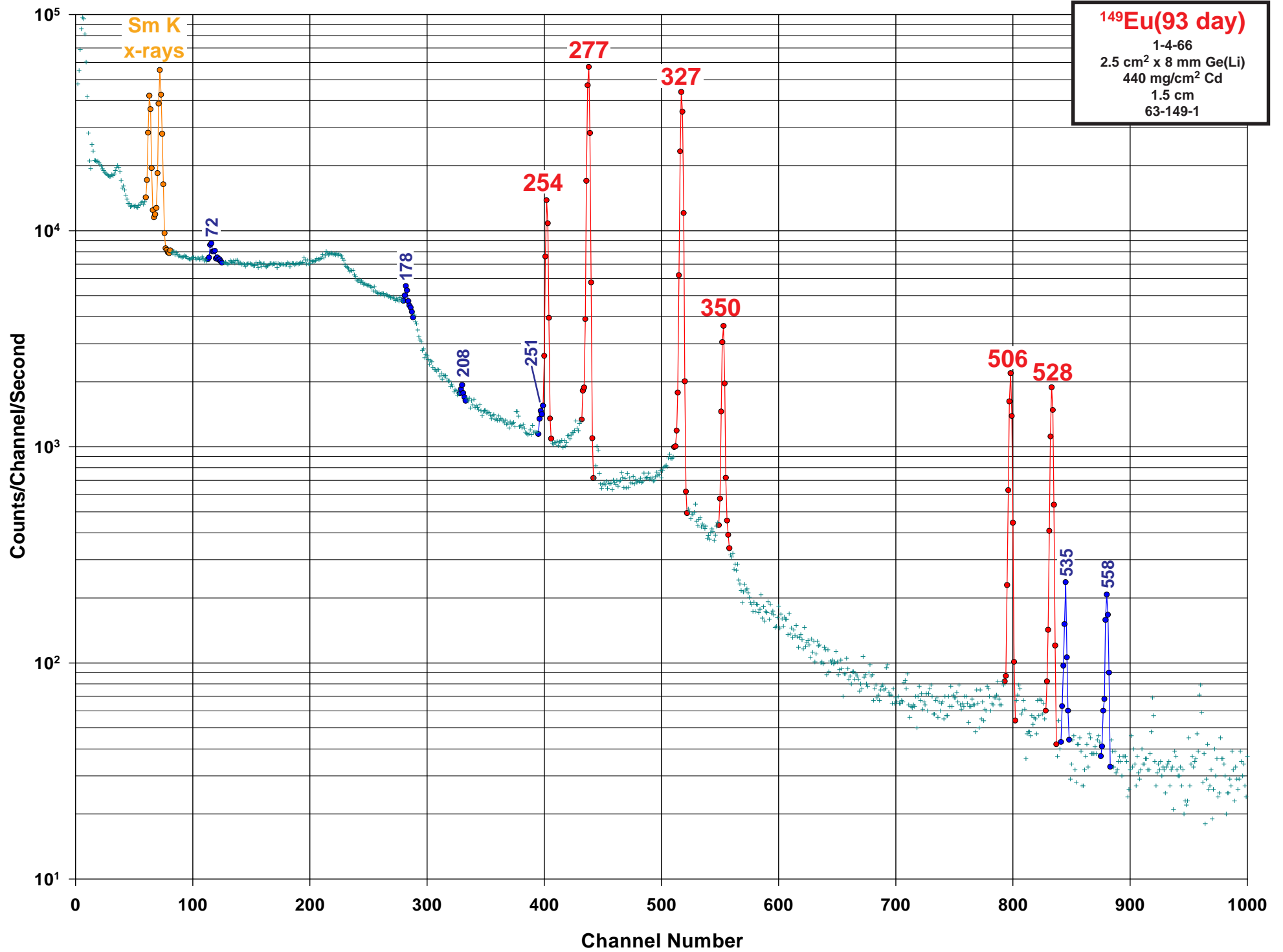
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: Sm(p,xn)

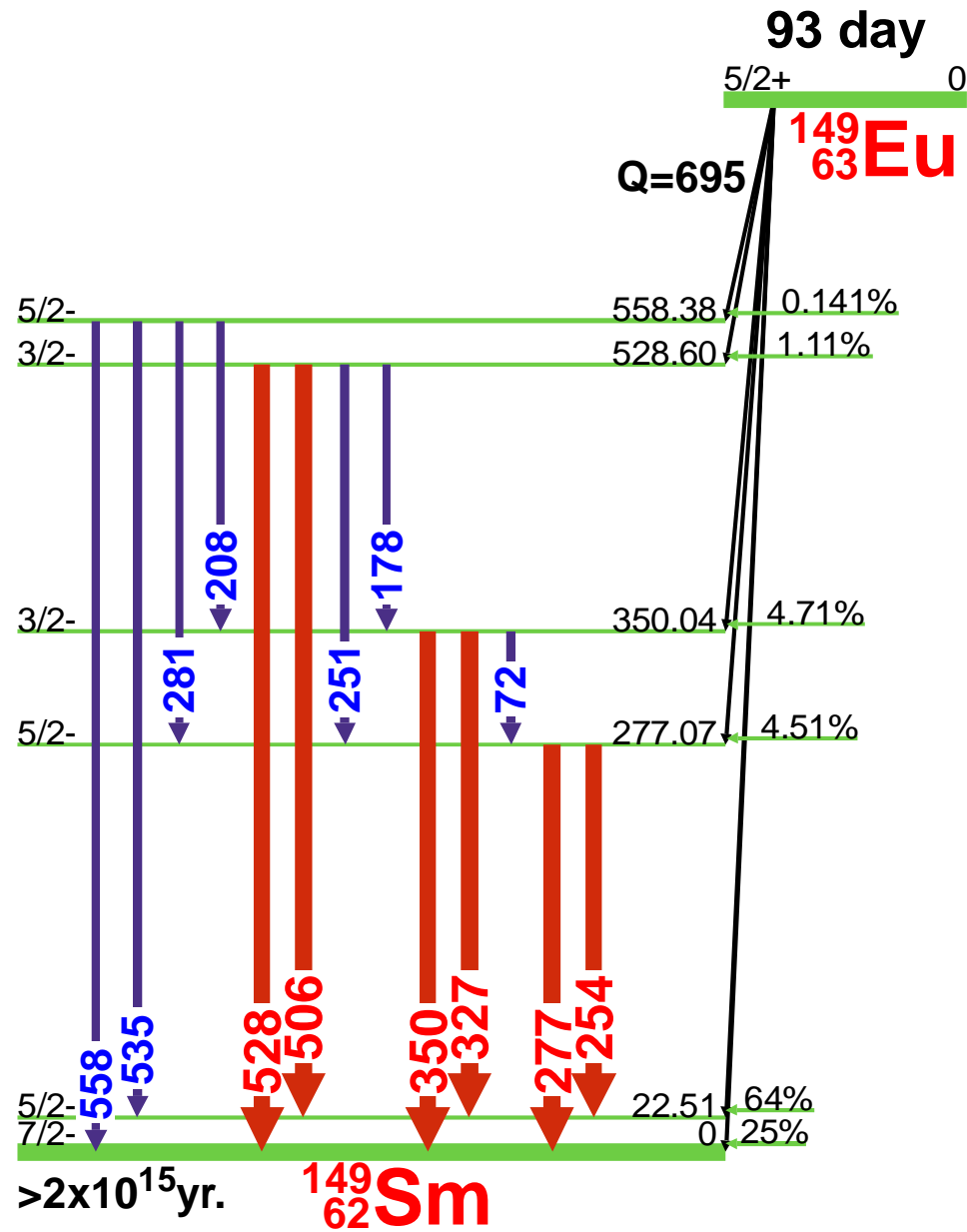
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1449.106	0.012	1.00	0.217	0.012	4
1453.24	0.04		0.0254	0.0015	4
1467.1	1.2				4
1471.90	0.04		0.0029	0.0003	4
1479.71	0.03		0.0042	0.0003	4
1482.0	1.0		0.0040	0.0011	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1520.58	0.13		0.0004	0.0001	4
1542.0	1.2				4
1548.51	0.16		0.0005	0.0001	4
1601.00	0.05		0.0082	0.0004	4
1641.98	0.07		0.0013	0.0001	4
1655.6	1.3		0.0034	0.0011	4





¹⁴⁹Eu(93 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁴⁹Eu

Half Life: 93.1(4) day

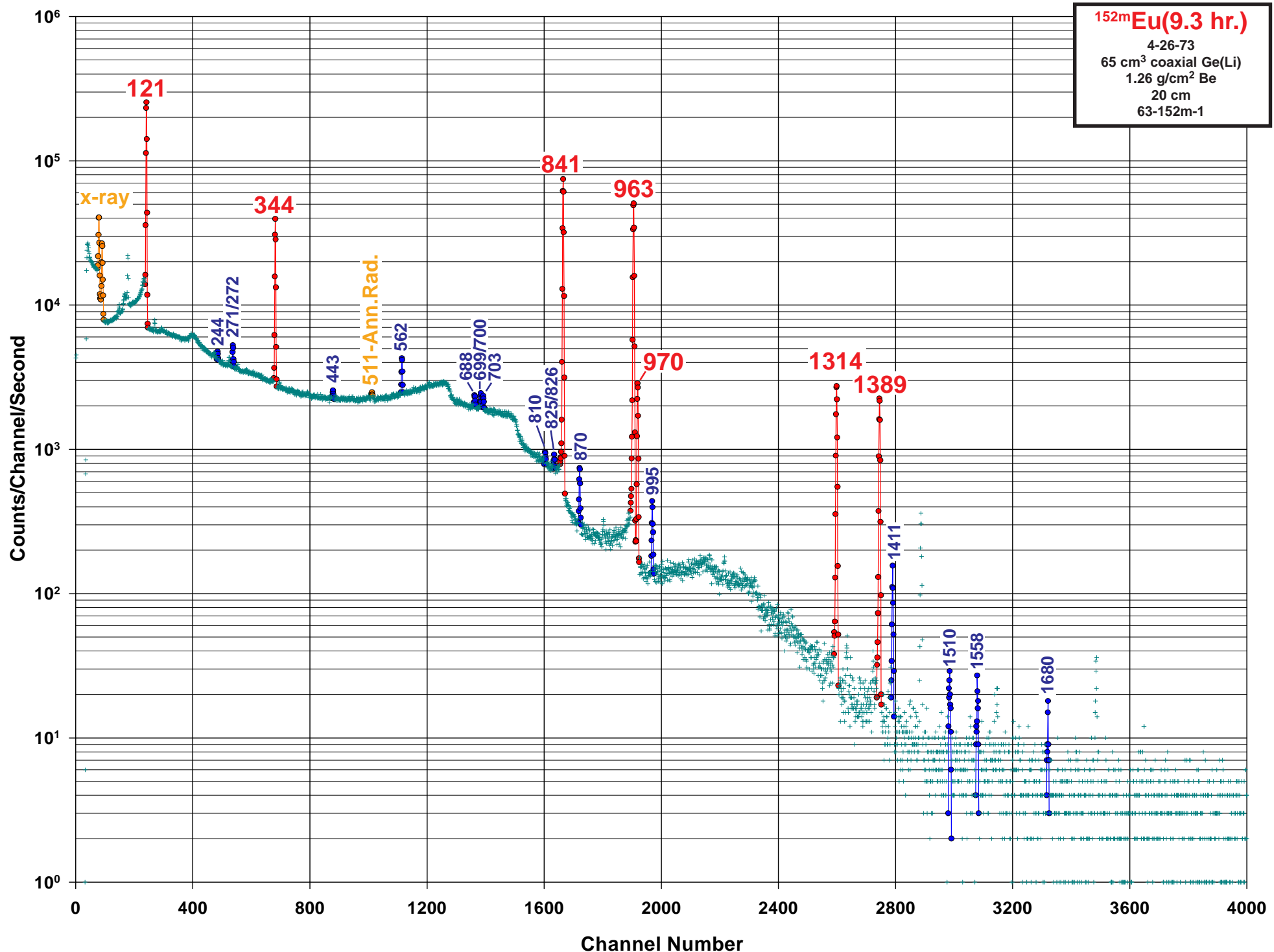
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁴⁹Sm(p,n)

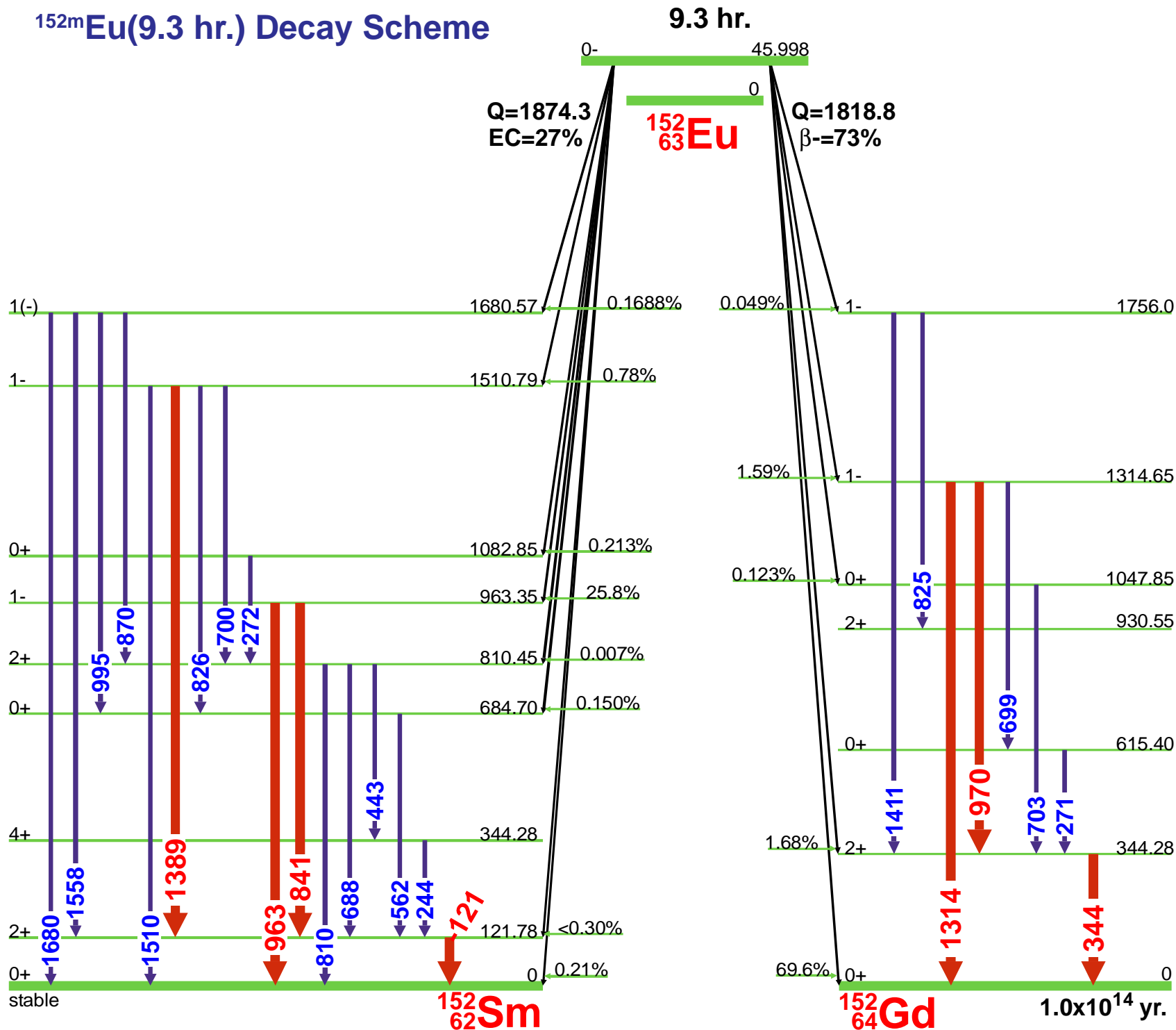
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
22.510	0.008		2.32	0.06	4
72.983	0.010	0.20	0.0141	0.0008	4
122.00	0.20		0.0003	0.0002	4
129.50	0.07		0.0004	0.0002	4
130.098	0.035		0.0031	0.0008	4
178.580	0.016	0.44	0.0185	0.0012	4
208.283	0.021	0.15	0.0121	0.0008	4
251.510	0.037	0.36	0.0109	0.0012	4
254.566	0.023	15.1	0.636	0.012	1
272.21	0.14		0.0001	0.0001	4
277.089	0.010	85.0	3.56	0.06	1
281.295	0.016	0.49	0.0226	0.0008	4
285.950	0.010		0.0007	0.0002	4
308.00	0.10		0.0001	0.0001	4
327.526	0.010	100.	4.03	0.12	1
350.016	0.010	8.7	0.367	0.012	1
376.50	0.20				4
381.70	0.20		0.0035	0.0007	4
506.093	0.010	14.1	0.558	0.013	1
528.587	0.010	13.6	0.508	0.012	1
535.897	0.012	1.18	0.048	0.003	2
558.372	0.010	1.59	0.052	0.004	2
568.27	0.10				4
590.880	0.010		0.0001		4
613.915	0.017		0.0003		4
636.05	0.10		0.0003		4
636.50	0.07		0.0001		4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{152m}Eu(9.3 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

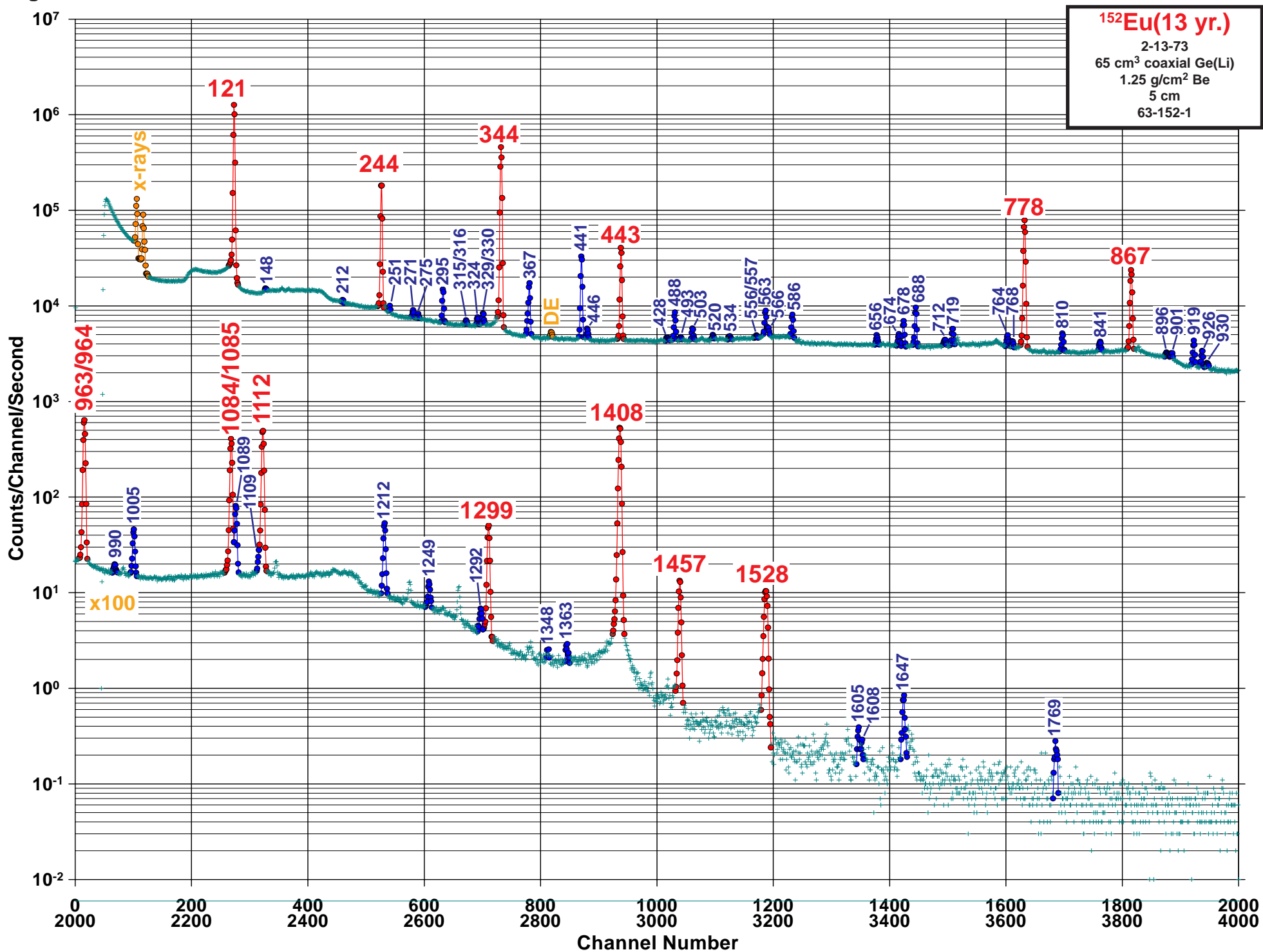
Nuclide: ^{152m}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 9.3116(1) hr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{151}\text{Eu}(n,\gamma)$

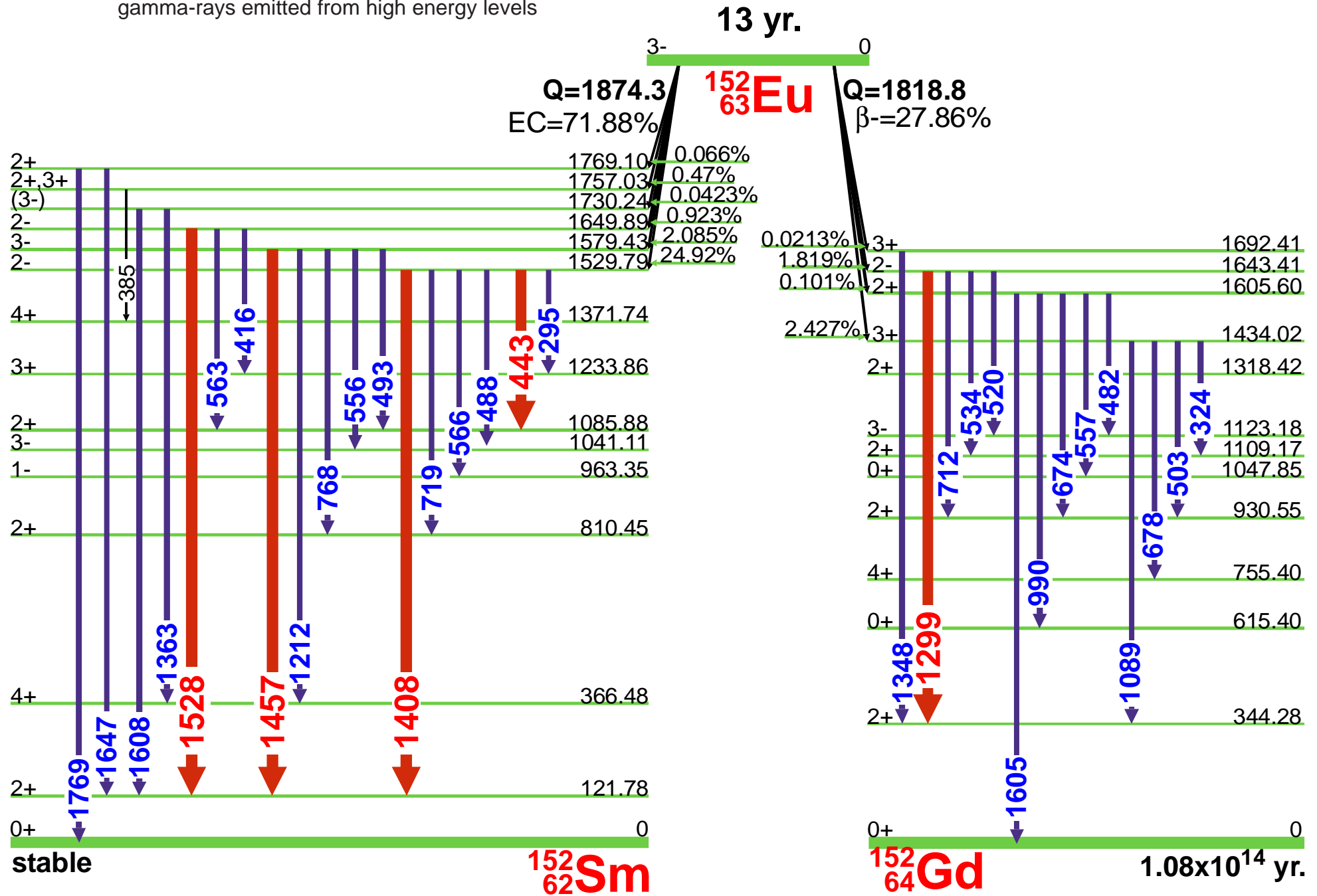
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	117.3	0.3		0.0168	0.0026	4		778.904			0.0018	0.0009	4
	121.777	0.005	50.66	25.9	0.9	1		796.1	0.3		0.013	0.005	4
	152.9	0.3		0.0053	0.0016	4		810.47	0.08	0.34	0.092	0.005	4
	160.0	0.5		0.0026	0.0016	4		825.5	0.3	0.23	0.0007	0.0004	4
	191.6	0.3		0.0007	0.0004	4	D	826.01	0.07		0.0026	0.0016	
	218.1	0.3		0.0002	0.0001	4		841.594	0.008	100.	52.5	1.4	1
	220.8	0.3		0.0005	0.0005	4		845.4	0.5		0.0089	0.0019	4
	244.700	0.010	0.37	0.0919	0.0027	4		870.13	0.05	0.80	0.326	0.009	3
	256.99	0.22		0.0037	0.0016	4		915.7	0.4		0.037	0.005	4
	266.91	0.22		0.0011	0.0006	4		961.06	0.22		0.74	0.04	4
D	271.06	0.01	0.669	0.074	0.011	4		963.390	0.012	82.4	43.2	0.9	1
	272.41	0.04		0.037	0.004		970.350	0.009	4.60	0.59	0.09	1	
	278.7	0.3				4		995.870	0.010	0.51	0.252	0.007	3
	340.1	0.3		0.018	0.007	4		1039.2	0.5		0.030	0.006	4
	344.31	0.03	17.36	2.4	0.4	1		1082.8	0.5				4
	387.8	0.3		0.0026	0.0016	4		1109.174			0.00028	0.00014	4
	398.00	0.15				4		1116.0	1.0		0.0010	0.0006	4
	412.0	0.3		0.0007	0.0004	4		1137.5	0.3		0.05	0.03	4
	443.96	0.04	0.21	0.091	0.004	4		1168.16	0.19		0.022	0.005	4
Ann.	511.006			0.014		4		1207.3	0.6		0.010	0.004	4
	547.35	0.08		0.034	0.004	4		1290.0	0.5		0.0033	0.0003	4
	562.930	0.020	1.55	0.814	0.019	3		1314.67	0.01	6.67	0.93	0.14	1
	586.265	0.003		0.0126	0.0019	4		1389.000	0.010	5.74	2.77	0.10	1
	605.0	0.5		0.015	0.006	4		1406.5	0.5		0.0026	0.0016	4
	632.8	0.3		0.0011	0.0007	4		1411.70	0.03	0.35	0.044	0.007	2
	646.9	0.3		0.0007	0.0004	4		1420.0	1.0		0.0021	0.0016	4
	684.85	0.20				4		1460.64	0.13		0.0016	0.0004	4
	688.69	0.05	0.62	0.240	0.009	4		1510.83	0.05	0.075	0.0236	0.0016	3
D	699.27	0.04	0.84	0.070	0.011	4		1558.73	0.03	0.060	0.0289	0.0017	3
	700.3	0.3		0.039	0.007		703.54	0.05	0.066	0.010	4		
D	703.54	0.05	0.73	0.026	0.0016	4		1680.52	0.05	0.04	0.0194	0.0011	3
	703.7	0.3		0.0026	0.0016		764.9		1755.94	0.06		0.0026	0.0002
	764.9			0.0004	0.0003	4							





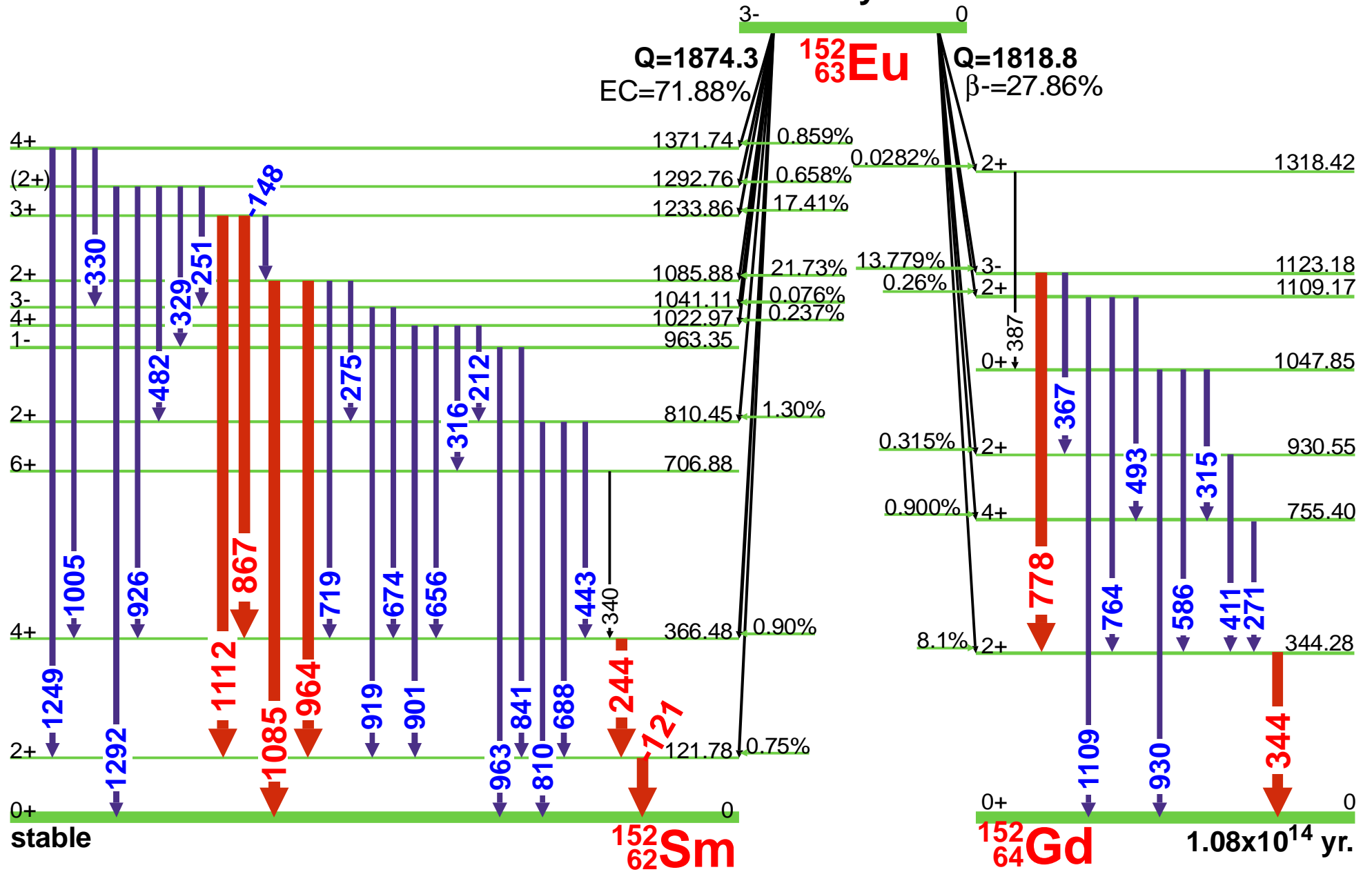
¹⁵²Eu(13 yr.) Decay Scheme

gamma-rays emitted from high energy levels



¹⁵²Eu(13 yr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{152}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 13.537(6) yr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{151}\text{Eu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
121.782		100.	39.76	0.12	1	379.37	0.06		0.0012	0.0003	4
125.69	0.13		0.022	0.007	4	385.69	0.20		0.0071	0.0011	4
148.010	0.017	0.06	0.052	0.006	4	387.90	0.08		0.0041	0.0003	4
173.17	0.15		0.029	0.010	4	387.90	0.08		0.0105	0.0008	
175.18			0.0056	0.0015	4	389.07	0.11		0.0048	0.0019	4
192.60	0.04		0.0244	0.0008	4	391.32	0.14		0.0018	0.0003	4
195.05	0.24		0.022	0.005	4	395.75	0.19		0.011	0.004	4
202.74	0.13		0.0071	0.0015	4	406.74	0.15		0.0012	0.0003	4
207.6	0.3		0.0082	0.0009	4	411.116	0.001	8.42	8.019	0.018	2
209.1					4	416.048	0.008	0.44	0.1531	0.0026	4
209.41	0.13		0.0196	0.0017	4	423.45	0.04		0.0045	0.0009	4
212.568	0.015	0.25	0.0276	0.0007	4	440.86	0.10		0.0186	0.0022	4
237.31	0.05		0.0130	0.0019	4	440.86	0.10		0.048	0.006	4
239.42	0.17		0.0063	0.0026	4	441.0					4
244.697	0.001	27.9	10.55	0.03	1	443.965	0.003	11.40	0.454	0.026	1
251.630	0.007	0.29	0.100	0.004	4	443.965	0.003		3.925	0.027	
269.86	0.06		0.0115	0.0011	4	482.31	0.03	0.11	0.0050	0.0022	4
271.131	0.008	0.31	0.262	0.008	4	482.31	0.03		0.041	0.003	
275.449	0.015	0.12	0.046	0.003	4	482.43					
285.98	0.03		0.0138	0.0011	4	488.679	0.002	1.54	0.5828	0.0046	3
295.939	0.002	1.67	0.622	0.007	3	493.508	0.020	0.25	0.035	0.004	4
315.174	0.017	0.19	0.182	0.005	4	493.508	0.020		0.041	0.003	
316.20	0.20		0.0030	0.0019		496.39	0.03		0.0071	0.0011	4
320.03	0.15		0.0022	0.0007	4	496.39	0.03		0.0152	0.0015	4
324.83	0.03	0.33	0.259	0.012	4	503.474	0.005	0.59	0.533	0.029	4
329.425	0.021	0.40	0.179	0.011	4	511.006			0.028		4
330.540	0.100		0.0082	0.0022		520.227	0.005	0.22	0.187	0.014	4
340.40	0.14		0.051	0.004	4	523.13	0.05		0.0209	0.0022	4
344.279	0.001	97.9	95.2	1.5	1	526.881	0.020		0.0471	0.0023	4
351.66	0.04		0.033	0.005	4	534.245	0.007	0.25	0.153	0.004	4
357.26	0.05		0.0056	0.0011	4	536.23					4
358.13					4	538.29	0.06		0.0054	0.0008	4
367.789	0.002	3.30	3.089	0.018	3						

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{152}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 13.537(6) yr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{151}\text{Eu}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	556.56	0.03	0.08	0.0257	0.0019	4
	557.91	0.17		0.016	0.007	
	561.2	0.5		0.0015	0.0003	4
	562.930	0.020		0.0037	0.0019	4
	563.990	0.007	1.91	0.681	0.009	3
	566.439	0.005	0.55	0.1795	0.0026	4
	571.83	0.08		0.0067	0.0011	4
	586.265	0.002	1.99	1.649	0.019	3
	595.61	0.12		0.045	0.015	4
	615.40	0.10				4
	616.05	0.03		0.0127	0.0011	4
	644.37	0.05		0.0086	0.0011	4
	656.487	0.005	0.76	0.2015	0.0026	4
	664.78	0.05		0.023	0.003	4
	671.155	0.017		0.0272	0.0022	4
D	674.675	0.003	0.61	0.0609	0.006	4
	674.675	0.003		0.240	0.006	
	678.623	0.005	1.94	1.692	0.015	3
	683.32	0.11		0.0045	0.0011	4
	686.61	0.05		0.0268	0.0022	4
	688.670	0.005	3.24	1.192	0.012	3
	696.87	0.19		0.022	0.011	4
	702.96					4
	703.25	0.06		0.0057	0.0019	4
	703.25	0.06		0.0124	0.0029	
	712.843	0.006	0.43	0.333	0.029	4
D	719.349	0.004	1.35	0.082	0.011	4
	719.349	0.004		0.387	0.011	
	727.99	0.14		0.0156	0.0011	4
	735.40	0.10		0.0082	0.0015	4
	756.12	0.09				4
	764.900	0.009	0.98	0.77	0.09	4
	768.944	0.009	0.45	0.130	0.006	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	778.904	0.002	48.0	46.45	0.09	1
	794.81	0.03	0.18	0.094	0.008	4
	805.70	0.07		0.0171	0.0015	4
	810.451	0.005	1.08	0.445	0.004	3
	839.36	0.04		0.0223	0.0015	4
	841.570	0.005	0.80	0.231	0.003	4
	867.373	0.003	15.5	5.906	0.029	1
	896.58	0.09		0.093	0.003	4
	901.181	0.011	0.43	0.120	0.006	4
	906.01	0.06		0.0227	0.0022	4
	919.330	0.003	1.85	0.594	0.008	3
	926.317	0.015	1.44	0.386	0.007	3
	930.580	0.015	0.49	0.262	0.007	4
	937.05	0.15		0.012	0.005	4
	958.63	0.05		0.030	0.003	4
D	963.390	0.012	53.5	0.188	0.004	1
	964.079	0.018		20.32	0.05	
	968.0			0.005	0.003	4
	974.09	0.04		0.0505	0.0029	4
	990.19	0.03	(0.30)	0.112	0.005	4
	1001.1	0.3		0.0063	0.0011	4
	1005.272	0.017	3.10	0.898	0.007	3
D	1084.0	1.0	38.85	0.343	0.011	1
	1085.869	0.024		14.20	0.04	
	1089.737	0.005	6.82	6.200	0.024	2
	1109.174	0.012		0.666	0.029	4
	1112.069	0.003	49.75	18.98	0.05	1
	1139.0	1.0		0.0018	0.0001	4
	1170.93	0.11		0.051	0.004	4
	1206.11	0.15		0.050	0.004	4
	1212.948	0.011	5.75	1.978	0.010	2
	1249.938	0.013	1.05	0.262	0.005	3
	1261.343	0.023		0.120	0.005	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{152}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

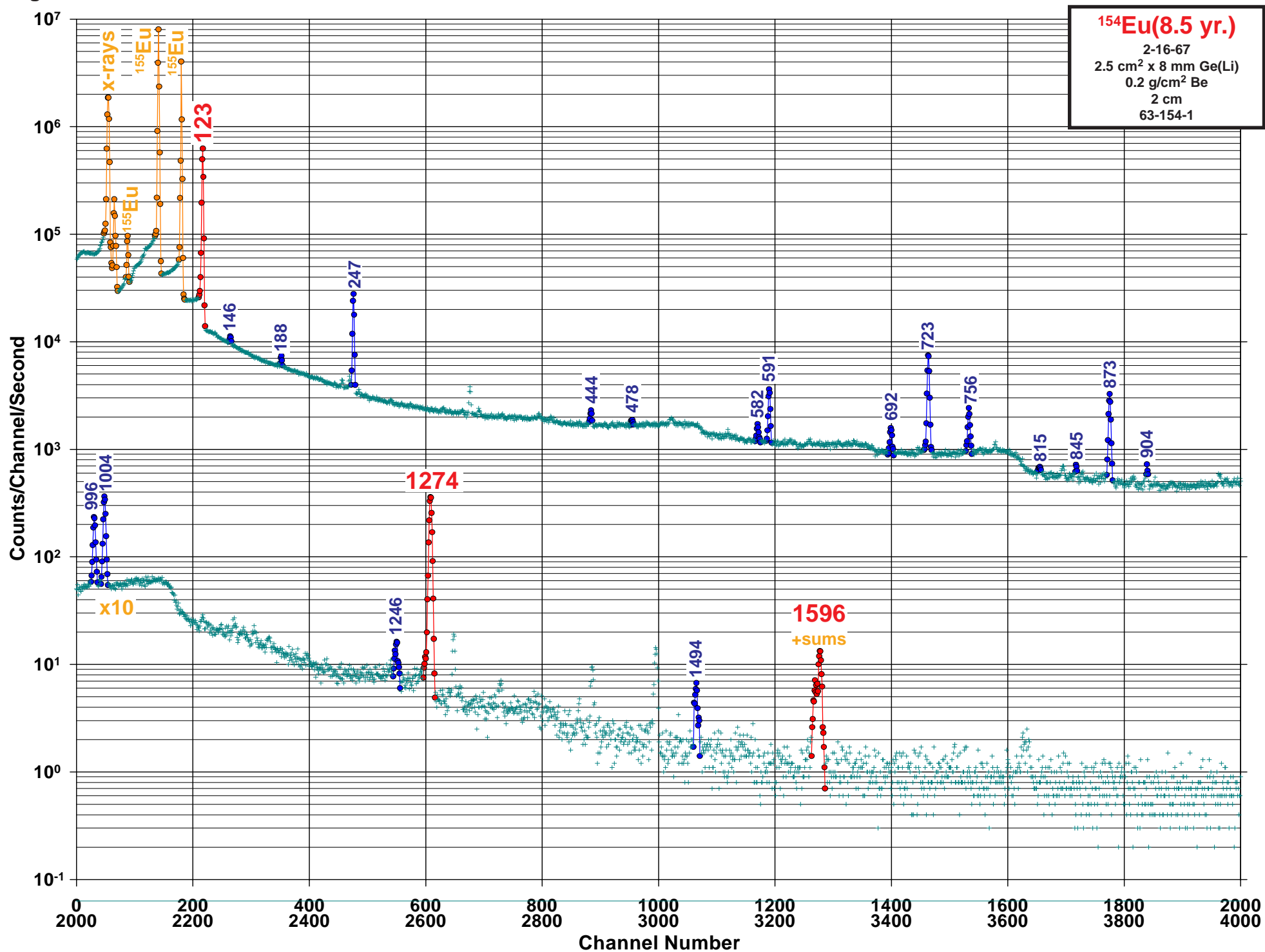
Half Life: 13.537(6) yr.

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{151}\text{Eu}(n,\gamma)$

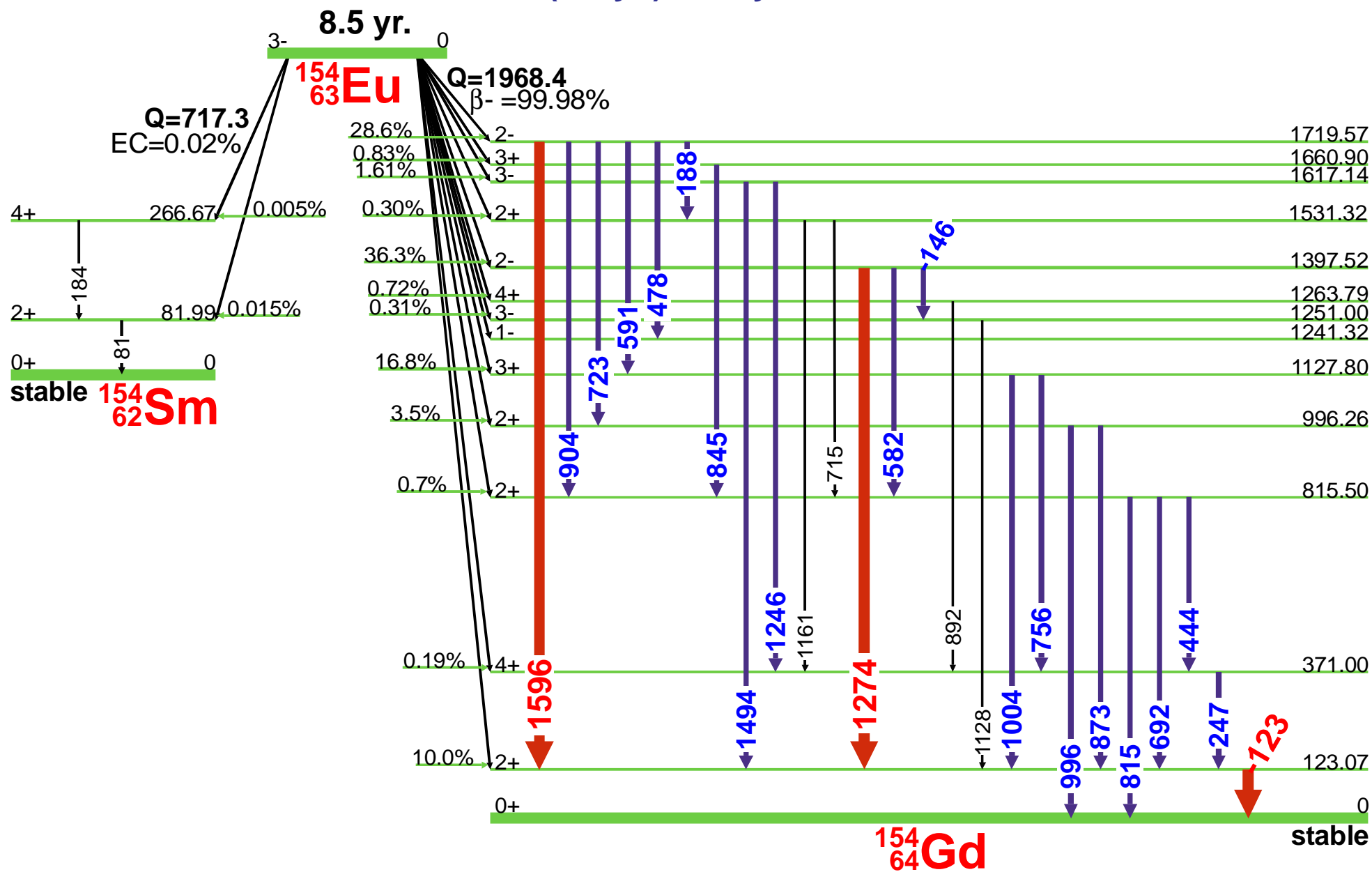
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1292.778	0.019	0.48	0.146	0.008	3
1299.140	0.009	6.15	5.826	0.029	1
1314.70	0.20		0.018	0.004	4
1315.31	0.23		0.0101	0.0022	4
1348.10	0.07	0.10	0.064	0.004	4
1363.77	0.05	0.10	0.0358	0.0015	4
1390.36	0.16		0.0067	0.0011	4
1408.006	0.003	78.10	29.22	0.07	1
1457.643	0.011	1.78	0.698	0.006	1

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1485.9	0.3		0.008	0.003	4
1528.103	0.018	1.00	0.391	0.006	1
1605.61	0.07	0.03	0.0293	0.0017	4
1608.36	0.08	0.02	0.0074	0.0005	4
1635.2	0.5		0.0002	0.0001	4
1647.41	0.14	0.03	0.0088	0.0008	4
1674.30	0.06		0.0086	0.0011	4
1698.1	0.4		0.0082	0.0026	4
1769.09	0.05	0.04	0.0133	0.0005	4





¹⁵⁴Eu(8.5 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{154}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 8.593(4) yr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{153}\text{Eu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
58.40			0.0038	0.0004	4
80.40			0.0030	0.0008	4
81.990	0.020		0.0034	0.0032	4
82.10			0.0031	0.0020	4
123.071	0.001	100.	40.6	0.4	1
125.4			0.0070	0.0021	4
129.5			0.0136	0.0020	4
131.58	0.05		0.0111	0.0005	4
134.8			0.0072	0.0004	4
146.05	0.05	1.03	0.0259	0.0010	4
156.2			0.0098	0.0004	4
159.9			0.0010	0.0005	4
162.1			0.0011	0.0004	4
165.7			0.0025	0.0004	4
180.7			0.0040	0.0005	4
184.68	0.08		0.0042	0.0030	4
184.7			0.0037	0.0007	4
188.252	0.008	0.51	0.239	0.005	4
195.5	0.5		0.0021	0.0010	4
197.0			0.00158	0.00017	4
209.4	0.4		0.0025	0.0004	4
219.4			0.0023	0.0005	4
229.0	0.5		0.0024	0.0006	4
232.01	0.05		0.0237	0.0009	4
237.7			0.0063	0.0024	4
247.930	0.008	16.8	6.91	0.05	2
260.2			0.0022	0.0006	4
267.5			0.007	0.008	4
267.5			0.007	0.008	4
269.8			0.0072	0.0008	4
274.0	0.5		0.00388	0.00018	4
279.9			0.00297	0.00014	4
290.0			0.00336	0.00018	4
295.7			0.00238	0.00014	4
296.0			0.0014	0.0010	4
301.3			0.0102	0.0004	4
305.1			0.0175	0.0007	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
308.2			0.0024	0.0006	4
312.3			0.0186	0.0014	4
315.4			0.0073	0.0014	4
320.0	1.0		0.0010	0.0007	4
322.01	0.05		0.0661	0.0018	4
329.6			0.0091	0.0005	4
346.72	0.05		0.0290	0.0010	4
368.2			0.00297	0.00014	4
370.7			0.0056	0.0010	4
375.2	0.5		0.0020	0.0006	4
382.00	0.05		0.0099	0.0004	4
397.1			0.0287	0.0010	4
401.258	0.014		0.1900	0.0021	4
403.55	0.05		0.0262	0.0010	4
414.3			0.00497	0.00024	4
419.4			0.0035	0.0014	4
422.0			0.0022	0.0008	4
435.9			0.0038	0.0010	4
444.490	0.006	1.83	0.562	0.006	4
463.9			0.00427	0.00024	4
467.84	0.05		0.0605	0.0018	4
478.27	0.04	0.82	0.2250	0.0018	4
480.6			0.00483	0.00028	4
483.7			0.00497	0.00028	4
484.6			0.00395	0.00021	4
488.3			0.0070	0.0024	4
506.5			0.0063	0.0010	4
510.6			0.059	0.007	4
512.0			0.031	0.007	4
518.00	0.05		0.0472	0.0021	4
532.0			0.0070	0.0024	4
532.8			0.0063		4
545.6			0.0144	0.0014	4
557.58	0.04		0.268	0.003	4
569.2			0.0100	0.0008	4
582.01	0.04	2.83	0.889	0.009	4
591.762	0.005	13.0	4.96	0.04	3
597.5			0.0055	0.0003	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{154}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 8.593(4) yr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{153}\text{Eu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
598.3			0.0062	0.0007	4
600.0			0.00046		4
602.81	0.05		0.0336	0.0014	4
613.26	0.05		0.093	0.004	4
620.5			0.0091	0.0005	4
625.254	0.007		0.318	0.004	4
642.4			0.0045	0.0014	4
649.44	0.05		0.078	0.003	4
650.6			0.0099	0.0004	4
664.68	0.05		0.0287	0.0010	4
668.9			0.0133	0.0018	4
676.600	0.012		0.157	0.007	4
692.425	0.004	4.91	1.792	0.015	3
715.76	0.05		0.188	0.009	4
723.305	0.005	54.3	20.11	0.15	2
737.6			0.0063	0.0024	4
756.804	0.005	12.8	4.54	0.04	3
774.4			0.008	0.004	4
790.1			0.0105	0.0021	4
800.3			0.032	0.005	4
815.53	0.06	1.74	0.513	0.005	4
830.3			0.008	0.003	4
845.39	0.05	1.90	0.588	0.005	4
850.64	0.05		0.242	0.004	4
873.190	0.005	31.9	12.20	0.08	2
880.61	0.03		0.081	0.004	4
892.781	0.009		0.515	0.005	4
898.4			0.0020	0.0005	4
904.076	0.006	2.48	0.893	0.007	4
906.1			0.0118	0.0006	4
919.2			0.0122	0.0006	4
924.56	0.07		0.0619	0.0021	4
928.4			0.0045	0.0021	4
981.3			0.0084	0.0014	4
984.5			0.0094	0.0018	4
996.262	0.006	30.26	10.53	0.07	2
1004.725	0.007	50.49	17.91	0.12	2
1012.80	0.20		0.0028	0.0028	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1023.0	1.0		0.0066	0.0018	4
1033.			0.0118	0.0006	4
1047.40	0.10		0.0497	0.0024	4
1049.40	0.10		0.0172	0.0007	4
1072.			0.0035	0.0014	4
1110.			0.0028	0.0021	4
1118.30	0.10		0.108	0.014	4
1124.			0.0069	0.0010	4
1128.560	0.008	1.53	0.318	0.004	4
1136.			0.0074	0.0010	4
1140.711	0.009		0.2355	0.0021	4
1153.1	0.5		0.0108	0.0024	4
1161.			0.0437	0.0018	4
1170.0	0.5		0.0036	0.0009	4
1189.			0.093	0.003	4
1217.			0.0034	0.0010	4
1232.			0.008	0.004	4
1241.60	0.20		0.133	0.005	4
1246.150	0.009	2.80	0.864	0.007	3
1274.436	0.006	95.0	35.0	0.3	1
1290.			0.0248	0.0024	4
1292.00	0.20		0.0127	0.0005	4
1295.50	0.20		0.0091	0.0006	4
1316.			0.017	0.004	4
1387.0	0.5		0.0192	0.0014	4
1400.			0.0031	0.0006	4
1408.40	0.20		0.0231	0.0018	4
1415.0	0.5		0.00399	0.00021	4
1418.60	0.20		0.0108	0.0014	4
1419.0	0.3		0.00196	0.00010	4
1425.6	0.6		0.0012	0.0005	4
1490.			0.0029	0.0003	4
1494.048	0.009	1.59	0.700	0.008	3
1510.0	0.5		0.0048	0.0008	4
1522.0	1.0		0.00060	0.00028	4
1531.4	0.3		0.0060	0.0004	4
1537.82	0.03		0.0528	0.0018	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{154}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

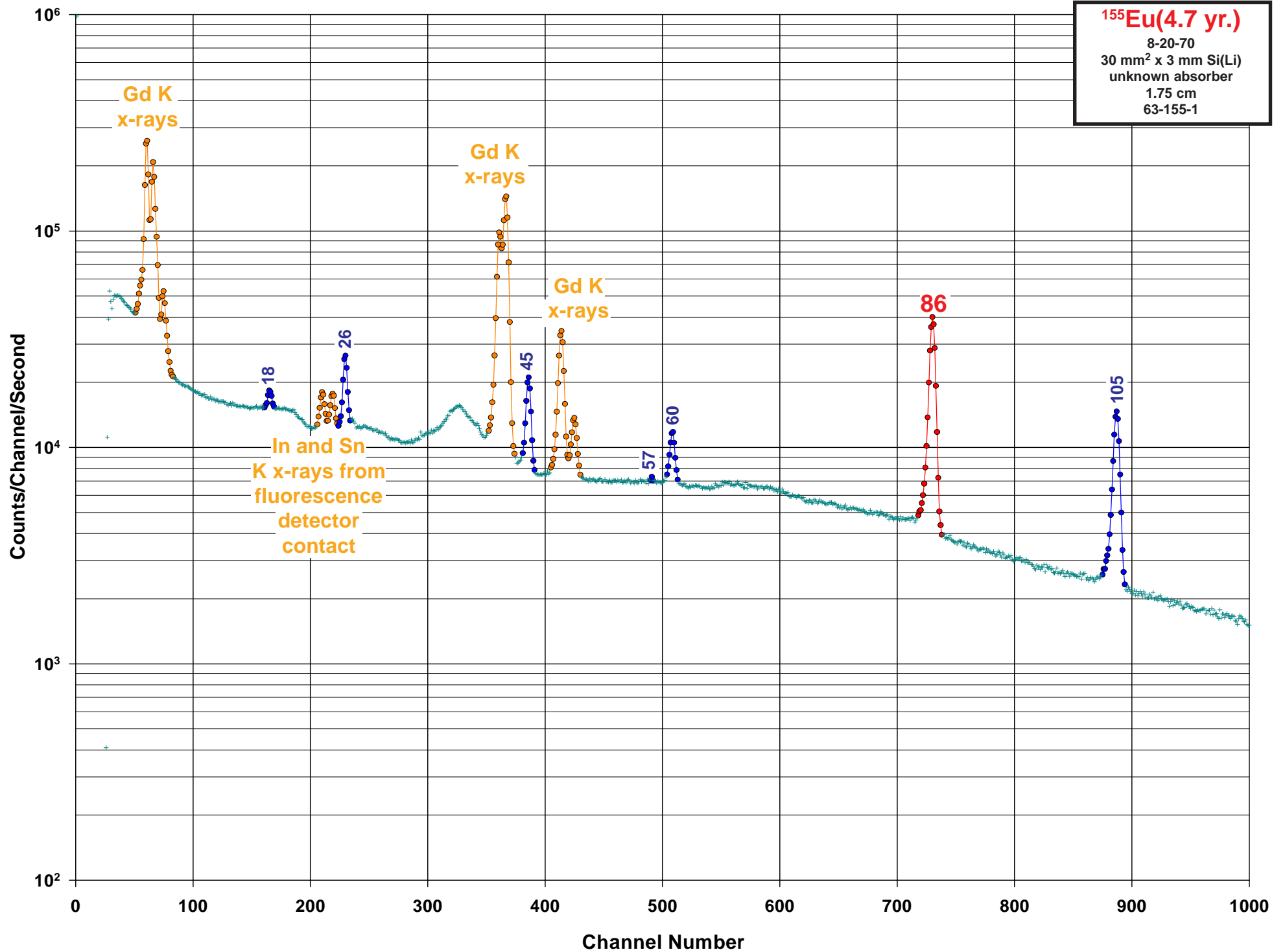
Half Life: 8.593(4) yr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{153}\text{Eu}(n,\gamma)$

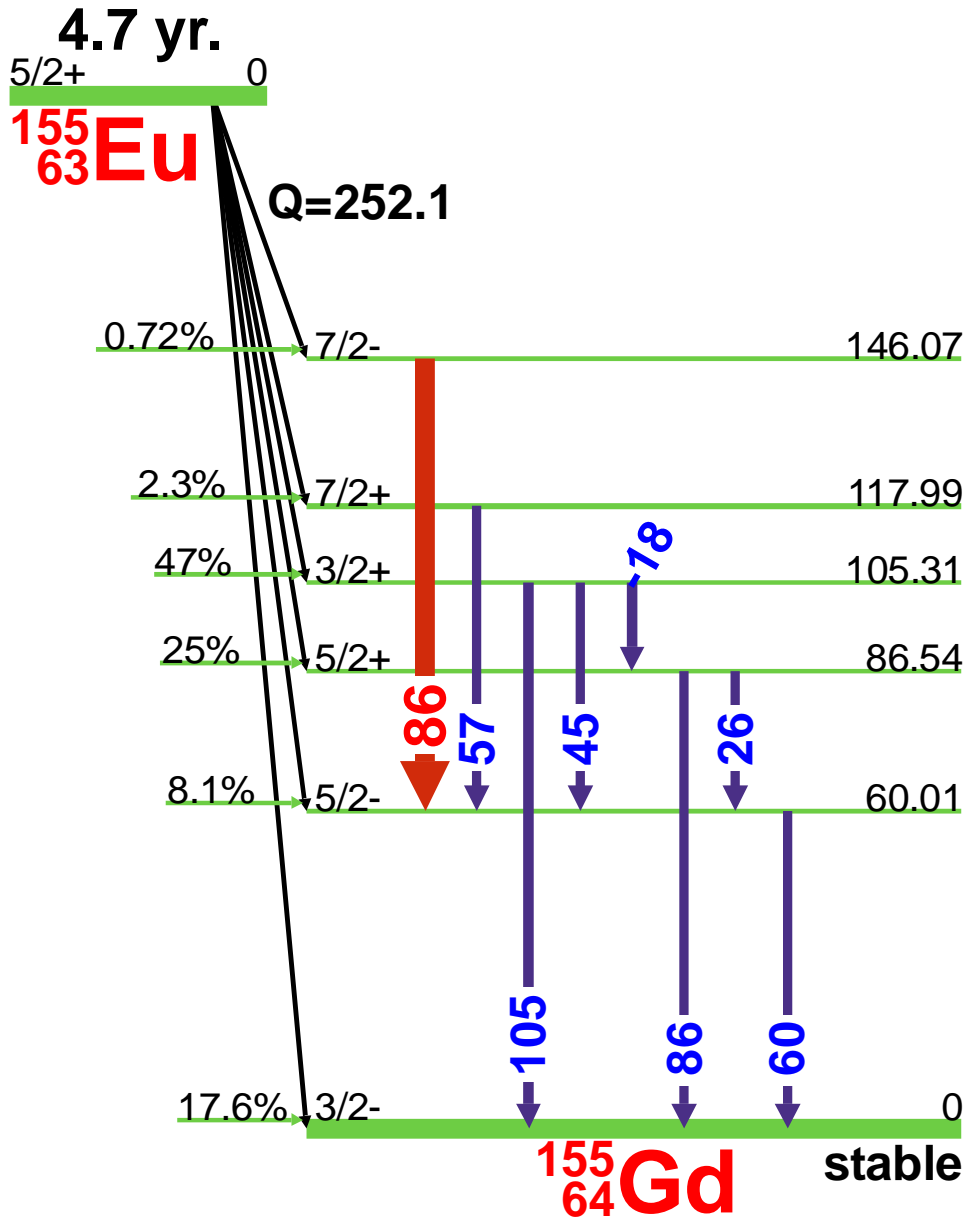
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1554.			0.0011	0.0005	4
1596.495	0.018	5.35	1.788	0.015	1
1667.30	0.20		0.00192	0.00024	4
1674.			0.00172	0.00024	4
1717.			0.00060	0.00024	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1773.0	1.0		0.00032	0.00014	4
1838.0	0.5		0.00084	0.00018	4
1895.0	1.0		0.00063	0.00018	4





¹⁵⁵Eu(4.7 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁵⁵Eu

Half Life: 4.7611(13) yr.

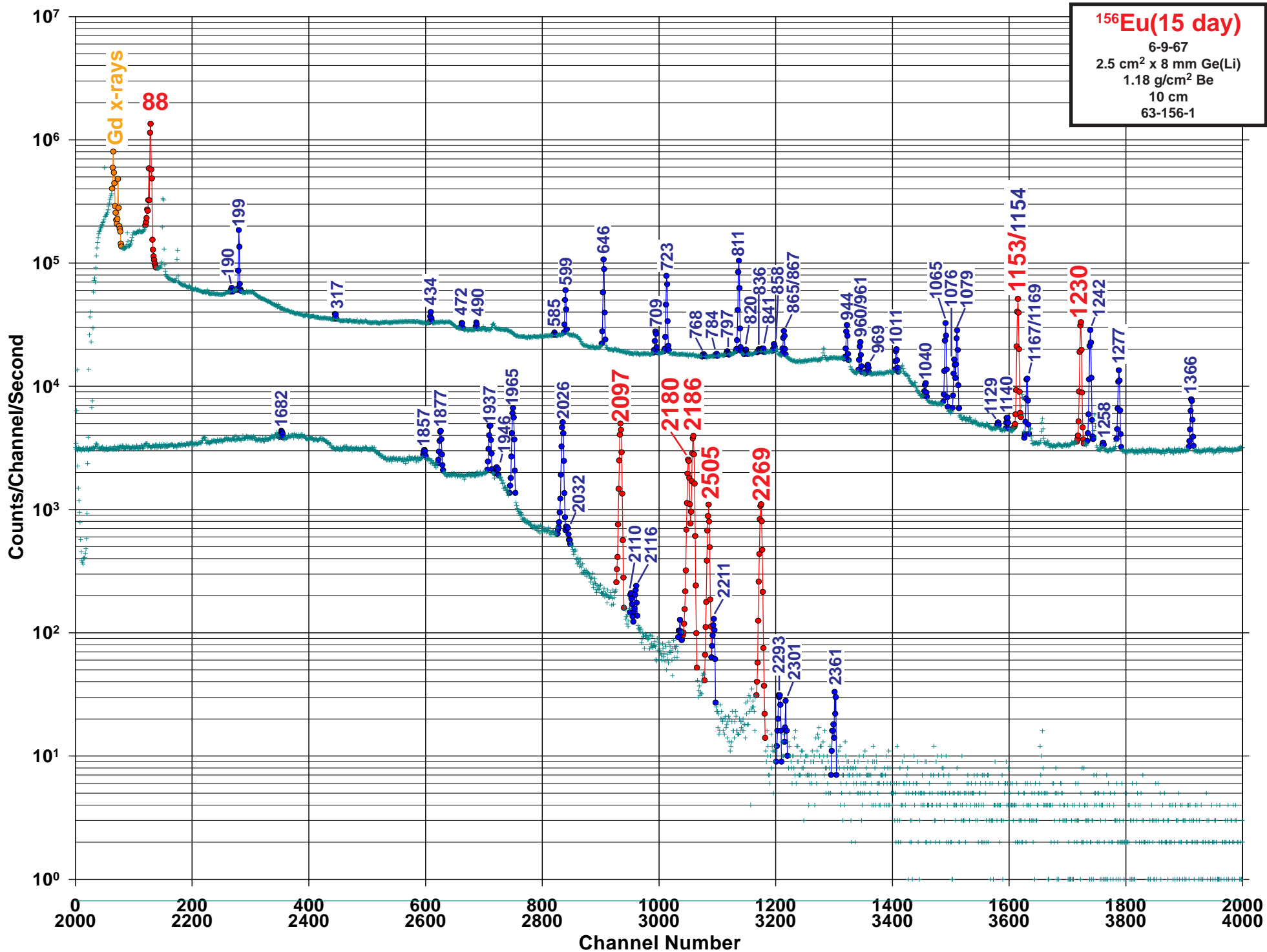
Detector: 30 mm² x 3 mm Si (Li)

Method of Production: ¹⁵⁴Sm(n, γ) β^-

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
10.49	0.04		0.0049	0.0005	4
12.70	0.25		0.010	0.006	4
13.80	0.25		0.020	0.006	4
18.764	0.002	0.16	0.049	0.012	4
21.036	0.004		0.0005		4
24.56	0.30		0.008	0.008	4
26.532	0.021	1.00	0.316	0.012	4
31.444	0.007		0.0071	0.0015	4
40.75	0.20		0.0264	0.0028	4
45.297	0.001	4.1	1.326	0.026	3
57.980	0.002		0.067	0.003	4
60.009	0.001	3.9	1.13	0.05	4
86.062	0.005	100.	0.150	0.015	1
86.545	0.003		30.7	0.6	
105.305	0.003	68.3	21.2	0.5	3
107.60	0.20		0.0004		4
146.061	0.015		0.0519	0.0028	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data



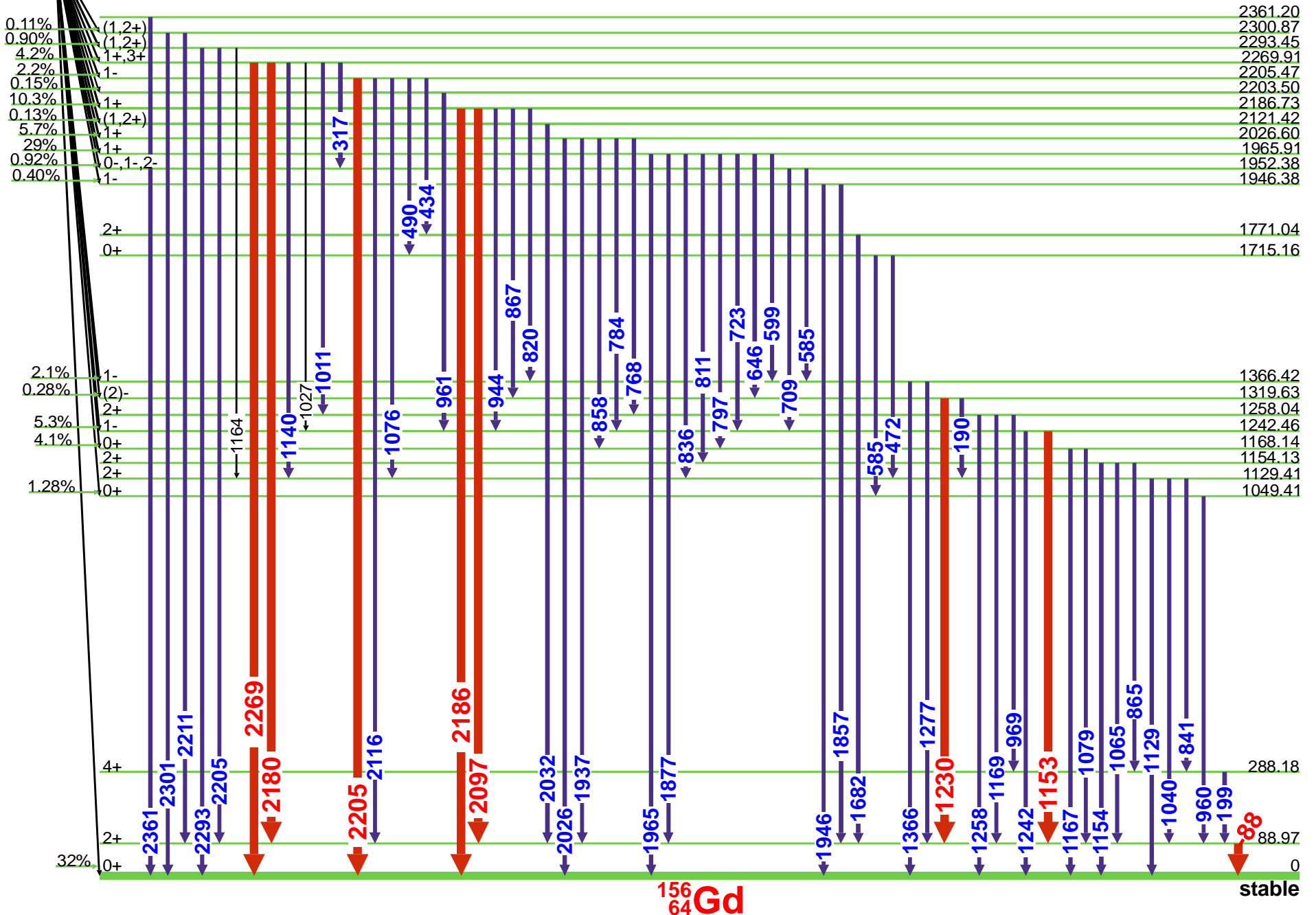


15 day

¹⁵⁶Eu(15 day) Decay Scheme

0+ ¹⁵⁶63Eu 0

Q=2451



¹⁵⁶64Gd

stable

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{156}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 15.19(8) day.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{155}\text{Eu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	
88.966	0.002	100.	8.4	1.1	1		811.77	0.05	21.5	9.7	0.8	2	
138.70	0.20		0.0079	0.0011	4		820.36	0.07	0.35	0.169	0.015	4	
160.20	0.20		0.0103	0.0014	4		836.52	0.07	0.24	0.082	0.008	4	
190.16	0.08	1.1	0.0165	0.0021	4		839.00	0.20		0.030	0.005	4	
199.216	0.005	1.3	0.74	0.07	3		841.16	0.10	0.49	0.208	0.018	4	
215.70	0.20		0.013	0.003	4		858.36	0.12	0.60	0.205	0.018	4	
244.7	0.3		0.009	0.003	4		865.8	0.3	3.34	0.188	0.019	4	
281.40	0.20		0.0078	0.0020	4	D	867.01	0.08		1.33	0.11		
290.49	0.15		0.0087	0.0021	4		872.39	0.09		0.040	0.006	4	
317.30	0.09		0.060	0.008	4		903.62	0.10		0.040	0.006	4	
335.69	0.11		0.0102	0.0016	4		916.4	0.4		0.032	0.006	4	
348.27	0.09		0.0136	0.0022	4		928.8	0.4		0.028	0.005	4	
354.20	0.09		0.0145	0.0023	4		944.35	0.07	5.32	1.33	0.11	3	
434.40	0.09	0.51	0.208	0.018	4		947.46	0.15		0.292	0.025	4	
472.70	0.06	0.38	0.144	0.012	4		960.50	0.08	3.54	1.45	0.12	3	
490.34	0.06	0.38	0.160	0.014	4	D	961.0	0.6		0.15	0.03		
494.90	0.15		0.014	0.004	4		963.0			0.034	0.006	4	
498.88	0.06		0.066	0.007	4		969.83	0.06	0.84	0.37	0.03	4	
554.66	0.06		0.018	0.004	4		1011.87	0.05	1.20	0.314	0.027	4	
585.90	0.06				4	D	1018.50	0.10		0.084	0.008	4	
585.90	0.06		0.047	0.004			1027.39	0.08	0.84	0.128	0.012	4	
599.47	0.05	4.67	2.08	0.17	3		1037.0			0.053	0.006	4	
626.0			0.022	0.004	4		1040.44	0.07	1.19	0.50	0.04	4	
632.79	0.08		0.039	0.006	4		1049.36	0.08				4	
646.29	0.05	14.0	6.3	0.5	2		1065.14	0.05	11.80	4.9	0.4	2	
660.0			0.014	0.004	4		1076.0		5.32	0.338	0.029	3	
665.8	0.3		0.0058	0.0005	4		1079.16	0.05	10.40	4.6	0.4	2	
707.10	0.20		0.065	0.007	4		1101.80	0.11		0.042	0.007	3	
709.86	0.05	2.0	0.88	0.07	4		1115.78	0.07		0.050	0.006	3	
723.47	0.05	12.0	5.4	0.4	2		1129.47	0.07	0.38	0.135	0.013	3	
768.56	0.07	0.2	0.087	0.008	4		1140.51	0.05	0.68	0.283	0.024	3	
778.0			0.026	0.004	4								
784.14	0.10		0.050	0.006	4		D	1153.67	0.10	28.0	6.8	0.6	1
797.73	0.06	0.2	0.109	0.010	4								



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{156}Eu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

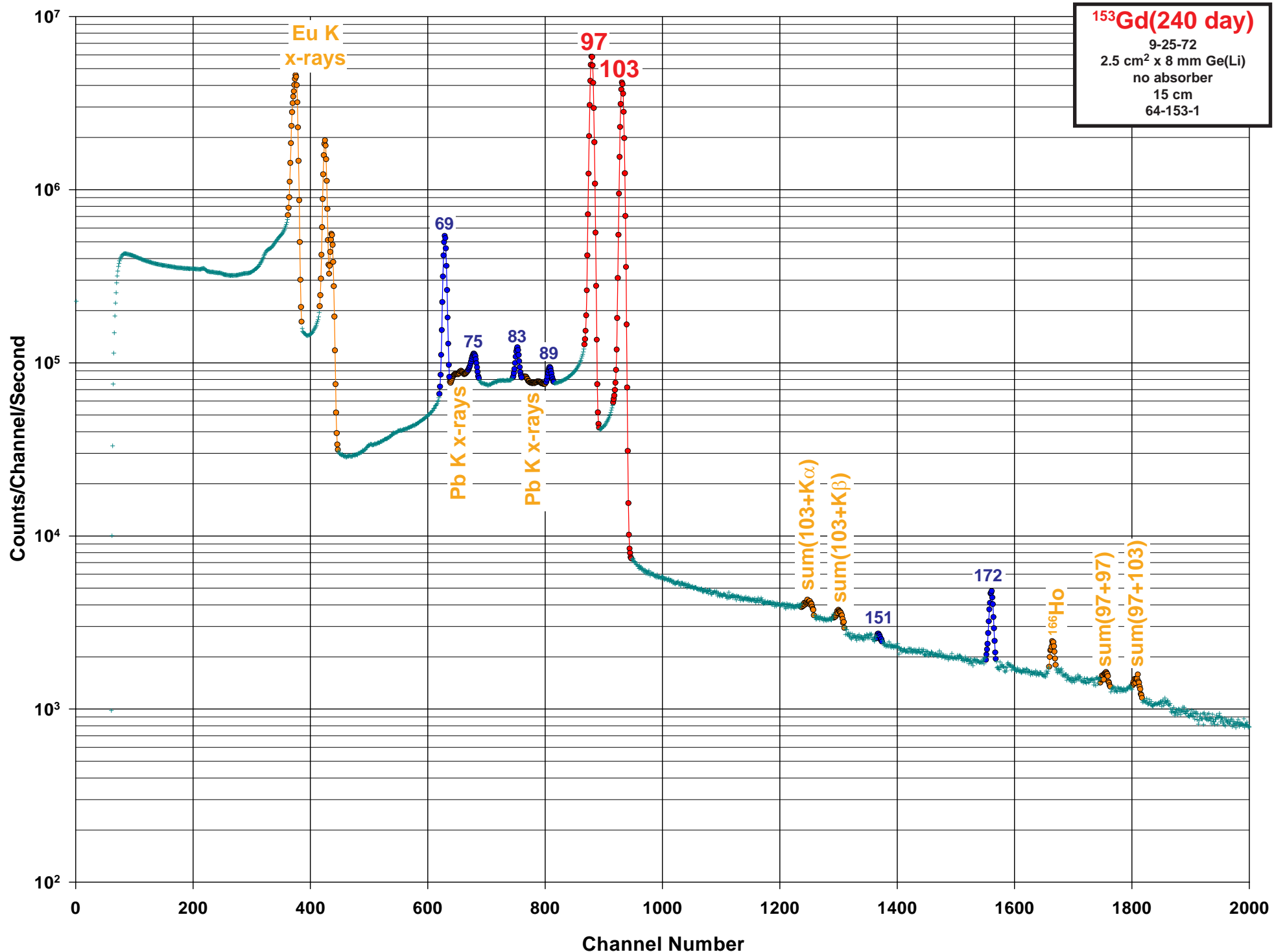
Half Life: 15.19(8) day.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{155}\text{Eu}(n,\gamma)$

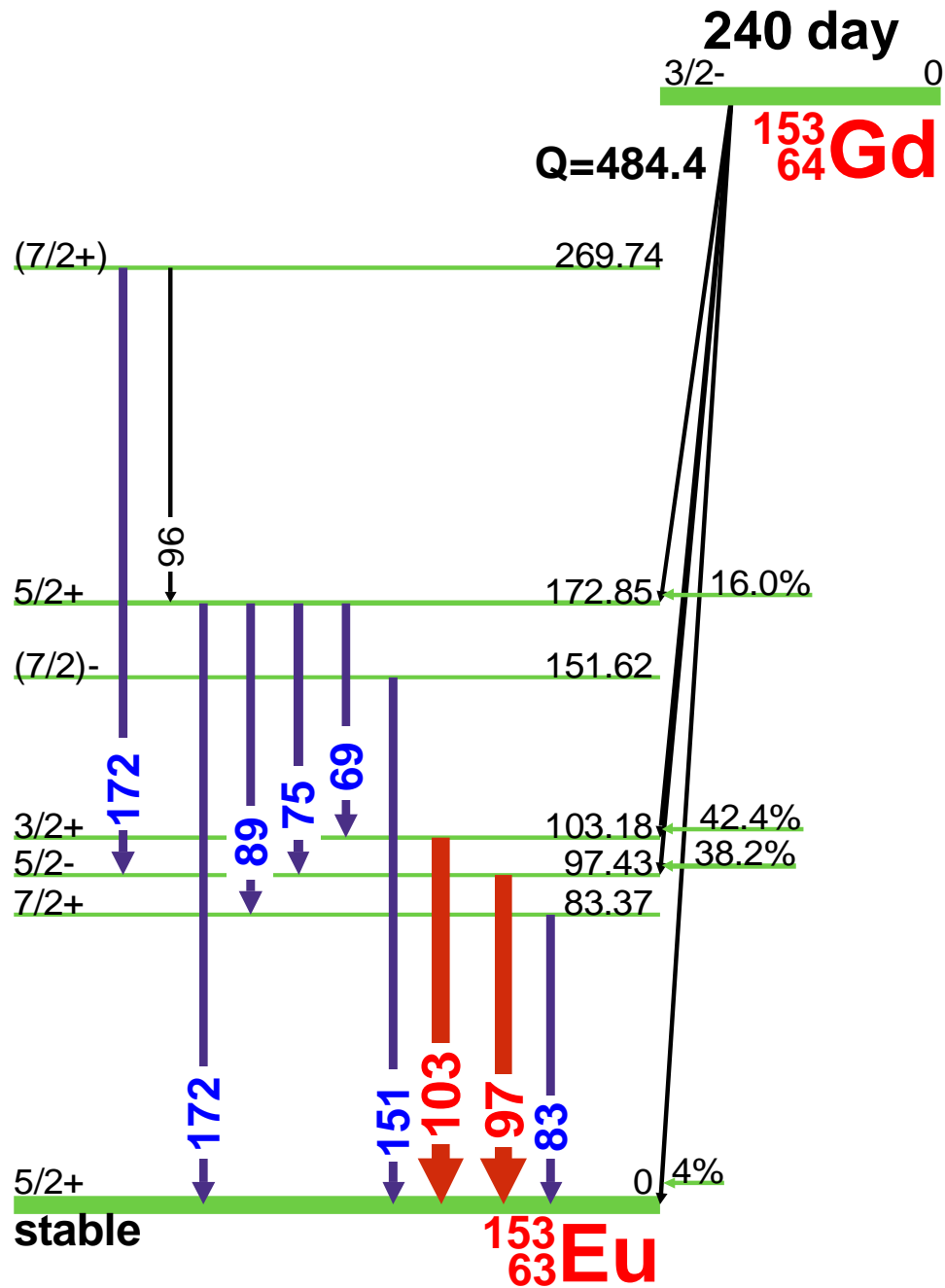
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	1153.67	0.10	28.0	6.8	0.6	1
	1154.08	0.10		4.7	0.4	
	1156.0			0.131	0.022	4
	1164.2	0.3	3.5	0.065	0.008	3
D	1167.90	0.10	0.69			4
	1169.12	0.05		0.266	0.022	
	1187.3	0.5		0.014	0.007	4
	1220.50	0.11		0.019	0.005	4
	1230.71	0.06	19.30	8.0	0.7	1
	1242.42	0.05	15.8	6.6	0.5	2
	1258.03	0.07	0.20	0.095	0.008	4
	1277.43	0.05	7.10	2.89	0.24	3
	1366.41	0.05	4.0	1.57	0.13	3
	1626.29	0.14		0.046	0.007	4
	1682.10	0.12	0.93	0.272	0.024	4
	1857.42	0.11	0.71	0.240	0.021	4
	1873.0			0.059	0.013	4
	1877.03	0.15	3.30	1.51	0.13	3
	1937.71	0.11	4.45	1.94	0.16	3
	1946.34	0.13	0.27	0.165	0.015	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1965.95	0.12	9.78	3.9	0.3	2
	2026.65	0.11	8.44	3.27	0.27	2
	2032.51	0.12	0.98	0.131	0.012	4
	2097.70	0.11	11.78	3.8	0.3	1
	2110.52	0.13	0.35	0.079	0.007	4
	2116.49	0.13	0.38	0.114	0.010	4
	2121.3	0.4		0.0047	0.0023	4
	2170.86	0.20		0.032	0.004	4
	2180.91	0.12	9.11	2.14	0.18	1
	2186.71	0.11	13.55	3.49	0.29	1
D	2205.38	0.13	3.78	0.88	0.07	1
	2205.4					
	2211.83	0.12	0.44	0.098	0.008	3
	2255.5	0.5		0.0060	0.0012	4
	2259.8	0.3		0.0114	0.0015	4
	2269.90	0.12	5.33	1.03	0.09	1
	2293.40	0.12		0.0224	0.0022	4
	2301.00	0.20		0.0104	0.0012	4
	2344.3	0.7		0.0040	0.0008	4
	2361.2	0.3		0.0168	0.0017	4





¹⁵³Gd(240 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁵³Gd

Half Life: 240.4(10) day.

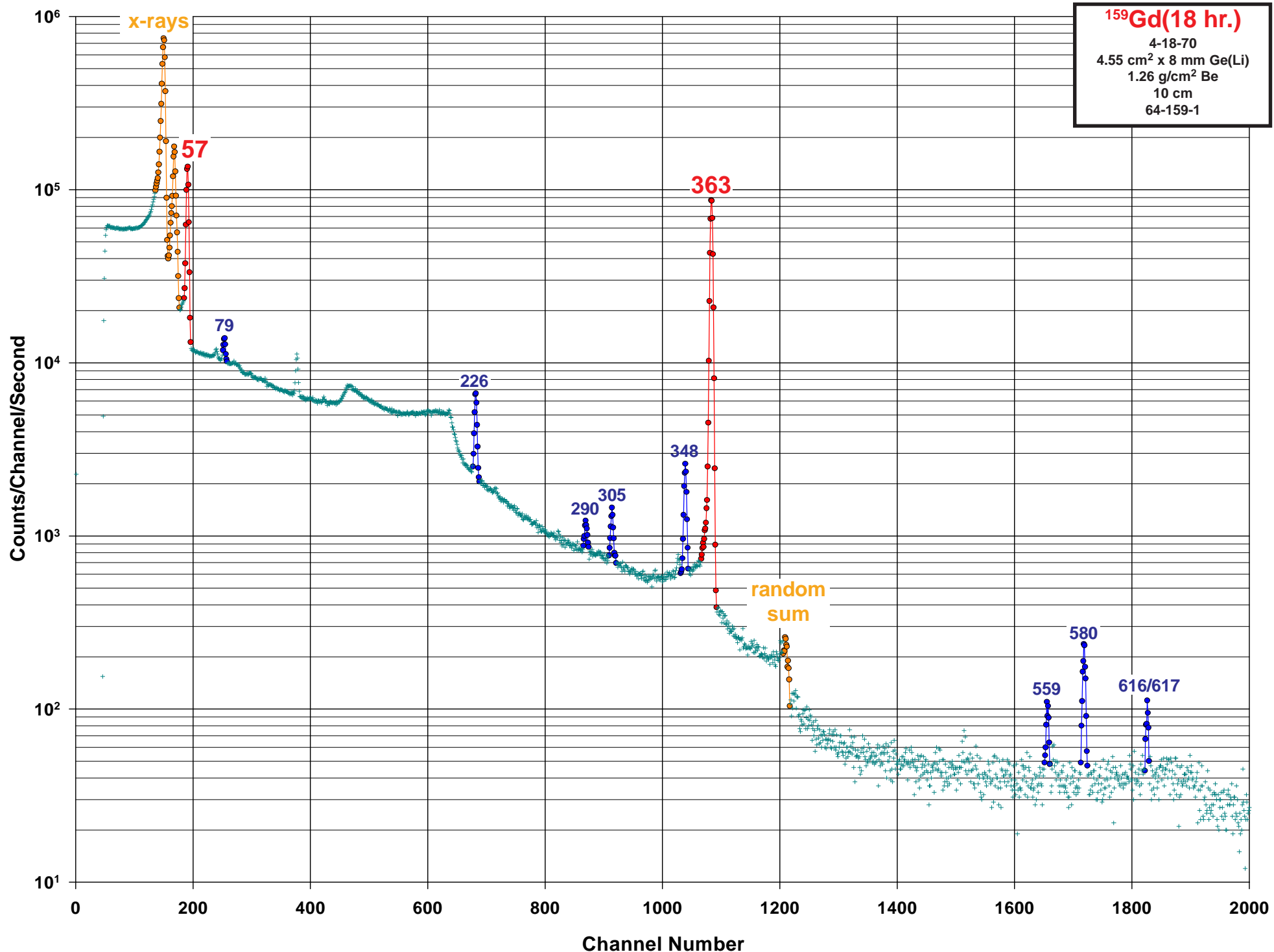
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁵²Gd(n,γ)

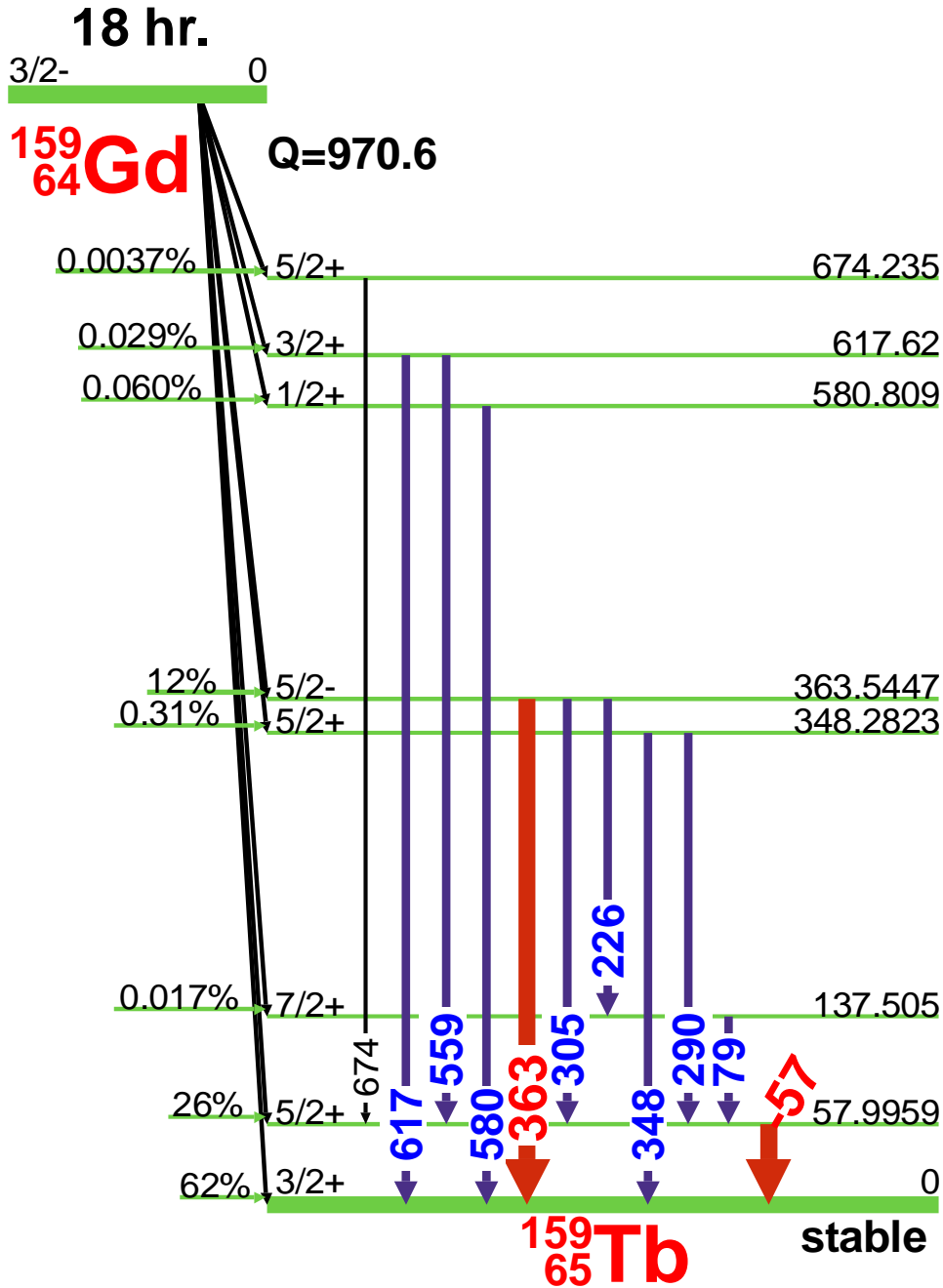
	E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
	14.064			0.0177	0.0027	4
	19.813					4
	21.200			0.0218	0.004	4
	54.193			0.0084	0.0020	4
	68.256			0.0162	0.0024	4
	69.673		7.8	2.42	0.07	2
	75.422		0.30	0.078	0.003	4
	83.367		0.80	0.196	0.007	4
	89.486		0.30	0.069	0.004	4
	96.882	0.001		0.0020	0.0020	
D	97.431		100.	29.0	0.8	1
	103.180		73.5	21.1	0.6	1
	118.112	0.001		0.0001	0.0001	4
	151.624	0.001	0.0130			4
	166.555	0.002		0.0003	0.0003	4
D	172.303	0.002		0.0002	0.0002	
	172.853		0.130	0.0360	0.0020	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁵⁹Gd(18 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁵⁹Gd

Half Life: 18.479(4) hr.

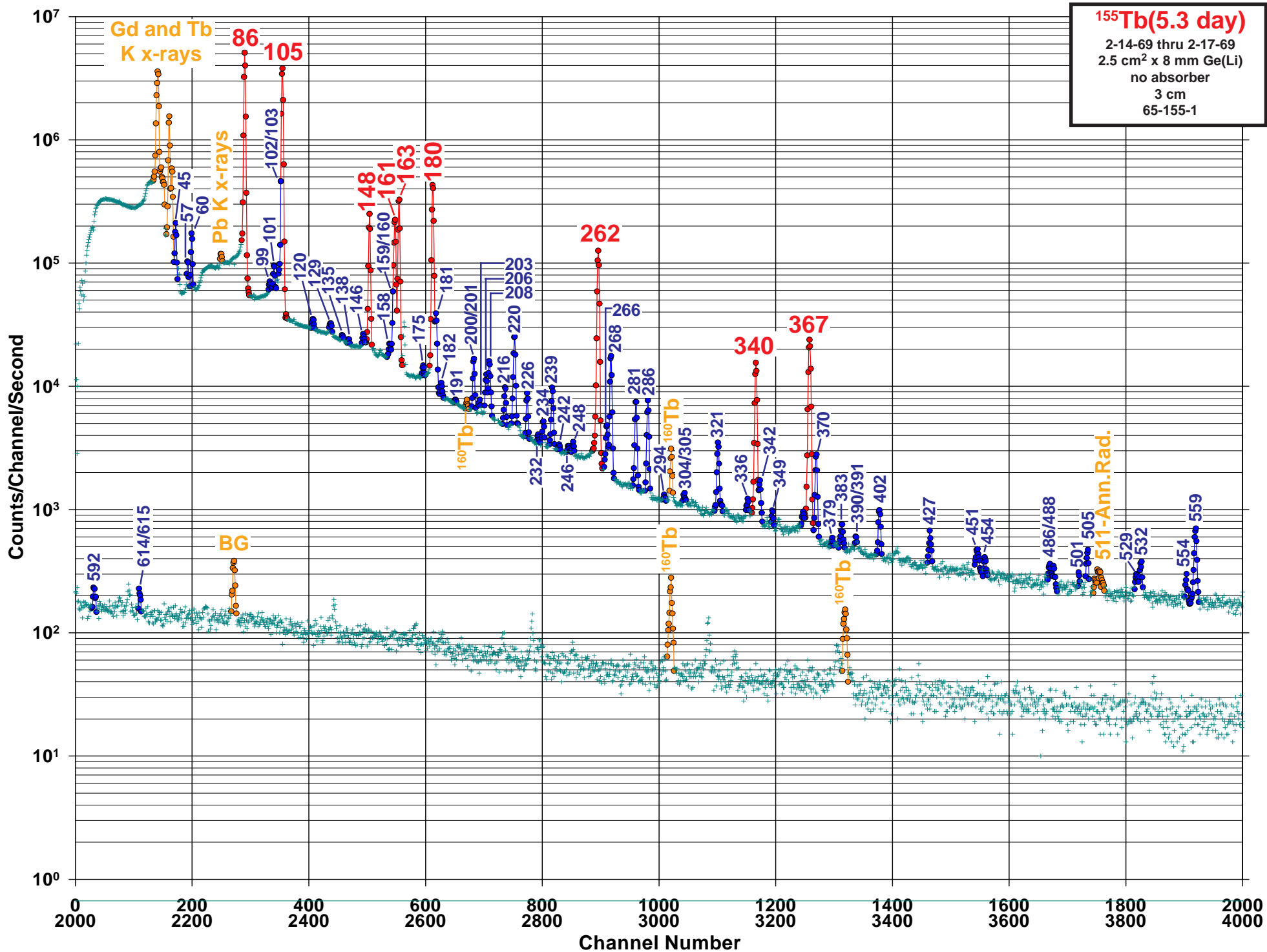
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ¹⁵⁸Gd(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
57.9998	0.0015	11.3	2.2	0.6	1
79.5131	0.0018	0.43	0.048	0.012	4
137.515	0.004		0.0063		4
210.7828	0.0024		0.02	0.005	4
226.0405	0.0011	1.74	0.22	0.06	3
237.341	0.004		0.0074		4
273.62	0.12		0.00068		4
274.163	0.018		0.0055		4
290.2864	0.0015	0.3	0.031	0.008	4
305.5491	0.0011	0.56	0.06	0.015	3
348.2807	0.001	2.03	0.23	0.06	3
363.543	0.001	100	11	3	1
536.78	0.18		0.0016		4
559.623	0.005	0.18	0.021	0.005	3
580.809	0.005	0.59	0.066	0.016	2
616.234	0.017		0.0018		
617.616	0.017	0.16	0.015	0.004	3
674.26	0.05		0.0003		4
753.74	0.06		0.00017		4
854.948	0.019		0.0024		4

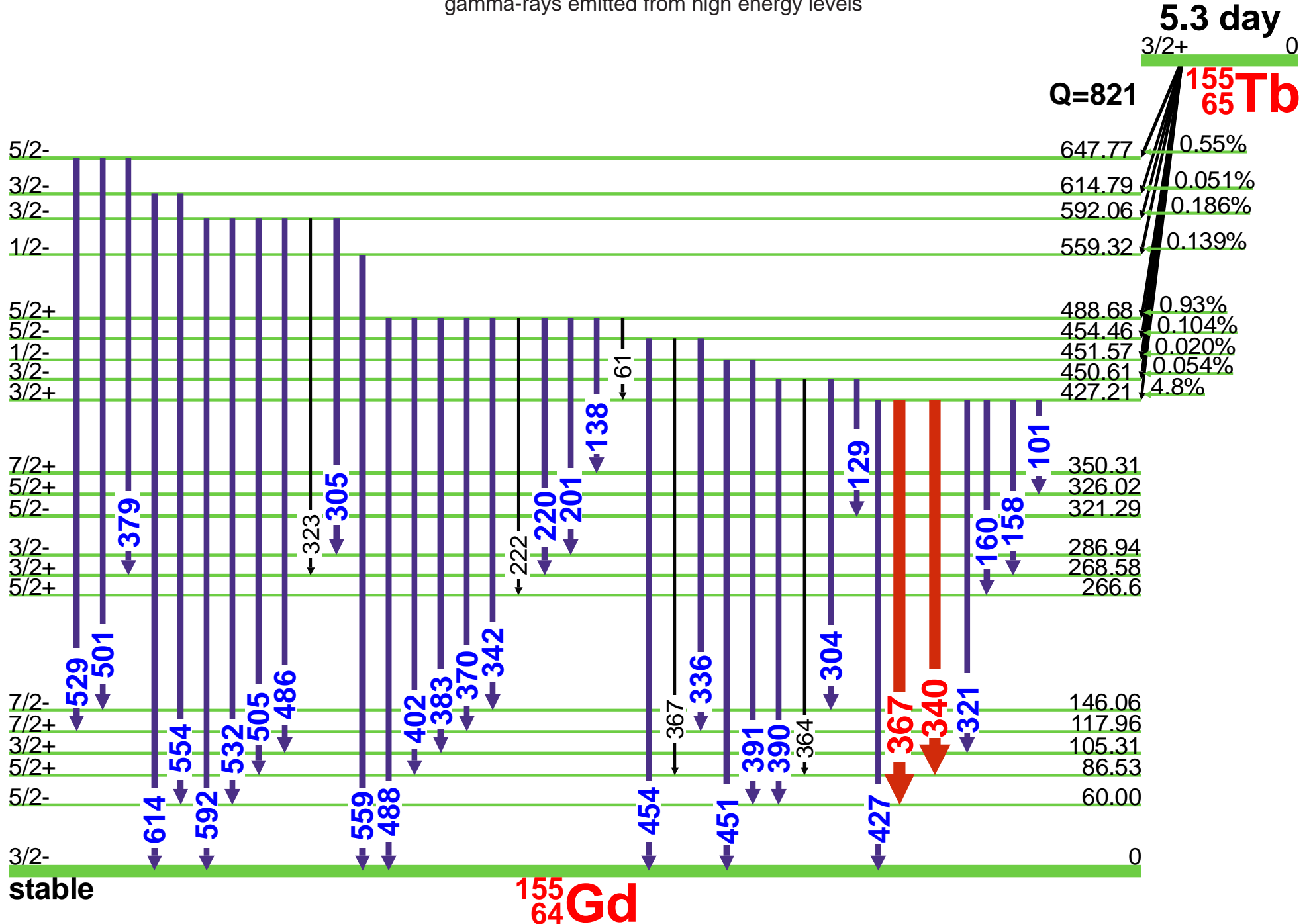
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





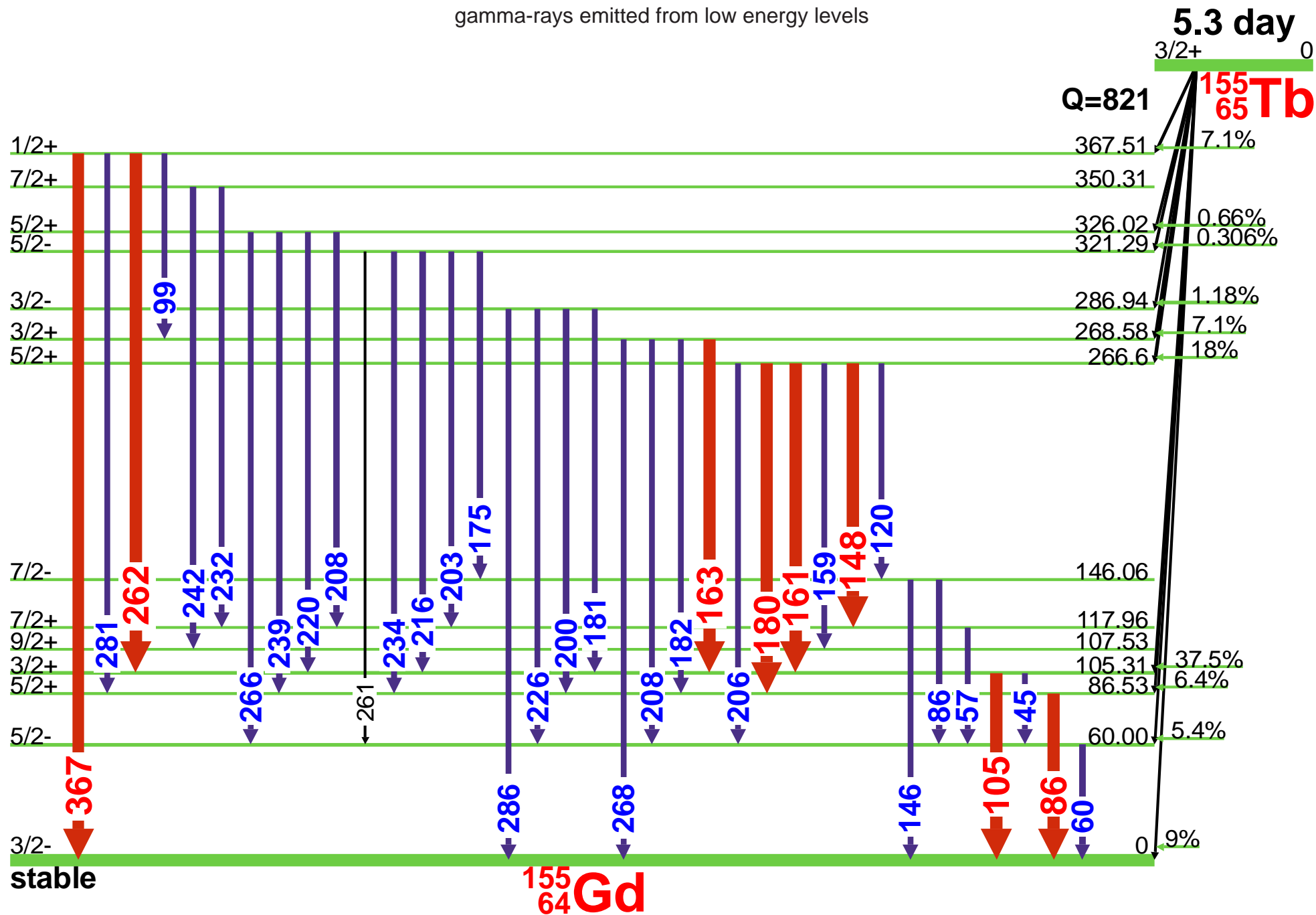
¹⁵⁵Tb(5.3 day) Decay Scheme

gamma-rays emitted from high energy levels



¹⁵⁵Tb(5.3 day) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{155}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 5.32(6) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{155}\text{Gd}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	10.49	0.04		0.015	0.005	4
	18.769	0.015		0.063	0.005	4
	20.999	0.023		0.0016	0.0001	4
	26.533	0.006		0.394	0.024	4
	31.43	0.09		0.022	0.005	4
	39.80					4
	40.70					4
	45.299	0.005		1.60	0.09	3
	55.650	0.008		0.0020	0.0015	4
	57.983	0.005	14.0	0.205	0.012	4
	59.63			0.021	0.004	4
	60.012	0.003	30.0	1.11	0.07	3
	61.49	0.04	0.5	0.029	0.004	4
	79.2			0.0251	0.0013	4
	80.60	0.10		0.015	0.010	4
	86.00	0.20		0.0151	0.0008	
D	86.55	0.03	1178.	32.0	1.8	1
	99.02	0.25	2.1	0.087	0.006	4
	101.160	0.010	8.8	0.161	0.013	4
D	102.40	0.10		0.015	0.005	4
	103.30	0.10	2.0	0.010	0.005	4
	105.318	0.003	1000.	25.1	1.3	1
	118.0			0.0025	0.0001	4
	120.6	0.3	3.0	0.069	0.007	4
	125.10	0.10		0.0050	0.0025	4
D	129.30	0.10		0.0005	0.0001	4
	129.30	0.10	2.8	0.006	0.004	4
	132.00	0.10		0.0075	0.0025	4
	136.20	0.10	0.78	0.0038	0.0025	4
	138.29	0.07	0.92	0.0241	0.0026	4
	141.50	0.10		0.0040	0.0020	4
	146.05	0.03	3.5	0.048	0.010	4
	148.640	0.010	105.	2.65	0.14	1
	150.63	0.05	1.1	0.0299	0.0023	4
	158.57	0.05	2.6	0.043	0.003	4
D	159.10	0.10		0.0075	0.0025	3
	160.51	0.10		0.78	0.04	3
	161.290	0.010	124.	2.76	0.15	1

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	162.650	0.020		0.0176	0.0009	4
	163.280	0.010	166.	4.44	0.23	1
	169.00	0.10		0.0025	0.0025	4
	175.290	0.020	1.3	0.044	0.005	4
	178.00	0.10		0.008	0.005	4
	180.080	0.010	278.	7.5	0.4	1
	181.69	0.09	20.1	0.422	0.022	3
	182.10	0.10	2.0	0.110	0.008	4
	185.30	0.10		0.008	0.005	4
	186.00	0.10		0.0013	0.0013	4
	188.30	0.10		0.0025	0.0010	4
	191.40	0.10	1.6	0.0009	0.0004	4
	193.319	0.004		0.0010	0.0002	4
D	200.411	0.004		0.230	0.013	
	201.0	1.0	8.5	0.013	0.008	3
	203.370	0.020	1.45	0.029	0.003	4
	206.540	0.020	7.2	0.171	0.015	3
D	208.05	0.05		0.231	0.017	
	208.58	0.05	11.9	0.058	0.013	3
	216.02	0.05	5.5	0.136	0.012	3
	218.40	0.10	0.5	0.008	0.005	4
D	220.07	0.05		0.166	0.010	
	220.70	0.05	25.8	0.508	0.027	2
	222.00	0.10	1.3	0.020	0.010	4
	226.950	0.010	5.9	0.148	0.008	3
	230.20	0.10		0.0018	0.0008	4
	232.330	0.020	1.1	0.0173	0.0022	4
	234.780	0.010	2.5	0.0331	0.0026	4
	237.5	0.4		0.0028	0.0020	4
	239.450	0.010	9.1	0.227	0.012	3
	242.800	0.020	0.75	0.0156	0.0011	4
	245.00	0.09		0.0028	0.0015	4
	246.05	0.09	0.84	0.0013	0.0005	4
	248.60	0.10	1.04	0.0050	0.0025	4
D	261.250	0.010		0.040	0.007	
	262.270	0.010	204.	5.29	0.28	1
	266.02	0.08		0.0028	0.0003	3
	268.560	0.010	26.6	0.71	0.06	2



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{155}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

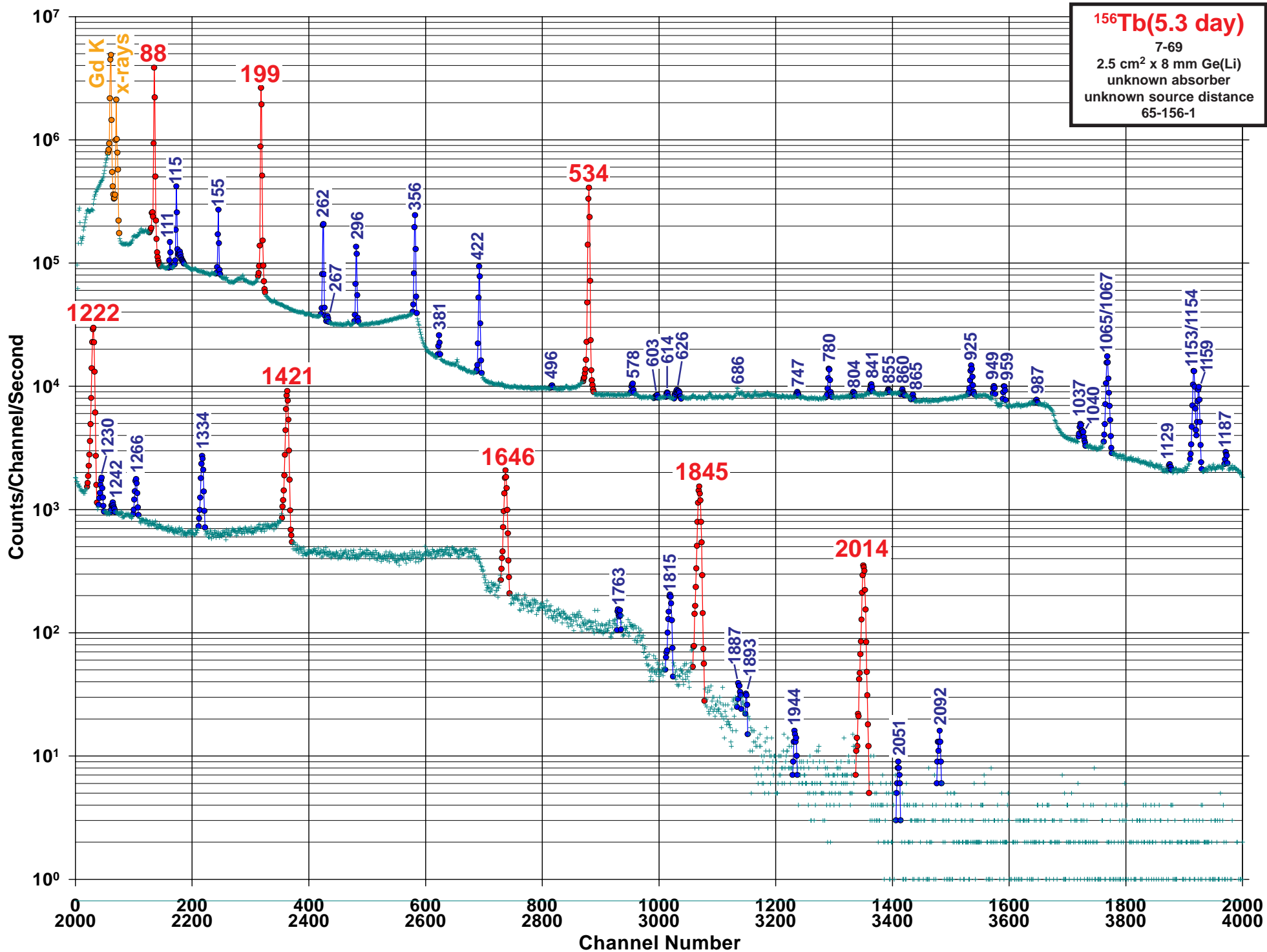
Half Life: 5.32(6) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{155}\text{Gd}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	271.0	0.5		0.0020	0.0013	4
	275.38	0.08		0.0030	0.0013	4
	278.60	0.10		0.0025	0.0025	4
	281.060	0.010	11.8	0.302	0.016	2
	286.960	0.010	12.0	0.317	0.018	2
D	290.20	0.10		0.0020	0.0008	4
	290.20	0.10		0.0020	0.0008	4
	294.75	0.15	0.17	0.0013	0.0005	4
	303.10	0.10		0.0023	0.0015	4
D	304.6	0.5	0.74	0.0005	0.0001	4
	305.11	0.10		0.0030	0.0013	4
	309.21	0.03		0.0048	0.0008	4
	317.90	0.10		0.0020	0.0010	4
	321.830	0.010	6.9	0.181	0.012	3
	323.53	0.08		0.023	0.008	4
	325.44	0.09		0.0045	0.0013	4
	328.1	0.3		0.0020	0.0010	4
	336.560	0.010	0.67	0.033	0.003	4
	340.670	0.010	43.0	1.18	0.07	1
	342.58	0.05	3.43	0.0078	0.0020	3
	344.0	0.9		0.008	0.008	4
	346.036	0.025		0.0065	0.0011	4
	349.1	0.9	0.90	0.0010	0.0004	4
	364.060	0.010	0.8	0.0115	0.0021	4
	367.360	0.010		0.78	0.13	1
D	367.360	0.010	92.0	1.48	0.19	1
	367.929	0.001		0.050	0.006	4
	370.730	0.010	8.5	0.228	0.013	2
	379.14	0.03		0.0070	0.0020	4
	381.06	0.03		0.0053	0.0006	4
	383.350	0.010	1.26	0.026	0.004	4
D	390.620	0.010	0.74	0.019	0.004	4
	391.600	0.010		0.0030	0.0013	4
	394.6	0.5		0.0020	0.0013	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	396.0	0.5		0.0020	0.0003	4
	402.160	0.010	3.09	0.072	0.006	3
	427.180	0.010	1.96	0.0274	0.0016	4
	428.70	0.10		0.0010	0.0005	4
	445.980	0.010		0.0098	0.0023	4
	450.640	0.020		0.0281	0.0027	4
	451.600	0.020	1.91	0.0098	0.0023	4
	454.450	0.010	0.89	0.0198	0.0023	4
	474.11	0.15		0.0004		4
	484.80	0.10		0.0003	0.0002	4
	486.88	0.15		0.0241	0.0024	4
	488.65	0.15	1.98	0.017	0.003	4
	493.90	0.10		0.0004	0.0002	4
	496.10	0.10		0.0005	0.0002	4
	499.24	0.06		0.0009	0.0002	4
	501.70	0.07		0.0115	0.0010	4
	505.520	0.010	2.00	0.045	0.004	3
	509.70	0.20		0.0003	0.0001	4
Ann.	511.009					
	512.89	0.09		0.0013	0.0002	4
	529.76	0.06	0.90	0.0118	0.0021	4
	532.09	0.05	1.7	0.045	0.007	4
	538.15	0.03		0.0003	0.0002	4
	542.45	0.03		0.0040	0.0020	4
	554.780	0.010	0.86	0.0198	0.0025	4
	559.320	0.010	5.1	0.136	0.010	3
	587.69	0.04		0.0040	0.0008	4
	592.080	0.010	0.75	0.0196	0.0022	4
	598.96	0.06		0.0023	0.0003	4
	603.25	0.15		0.0008	0.0005	4
D	614.800	0.010	1.14	0.0304	0.0026	4
	615.70	0.10		0.0020	0.0015	4
	634.51	0.09		0.0009	0.0004	4
	647.730	0.010		0.0141	0.0015	4
	658.93	0.15		0.0003	0.0001	4





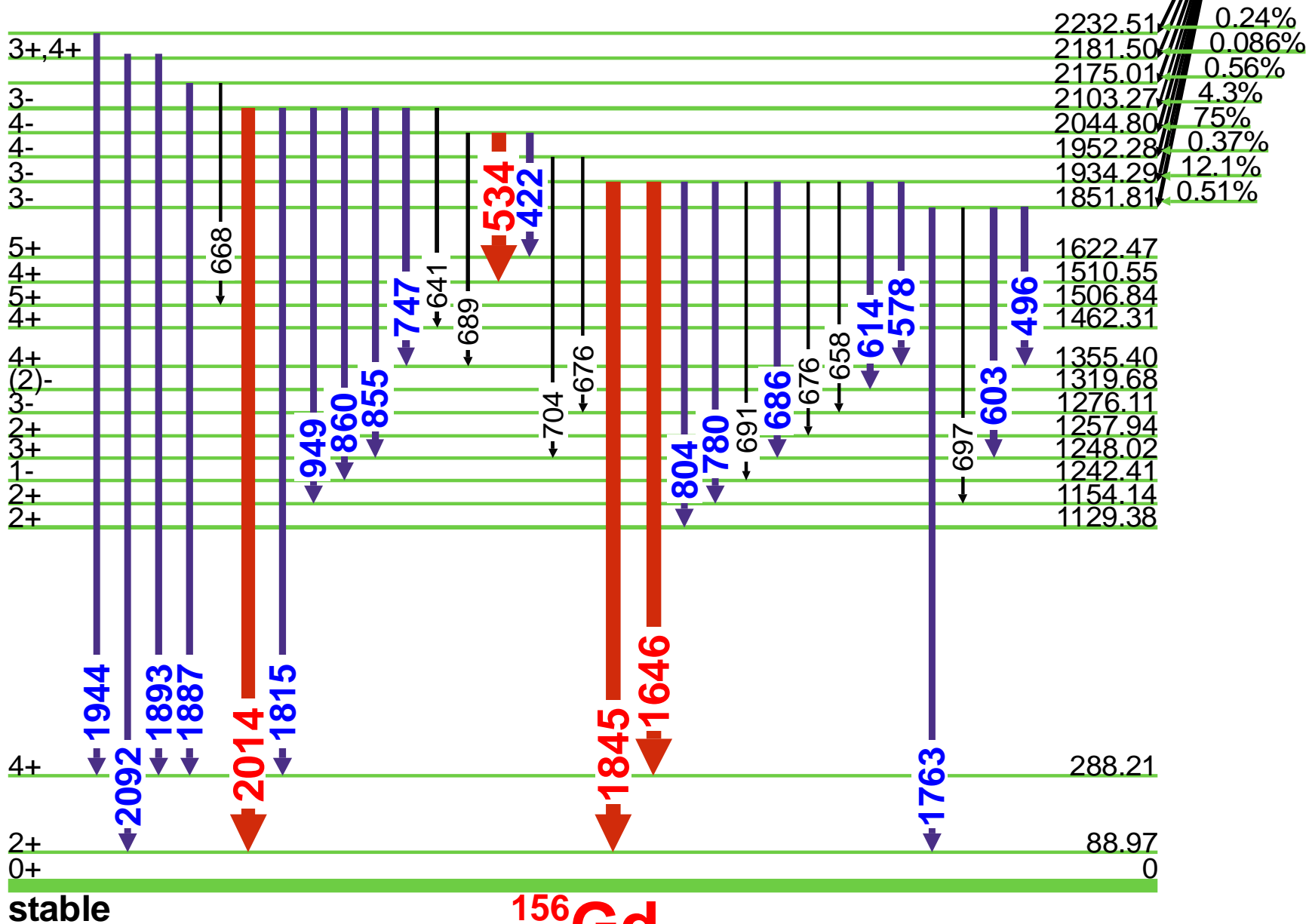
¹⁵⁶Tb(5.3 day) Decay Scheme

gamma-rays emitted from high energy levels

5.3 day

Q=2444

¹⁵⁶₆₅Tb

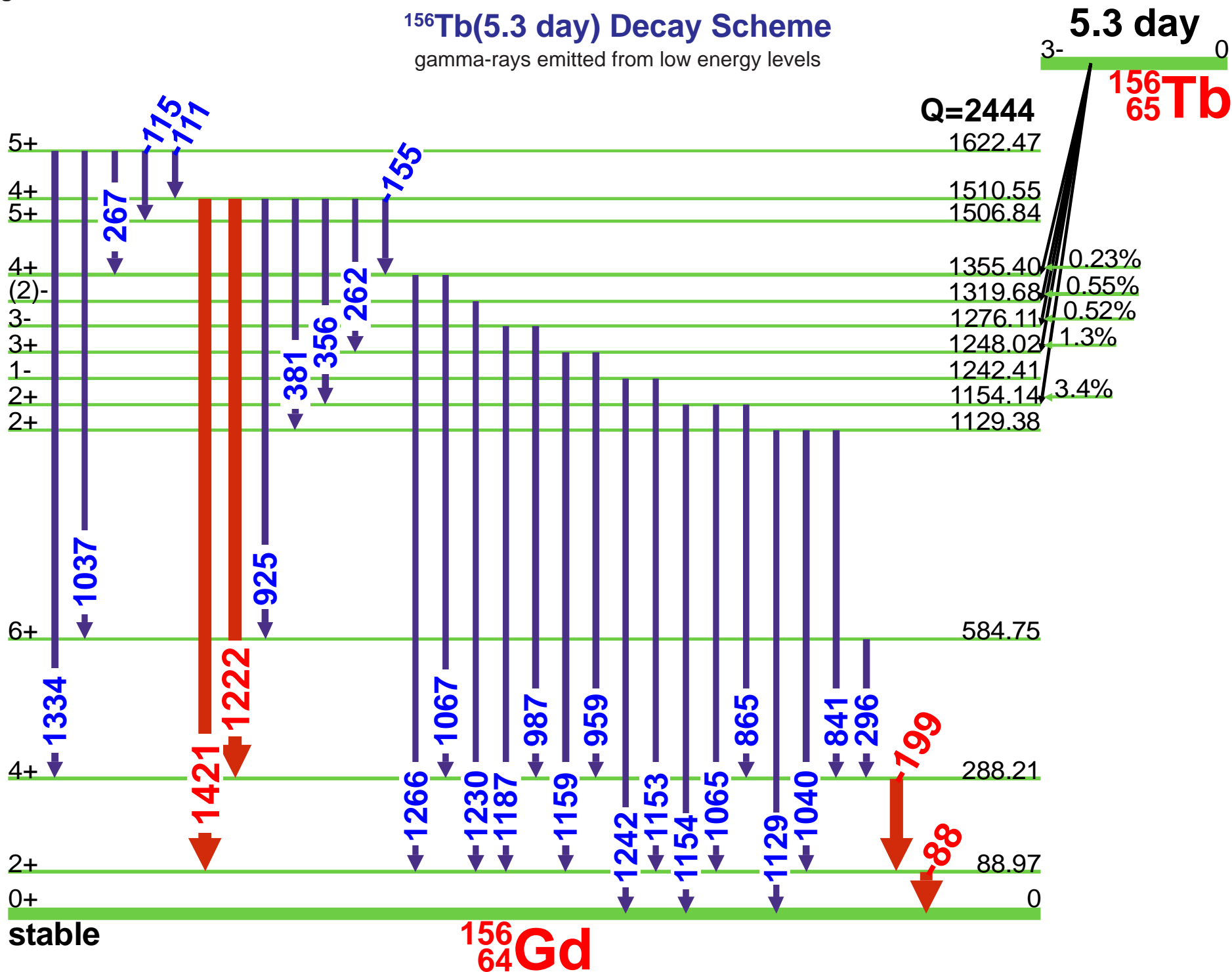


¹⁵⁶₆₄Gd



¹⁵⁶Tb(5.3 day) Decay Scheme

gamma-rays emitted from low energy levels



¹⁵⁶₆₄Gd



GAMMA-RAY ENERGIES AND INTENSITIES (Page 1 of 2)

Nuclide: ^{156}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 5.35(10) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{156}\text{Gd}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
88.970	0.020	46.2	17.7	2.5	1
111.93	0.03	4.10	1.49	0.21	3
115.61	0.03	0.15	0.053	0.013	4
155.15	0.03	4.58	1.58	0.20	3
199.19	0.04	115.7	41.0	5.	1
201.25	0.04				4
212.74	0.04		0.040	0.010	4
249.2	0.4		0.022	0.006	4
262.54	0.04	16.3	5.8	0.6	2
267.07	0.04	0.20	0.068	0.029	4
296.49	0.04	12.7	4.5	0.4	3
350.41	0.05				4
356.38	0.05	38.8	13.6	1.3	2
374.46	0.05		0.050	0.010	4
381.10	0.05	2.00	0.66	0.07	4
395.41	0.05				4
407.1	0.3		0.062	0.011	4
422.34	0.06	23.0	8.0	0.8	2
445.45	0.05		0.050	0.010	4
496.37	0.06	0.25	0.078	0.012	4
526.80	0.06		0.013	0.008	4
534.29	0.06	197.	67.	6.	1
537.98	0.06		0.194	0.020	4
567.61	0.06		0.022	0.007	4
576.2			0.044	0.009	4
578.91	0.06	1.20	0.45	0.04	4
582.6			0.058	0.009	4
592.60	0.10		0.034	0.008	4
596.81	0.06		0.040	0.008	4
603.75	0.10	0.34	0.108	0.013	4
609.47	0.10		0.024	0.008	4
614.63	0.10	0.56	0.204	0.021	4
626.28	0.10	0.77	0.277	0.028	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
629.10	0.10				4
632.67	0.10				4
634.0			0.016	0.006	4
636.31	0.10				4
641.01	0.10	0.33	0.071	0.011	4
651.10	0.10		0.012	0.006	4
658.12	0.10	0.58	0.179	0.019	4
668.17	0.10	0.26	0.071	0.011	4
673.60	0.10		0.025	0.009	4
676.13	0.10	0.35	0.0155	0.0015	4
676.13	0.10		0.143	0.014	
686.31	0.10	1.33	0.43	0.04	4
689.40	0.10	0.47	0.168	0.019	4
691.81	0.10	0.75	0.213	0.022	4
697.71	0.10	0.50	0.140	0.016	4
704.32	0.10	0.74	0.133	0.016	4
706.55	0.10				4
716.99	0.10	0.29	0.087	0.012	4
736.80	0.10		0.022	0.010	4
747.82	0.10	0.72	0.270	0.028	4
766.83	0.10		0.025	0.010	4
770.57	0.10		0.025	0.010	4
780.08	0.10	6.78	2.35	0.23	4
783.69	0.10		0.078	0.012	4
796.56	0.10		0.016	0.006	4
804.82	0.10	0.80	0.232	0.024	4
816.19	0.10		0.046	0.010	4
819.72	0.10		0.031	0.010	4
827.11	0.10		0.040	0.013	4
841.08	0.10	0.80	0.276	0.029	4
845.57	0.10		0.040	0.013	4
855.24	0.10	0.83	0.276	0.029	4
860.88	0.10	0.29	0.211	0.024	4
865.77	0.10	0.99	0.40	0.04	4



GAMMA-RAY ENERGIES AND INTENSITIES (Page 2 of 2)

Nuclide: ^{156}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 5.35(10) day

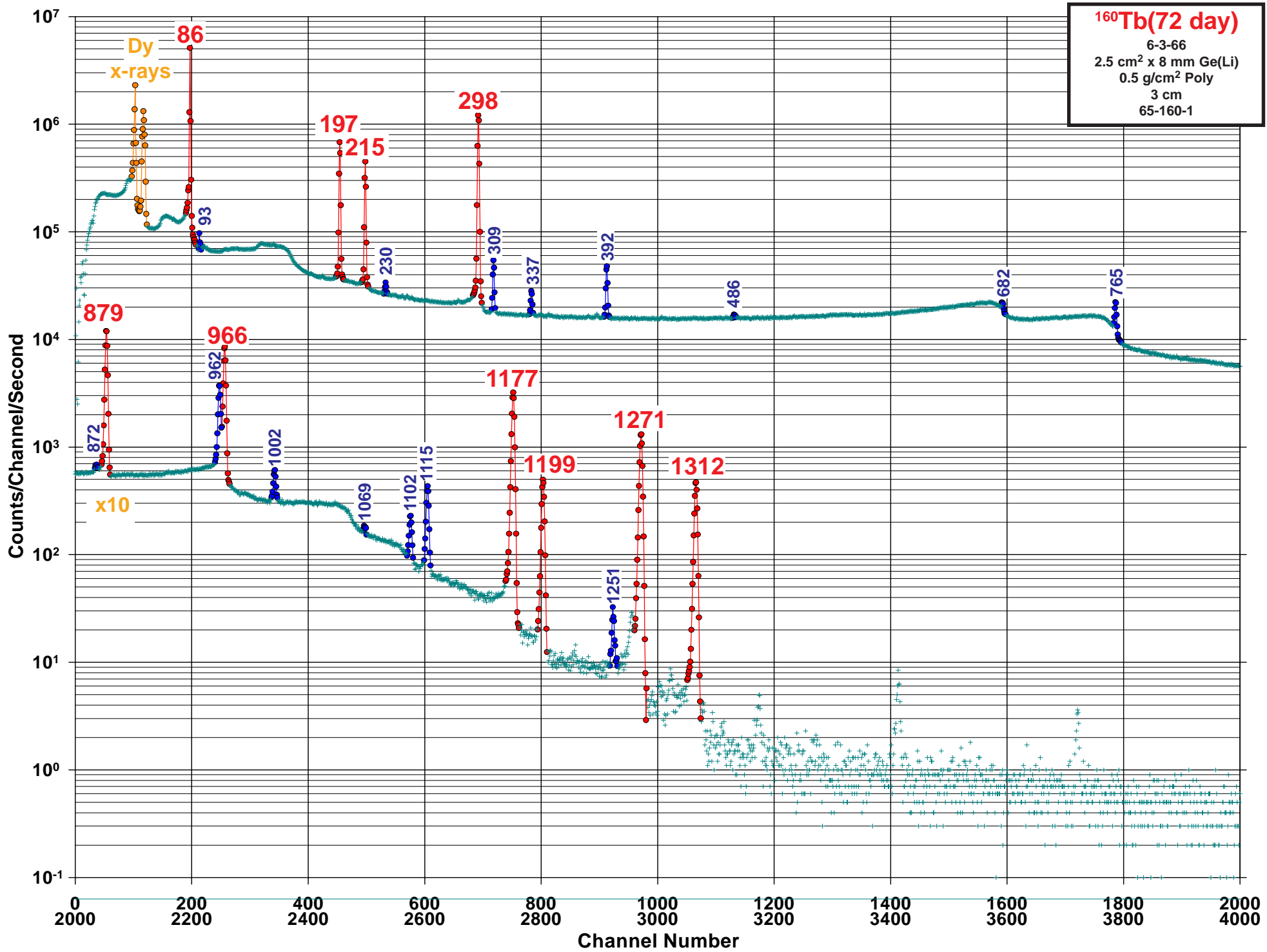
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{156}\text{Gd}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
877.30	0.10		0.053	0.005	4
877.30	0.10		0.065	0.006	4
898.83	0.10		0.028	0.013	4
921.93	0.10		0.121	0.017	4
925.68	0.10	12.1	3.4	0.3	4
926.98	0.10		0.47	0.05	4
949.08	0.10	4.63	1.61	0.16	4
959.66	0.10	6.24	1.96	0.19	4
969.70	0.10		0.121	0.017	4
974.1	0.3		0.118	0.017	4
984.43	0.10		0.096	0.016	4
987.76	0.10	0.61	0.29	0.03	4
1009.58	0.15		0.071	0.014	4
1032.0			0.031	0.010	4
1037.76	0.15	3.68	1.04	0.10	4
1040.40	0.15	2.52	0.64	0.06	4
1065.11	0.14	34.6	10.8	1.0	2
1067.15	0.15	8.9	2.81	0.27	3
1120.0			0.026	0.009	4
1129.25	0.15	0.60	0.169	0.019	4
1153.5		35.0	0.24	0.03	2
1154.07	0.15		10.4	1.0	
1159.03	0.15	23.5	7.2	0.7	2
1168.98	0.15		0.081	0.012	4
1174.27	0.15		0.169	0.019	4
1180.27	0.15		0.108	0.014	4
1187.08	0.15	2.20	0.63	0.06	4
1208.7	0.4		0.056	0.010	4
1218.82	0.15		0.34	0.04	4
1222.44	0.09	100.	31.	3.	1

D

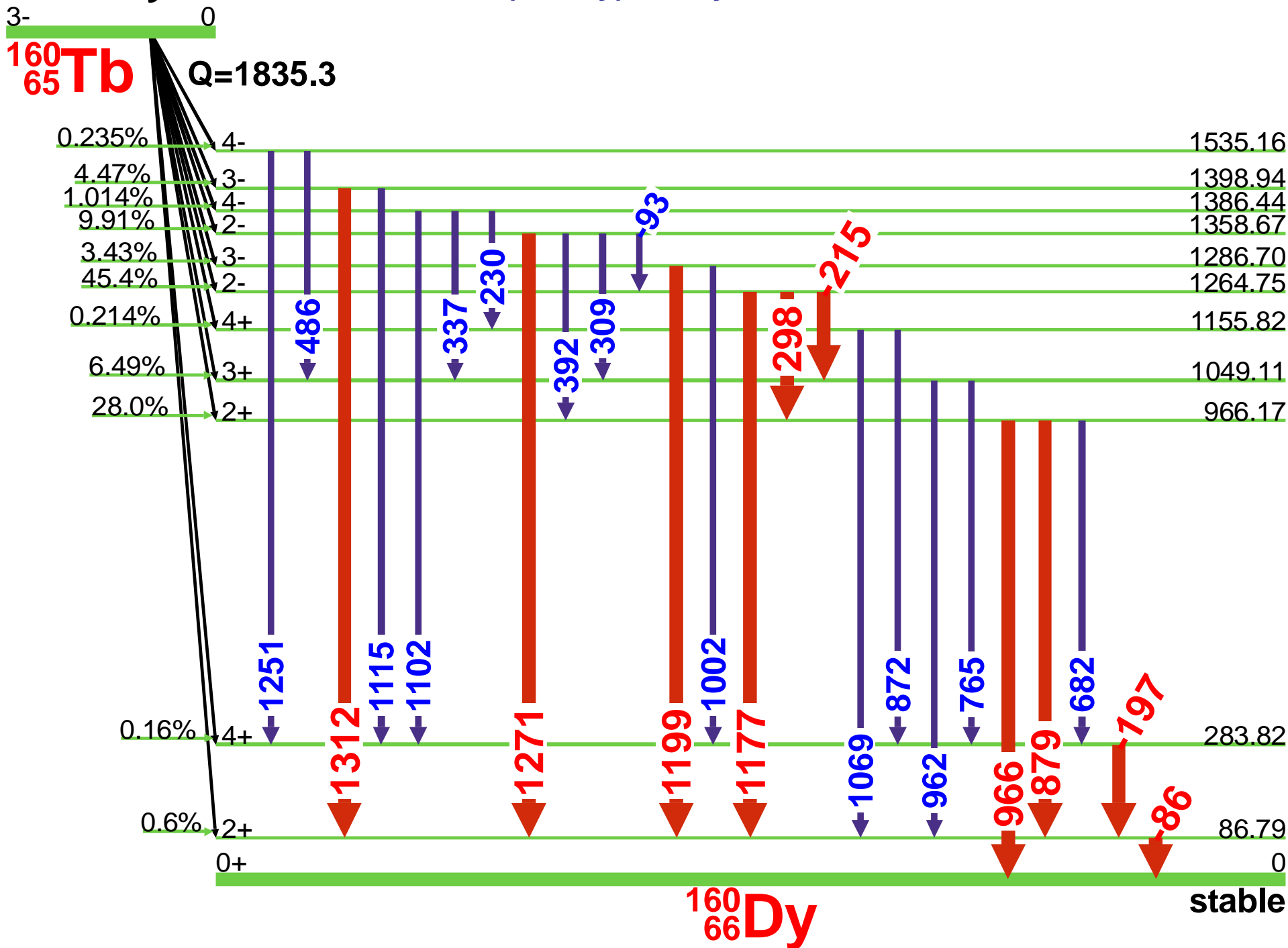
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1230.76	0.15	2.74	0.83	0.08	4
1235.67	0.15				4
1242.52	0.15	0.70	0.225	0.023	4
1250.7	0.5		0.041	0.008	4
1257.87	0.15		0.027	0.007	4
1266.60	0.15	3.26	1.07	0.10	3
1277.5	0.5		0.018	0.008	4
1334.46	0.15	8.40	2.54	0.25	3
1366.8	0.6		0.017	0.005	4
1374.0	0.7		0.028	0.007	4
1421.67	0.09	39.8	12.2	1.2	1
1450.2	0.4		0.039	0.007	4
1564.0	0.4		0.052	0.008	4
1646.24	0.10	11.2	3.8	0.4	1
1739.1	0.6		0.029	0.005	4
1763.1	0.6	0.19	0.104	0.011	4
1815.32	0.14	1.24	0.42	0.04	3
1845.45	0.10	12.2	4.1	0.4	1
1887.4	0.3	0.27	0.065	0.007	4
1893.4	0.3		0.041	0.005	4
1944.8	0.4	0.05	0.023	0.003	4
1950.7					4
1987.4	0.4		0.0127	0.0022	4
2014.45	0.16	3.20	1.12	0.11	1
2031.0			0.0059	0.0017	4
2051.2	0.4	0.05	0.0167	0.0025	4
2092.4	0.3	0.11	0.046	0.005	3
2103.5	0.5		0.0047	0.0016	4
2138.4	0.5		0.0115	0.0019	4





72 day

¹⁶⁰Tb(72 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{160}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

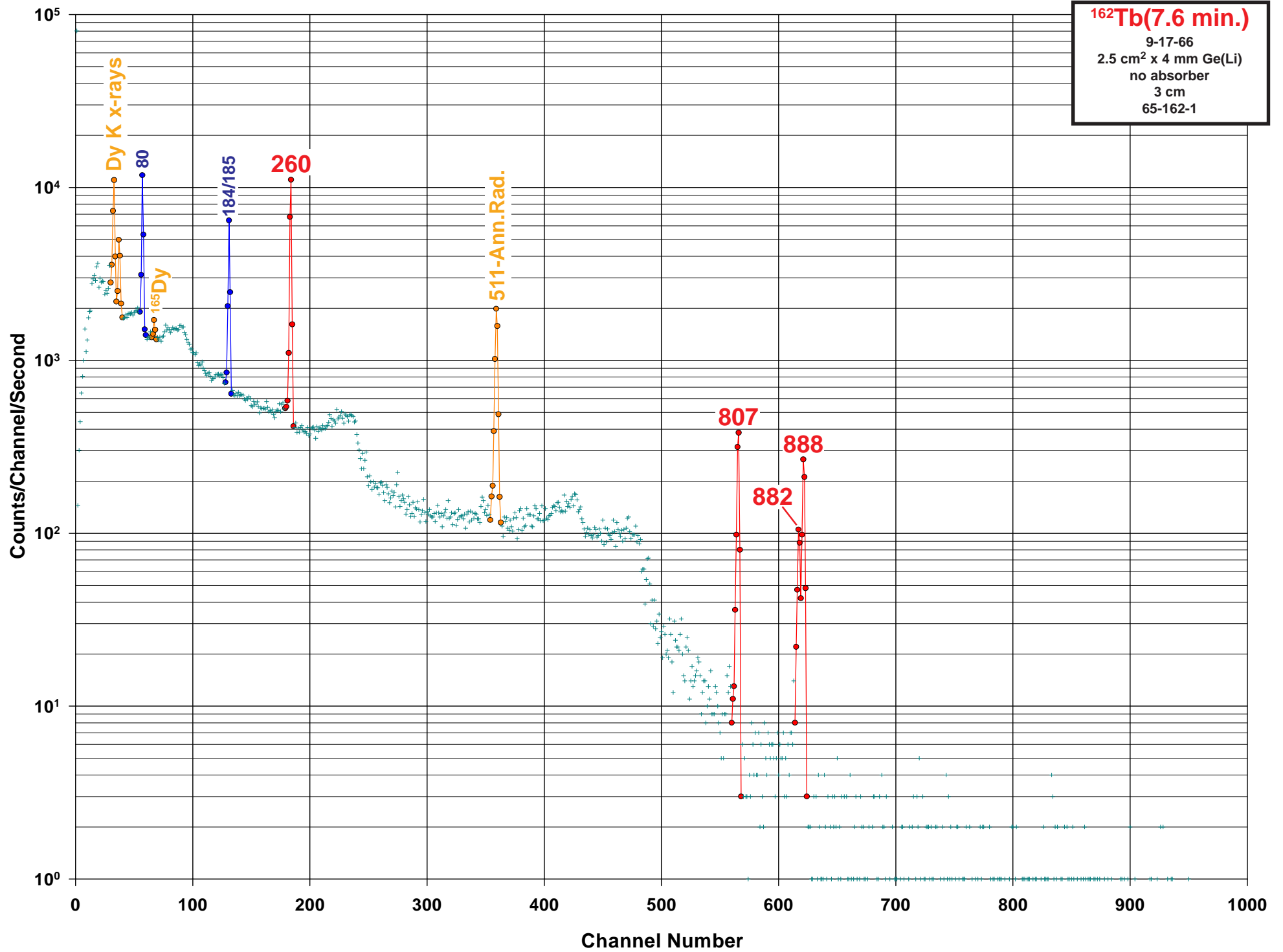
Half Life: 72.3(2) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{159}\text{Tb}(n,\gamma)$

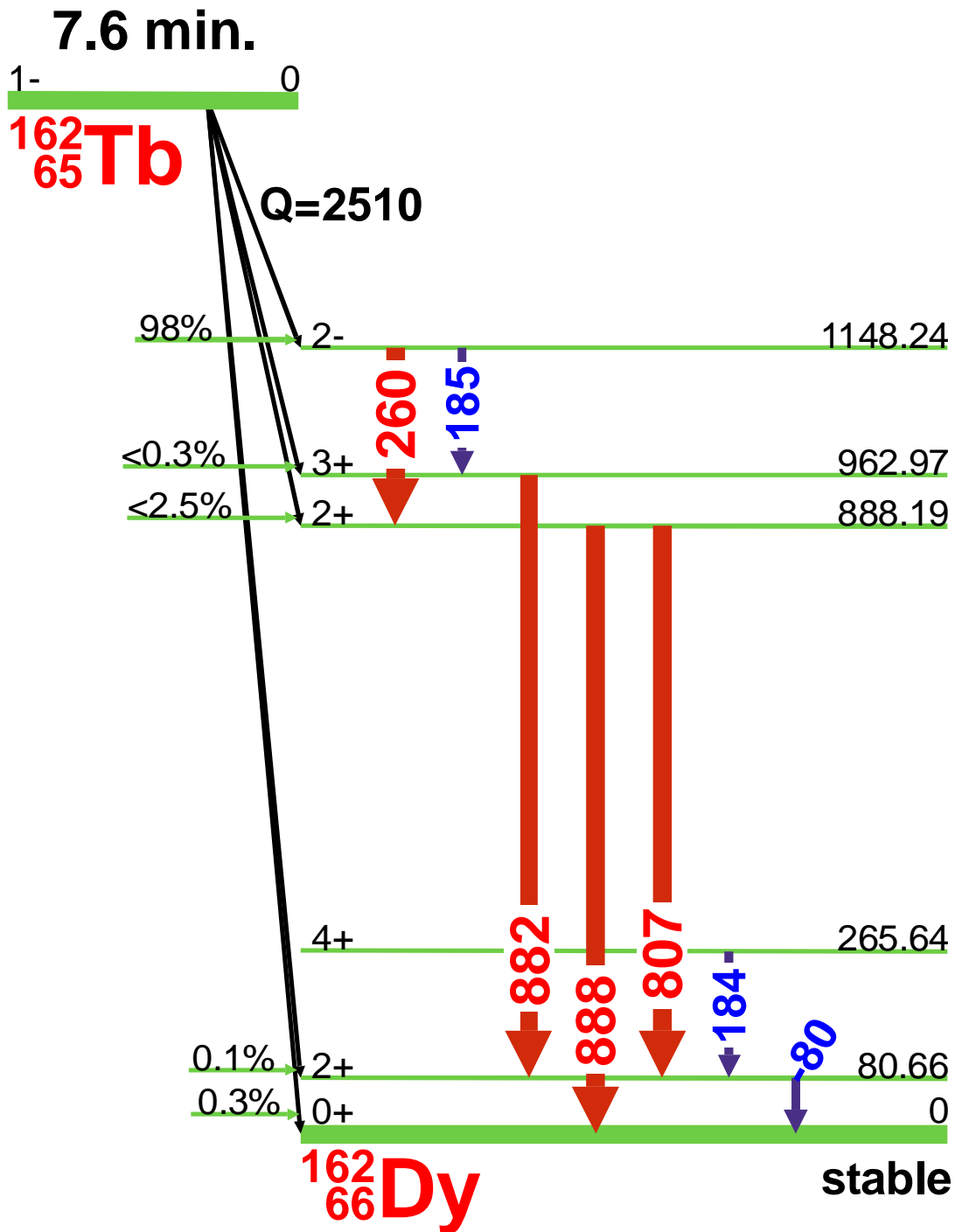
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
86.788		46.80	13.15	0.29	1
93.919	0.006	0.12	0.0566	0.0021	4
176.49	0.03		0.0062	0.0004	4
197.035	0.001	17.20	5.18	0.11	1
215.646	0.001	13.05	4.02	0.08	1
230.628	0.013	0.20	0.0807	0.0018	4
237.64	0.09		0.0060	0.0021	4
239.7	0.6		0.0021	0.0009	4
242.5	0.8		0.0075	0.0009	4
246.489	0.016		0.0208	0.0010	4
297.3			0.009	0.005	4
298.580	0.002	88.89	26.1	0.6	1
309.561	0.015	2.73	0.863	0.018	3
337.32	0.03	1.14	0.339	0.007	4
349.92	0.11		0.0144	0.0009	4
379.41	0.08		0.0141	0.0007	4
392.514	0.026	4.34	1.336	0.028	3
432.66	0.12		0.0232	0.0010	4
486.06	0.05	0.32	0.0846	0.0023	4
682.31	0.04	1.79	0.596	0.015	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
707.6	1.0		0.010	0.005	4
765.28	0.04	6.63	2.14	0.04	4
872.03	0.06	0.95	0.218	0.006	4
879.383	0.003	100.	30.1	0.6	1
962.317	0.004	35.37	9.81	0.22	2
966.171	0.003	84.80	25.1	0.5	1
1002.88	0.04	3.47	1.038	0.022	3
1005.0	1.0		0.039	0.009	4
1069.09	0.05	0.38	0.0999	0.0025	4
1102.60	0.03	2.05	0.582	0.012	3
1115.12	0.03	5.05	1.57	0.03	2
1177.962	0.004	52.1	14.9	0.3	1
1199.89	0.03	8.28	2.38	0.05	1
1251.27	0.05	0.32	0.1060	0.0023	3
1271.880	0.008	26.0	7.44	0.15	1
1285.58	0.10		0.0154	0.0012	4
1299.3	0.3		0.0054	0.0006	4
1312.14	0.04	9.99	2.86	0.07	1
1468.6	0.3		0.0006	0.0002	4
1556.6	0.4		0.0005	0.0001	4





^{162}Tb (7.6 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{162}Tb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

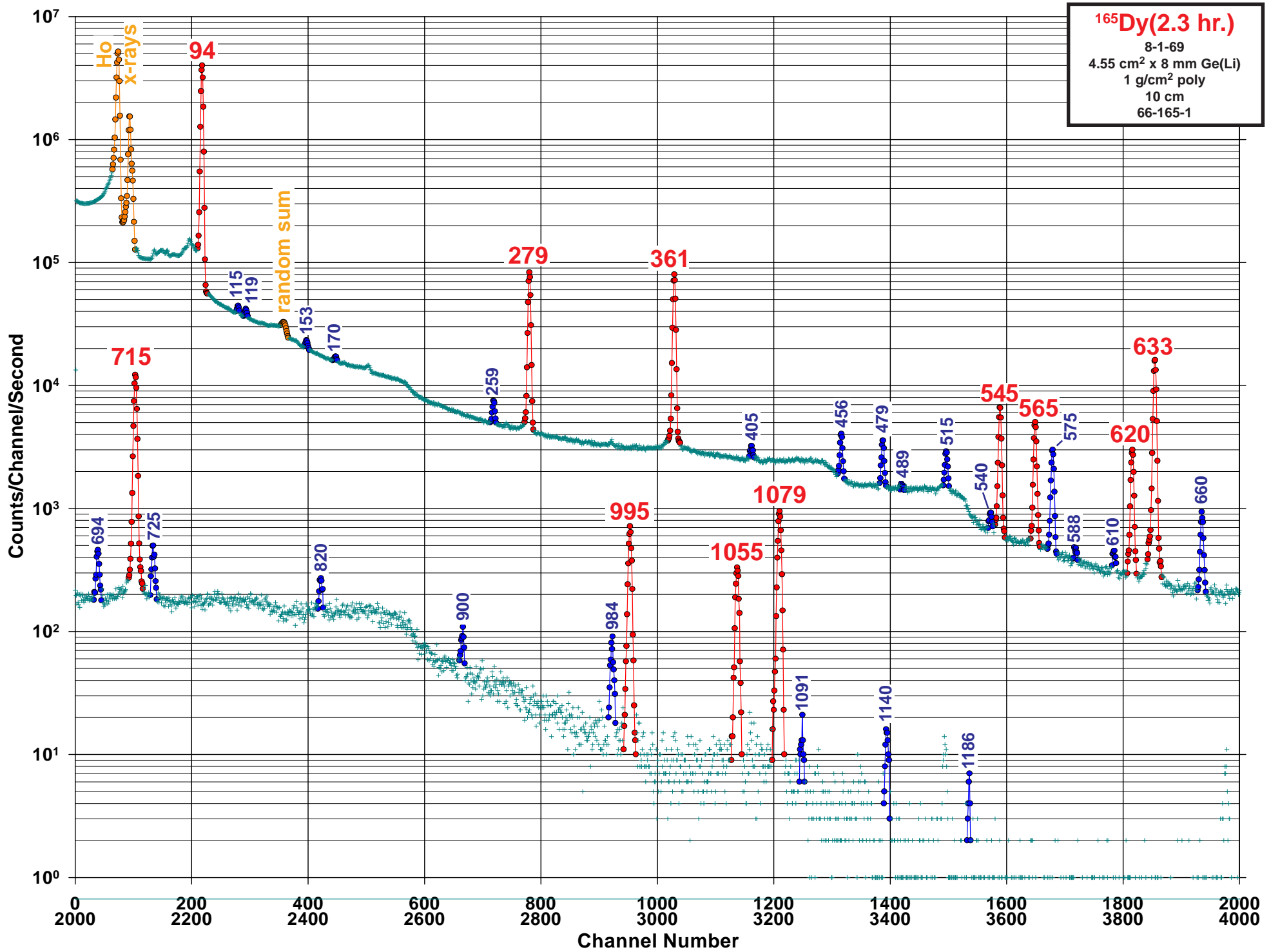
Half Life: 7.60(15) min.

Detector: 2.5 cm² x 4 mm Ge (Li)Method of Production: $^{163}\text{Dy}(\gamma,p)$

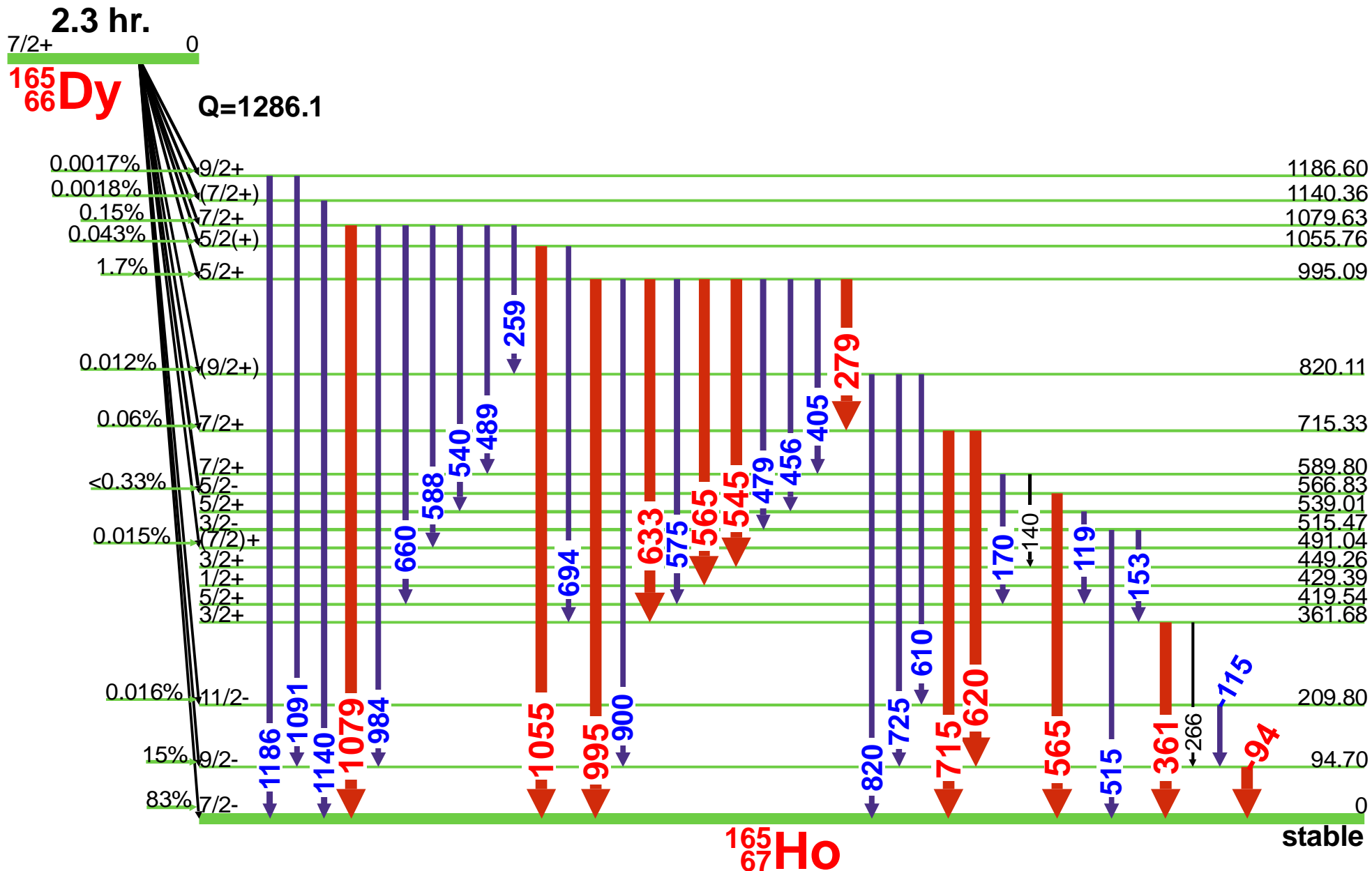
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
74.7			0.0030	0.0001	4
80.66	0.05		8.6	0.5	2
184.98			2.70	0.14	2
185.27	0.05		14.4	0.9	
247.1			0.0012		4
260.05	0.06		80.	5.	1
321.9			0.0016		4
543.2	0.6		0.107	0.013	4
622.52	0.10		0.89	0.03	4
697.35	0.10		2.58	0.09	4
728.5	0.4		0.069	0.008	4
807.53	0.08		42.8	1.5	1
819.7	0.6		0.025	0.004	4
857.0	0.3		0.087	0.006	4
882.32	0.08		13.4	0.5	1
888.20	0.08		38.7	1.4	1
894.7	0.4		0.0295	0.0026	4
944.2	0.6		0.0103	0.0021	4
980.4	0.7		0.0043	0.0017	4
1014.9	0.6		0.0154	0.0017	4
1067.55	0.10		0.556	0.020	4
1092.4	0.4		0.0197	0.0018	4
1129.3	0.4		0.0120	0.0017	4
1161.1	0.6		0.0068	0.0013	4
1187.9	0.6		0.0068	0.0013	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1195.1	0.3		0.090	0.004	4
1223.0	0.6		0.0133	0.0017	4
1267.5	0.6		0.0077	0.0013	4
1275.8	0.4		0.047	0.013	4
1276.9	0.4		0.043	0.013	4
1287.6	0.5		0.0154	0.0017	4
1372.9	0.6		0.0081	0.0013	4
1483.3	0.5		0.0047	0.0013	4
1517.0	0.6		0.0103	0.0013	4
1547.4	0.6		0.0098	0.0013	4
1556.5	0.6		0.0068	0.0013	4
1610.7	0.3		0.142	0.005	4
1665.1	0.3		0.080	0.003	4
1702.1	0.5		0.0351	0.0018	4
1782.4	0.3		0.0389	0.0019	4
1806.1	0.8		0.0046	0.0008	4
1901.8	0.6		0.0095	0.0010	4
1918.6	0.6		0.0072	0.0007	4
1982.3	0.6		0.0092	0.0007	4
1999.1	0.8		0.0016	0.0005	4
2047.9	0.4		0.0501	0.0020	4
2082.8	0.6		0.0083	0.0007	4
2167.3	0.6		0.0070	0.0006	4
2233.0	0.8		0.0061	0.0006	4
2290.2	1.0		0.0022	0.0004	4





¹⁶⁵Dy(2.3 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{165}Dy E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

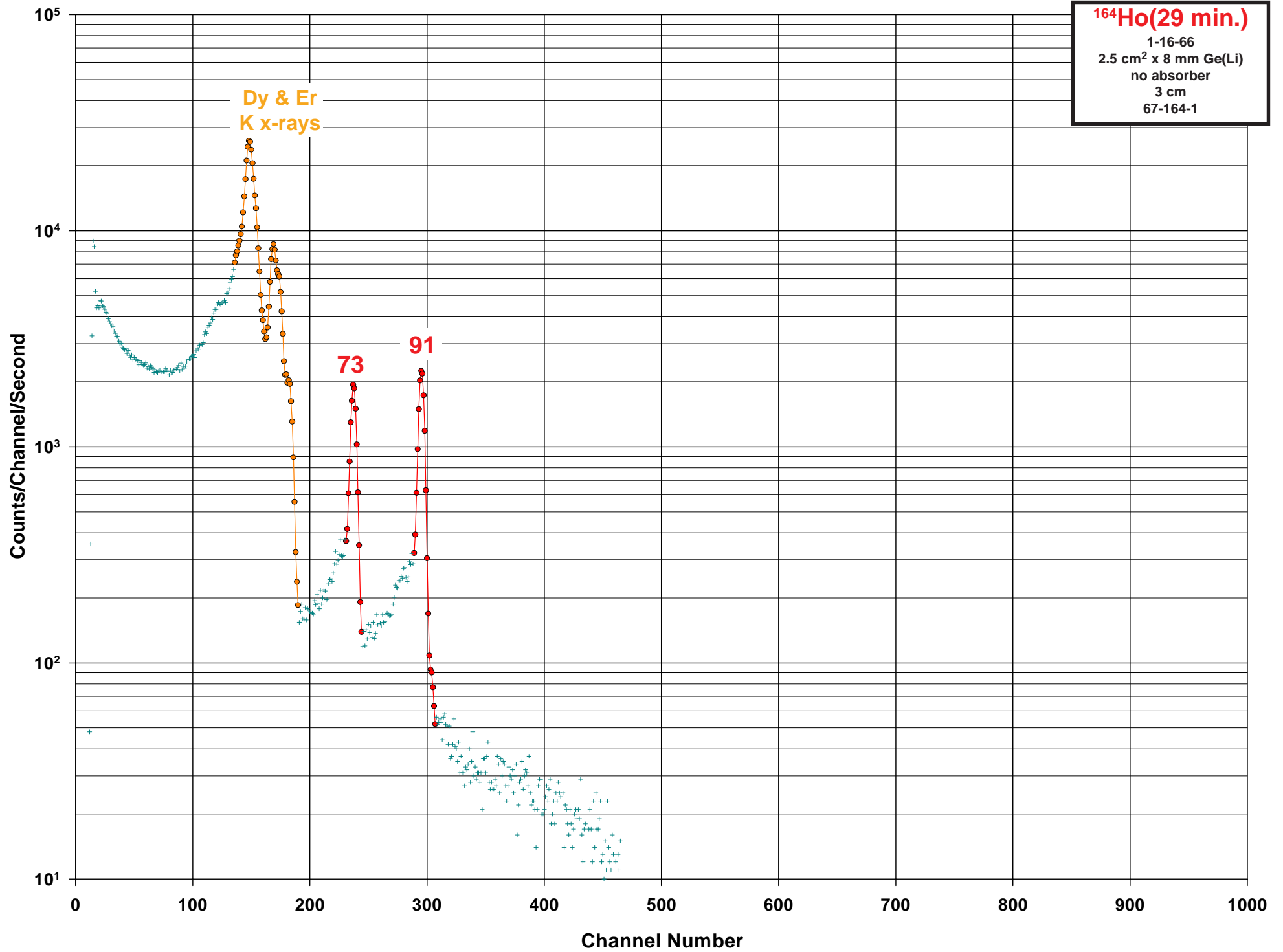
Half Life: 2.334(1) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{164}\text{Dy}(n,\gamma)$

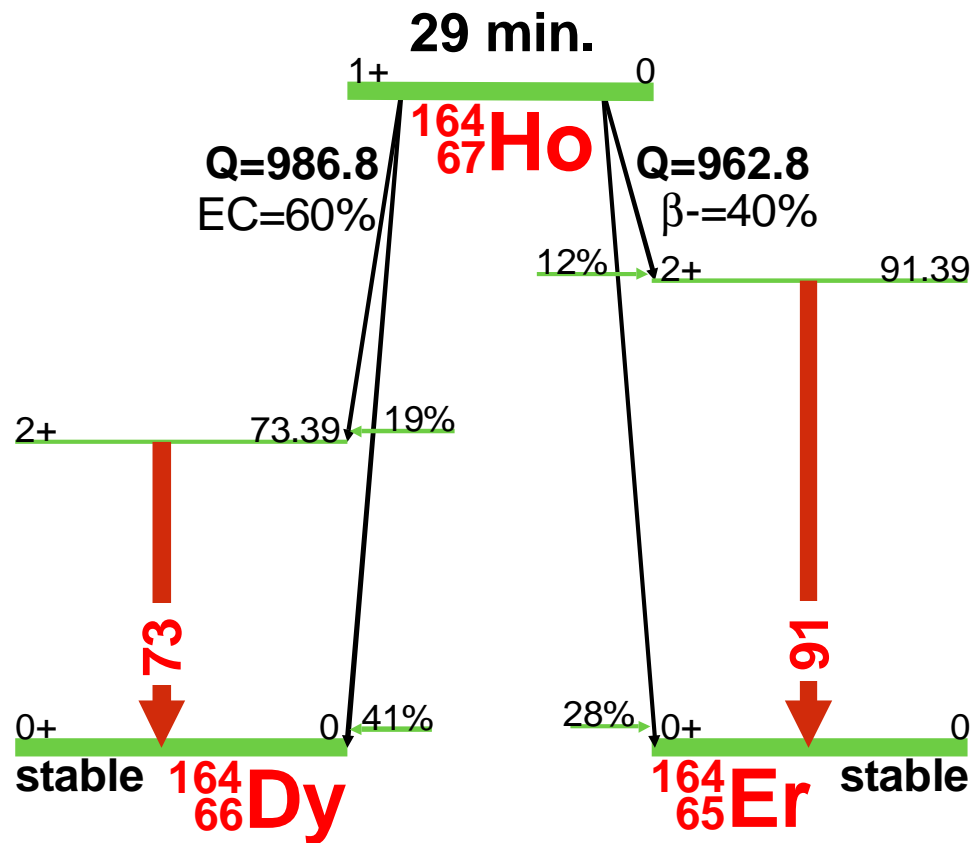
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
29.715	0.003		0.0042	0.0021	4
57.864	0.005		0.0139	0.0025	4
67.712	0.004		0.014	0.007	4
71.502	0.010		0.0024	0.0004	4
87.585	0.004	1.21	0.0143	0.0020	4
89.753	0.008		0.0029	0.0006	4
94.700	0.003	100.	3.6	0.4	1
95.931	0.004		0.0009	0.0002	4
98.80	0.15		0.0008	0.0002	4
109.59	0.03		0.0006	0.0002	4
115.104	0.010	0.63	0.0071	0.0008	4
119.47	0.03	0.52	0.0071	0.0008	4
129.39	0.03		0.0005	0.0002	4
140.544	0.020	1.4	0.0021	0.0003	4
153.803	0.006	0.56	0.0057	0.0007	4
170.22	0.03	0.34	0.0030	0.0004	4
174.96	0.03		0.0011	0.0003	4
209.70	0.25		0.0010	0.0005	4
228.3	0.3		0.0004	0.0003	4
259.53	0.05	0.52	0.0146	0.0016	4
266.80	0.15	0.09	0.0011	0.0004	4
279.763	0.012	15.2	0.50	0.05	1
356.90	0.25		0.0008	0.0004	4
361.680	0.020	26.2	0.84	0.09	1
405.25	0.03	0.49	0.0107	0.0011	4
456.093	0.025	1.51	0.042	0.005	3
472.11	0.15		0.0014	0.0003	4
479.622	0.025	1.40	0.044	0.005	3

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
489.90	0.10	0.07	0.0034	0.0005	4
504.10	0.15		0.0011	0.0003	4
512.57	0.25		0.0032	0.0007	4
515.467	0.025	1.45	0.038	0.004	3
540.52	0.05	0.41	0.0056	0.0008	4
545.834	0.020	5.05	0.162	0.016	1
565.718	0.020	3.97	0.132	0.013	1
565.718	0.020		0.132	0.013	
575.558	0.020	2.48	0.079	0.008	2
588.56	0.05	0.175	0.0033	0.0005	4
610.29	0.05	0.219	0.0053	0.0007	4
620.635	0.020	2.89	0.097	0.010	1
633.415	0.020	17.4	0.57	0.06	1
660.08	0.03	0.88	0.0266	0.0029	3
694.08	0.04	0.40	0.0116	0.0013	3
715.328	0.020	16.3	0.53	0.05	1
725.39	0.03	0.48	0.0140	0.0020	3
820.106	0.025	0.26	0.0081	0.0010	4
900.41	0.05	0.16	0.0025	0.0003	4
976.74	0.20		0.0002		4
984.92	0.04	0.18	0.0064	0.0007	3
995.089	0.025	1.71	0.0551	0.0055	1
1045.60	0.15		0.0005	0.0001	4
1055.76	0.03	0.93	0.031	0.003	1
1079.63	0.03	2.76	0.092	0.009	1
1091.91	0.08	0.037	0.0010	0.0001	4
1140.36	0.05	0.044	0.0013	0.0002	4
1186.56	0.10	0.014	0.0005	0.0001	4





¹⁶⁴Ho(29 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁶⁴Ho

Half Life: 29(1) min.

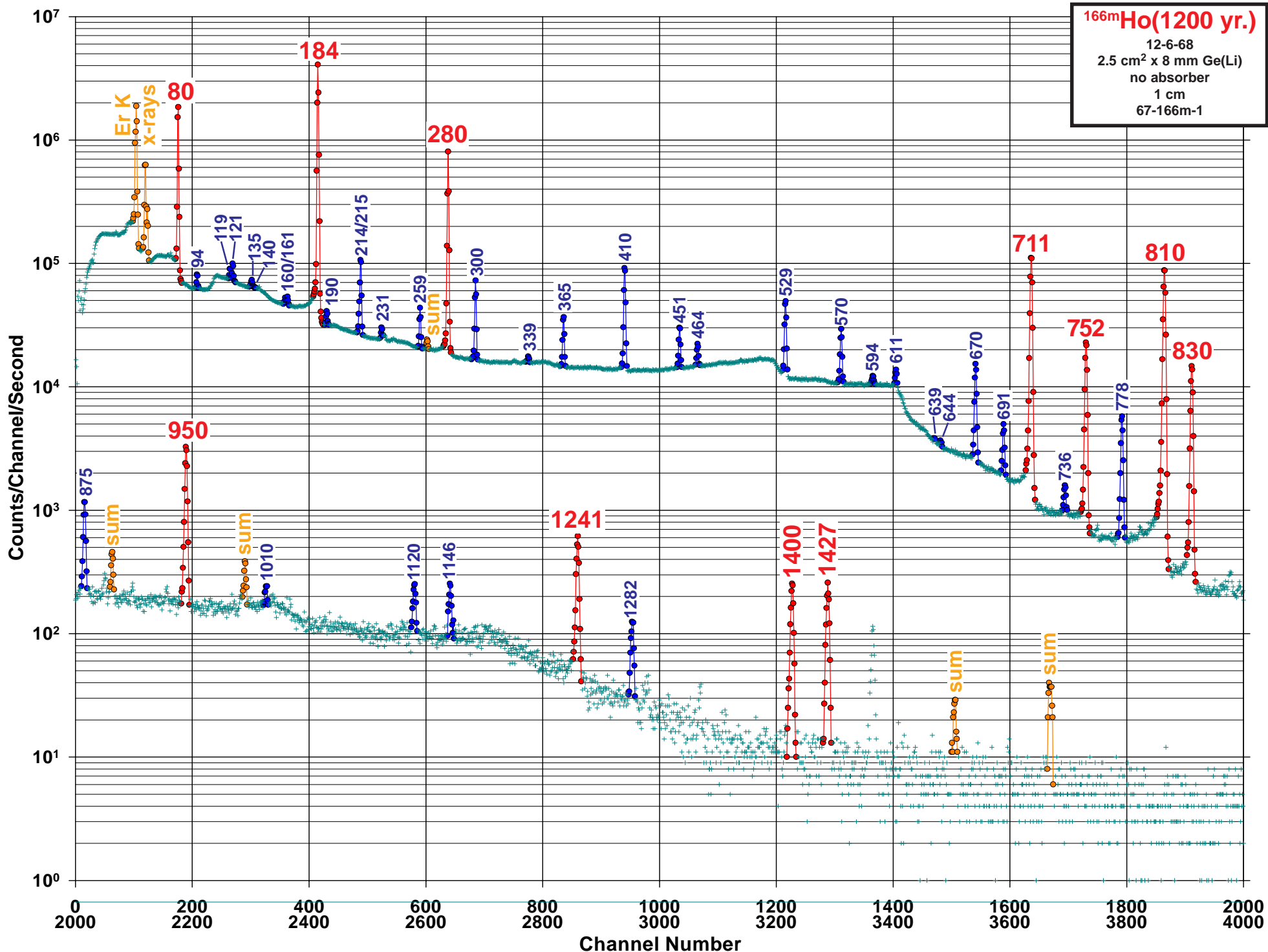
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁶⁵Ho(γ,n)

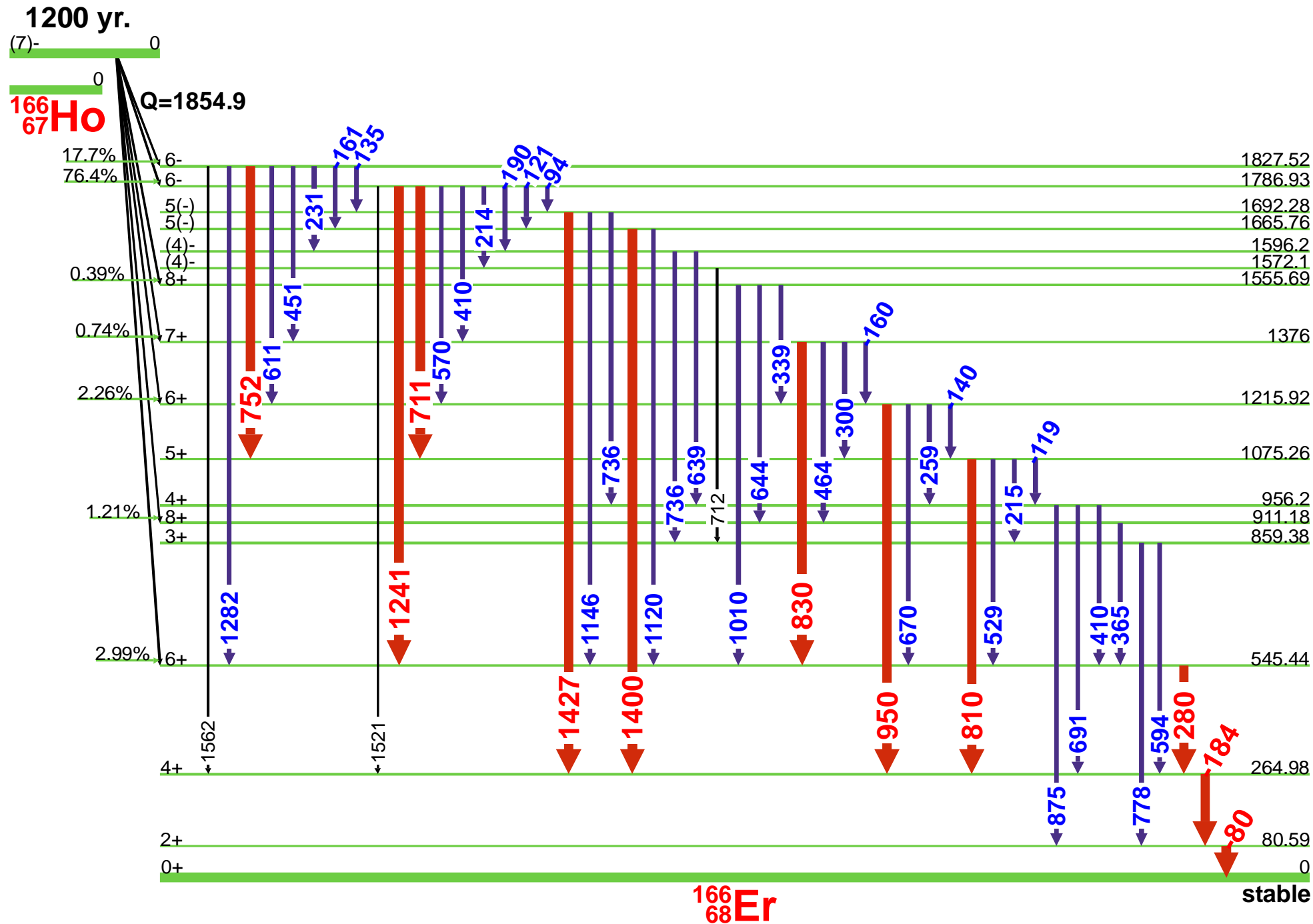
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
73.392	0.005		1.98	0.24	1
91.39	0.03		2.3	0.4	1
688.44	0.15				
761.8	0.2				

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





^{166m}Ho (1200 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

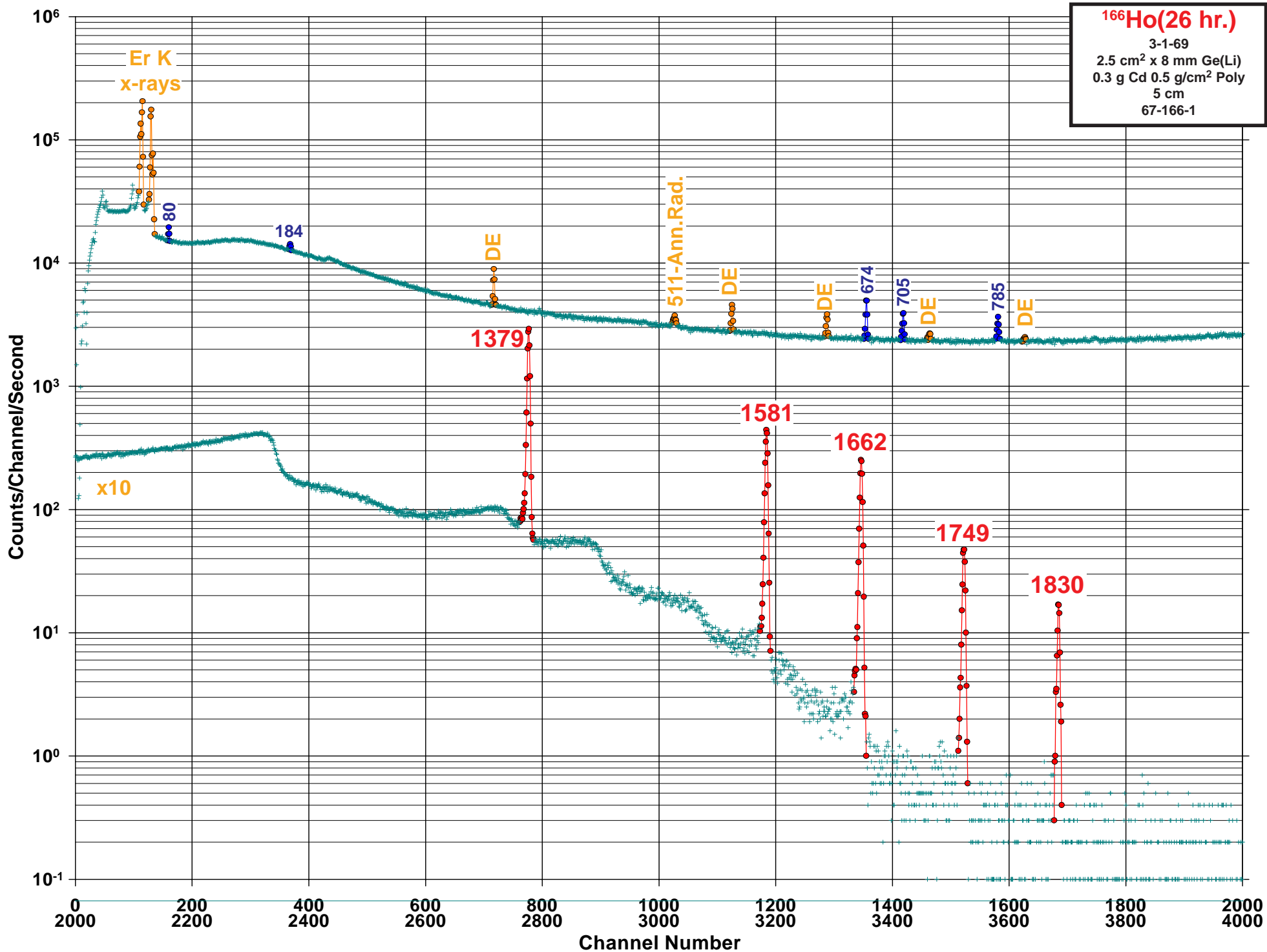
Nuclide: ^{166m}Ho E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1200(180) yr.

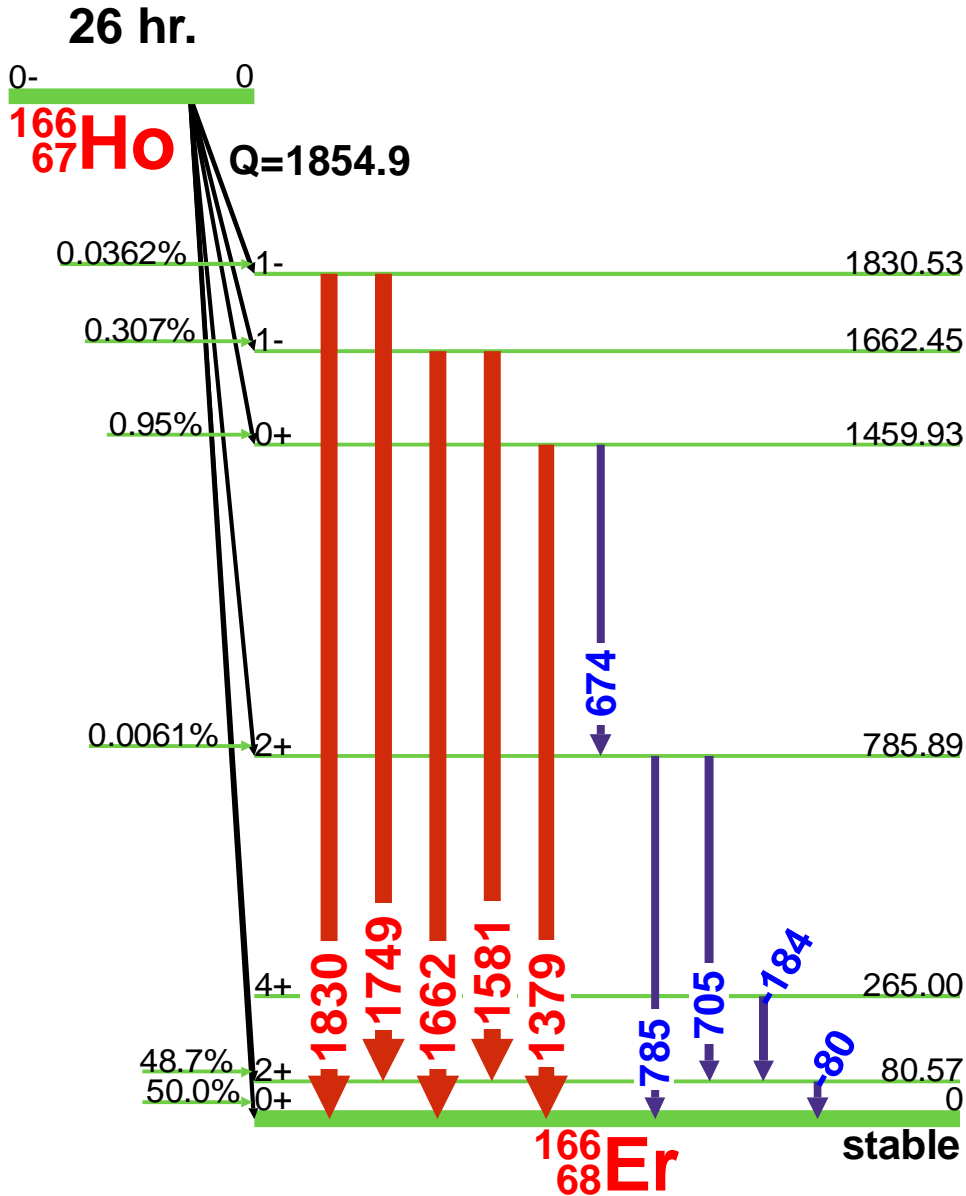
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{165}\text{Ho}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
73.45	0.02		0.0145	0.0002	4
80.586	0.005	17.1	12.33	0.17	1
94.694	0.008	0.19	0.152	0.008	4
96.85	0.05		0.0022	0.0001	4
119.069	0.008	0.24	0.1728	0.0042	4
121.198	0.009	0.36	0.252	0.011	4
135.282	0.014	0.14	0.096	0.004	4
140.707	0.024	0.059	0.0436	0.0022	4
160.087	0.014	0.18	0.094	0.006	4
161.775	0.014	0.15	0.103	0.004	4
170.31	0.03		0.0134	0.0008	4
184.41	0.006	100	72.6	1.2	1
190.774	0.023	0.3	0.218	0.007	4
214.786	0.014	0.75	0.44	0.016	4
215.89	0.02	3.55	2.61	0.06	3
231.326	0.019	0.33	0.209	0.007	4
255.2	0.12		0.0043	0.0009	4
259.737	0.012	1.5	1.089	0.02	3
280.459	0.008	40.7	29.8	0.4	1
300.762	0.009	5.1	3.73	0.05	2
304.82	0.04		0.218	0.022	4
339.74	0.03	0.23	0.161	0.006	4
365.747	0.012	3.4	2.48	0.04	3
410.8	0.05	15.8	0.0168	0.0005	2
410.944	0.008		11.41	0.16	
451.521	0.014	4.2	2.98	0.04	3
464.797	0.017	1.7	1.212	0.026	4
476.37	0.04		0.0363	0.0022	4
496.917	0.021		0.123	0.005	4
520.9	0.05		0.16	0.007	4
520.945	0.015		0.0003	0.0001	
529.801	0.018	13.9	9.69	0.14	3
570.99	0.023	7.85	5.5466	0.0814	3
590.67	0.15		0.0232	0.0022	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
594.43	0.04	0.96	0.563	0.01	4
611.55	0.03	1.89	1.408	0.028	4
615.96	0.03		0.096	0.007	4
617	0.5		0.022	0.006	4
639.97	0.04	0.22	0.09	0.004	4
644.61	0.05	0.24	0.139	0.008	4
670.502	0.014	7.88	5.48	0.07	2
691.249	0.014	2.09	1.343	0.022	3
705.32	0.04		0.018	0.011	4
711.683	0.008	80.2	55.3	0.7	1
712.89	0.13		0.298	0.087	
736.02	0.08	0.14	0.138	0.015	3
736.83	0.03		0.247	0.015	
752.285	0.013	17.9	12.29	0.16	1
778.817	0.01	4.5	3.08	0.04	2
785.89	0.04		0.0167	0.0022	4
810.276	0.008	85.6	58.1	0.8	1
830.577	0.012	14.5	9.82	0.13	1
875.652	0.015	1.08	0.722	0.017	2
950.967	0.018	4.15	2.76	0.04	1
1010.287	0.018	0.12	0.077	0.0024	4
1120.33	0.02	0.31	0.246	0.008	3
1146.84	0.03	0.3	0.202	0.005	3
1241.482	0.02	1.37	0.81	0.021	1
1261.98	0.12		0.0073	0.0007	4
1282.08	0.02	0.31	0.169	0.004	3
1306.9	0.4		0.0032	0.0003	4
1331.24	0.2		0.0037	0.0004	4
1400.74	0.03	0.75	0.514	0.008	1
1427.21	0.04	0.8	0.504	0.013	1
1446.72	0.13		0.0073	0.0001	4
1521.99	0.04		0.013	0.004	4
1562.57	0.04		0.0029	0.0008	4



¹⁶⁶Ho(26 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁶⁶Ho

Half Life: 26.83(2) hr.

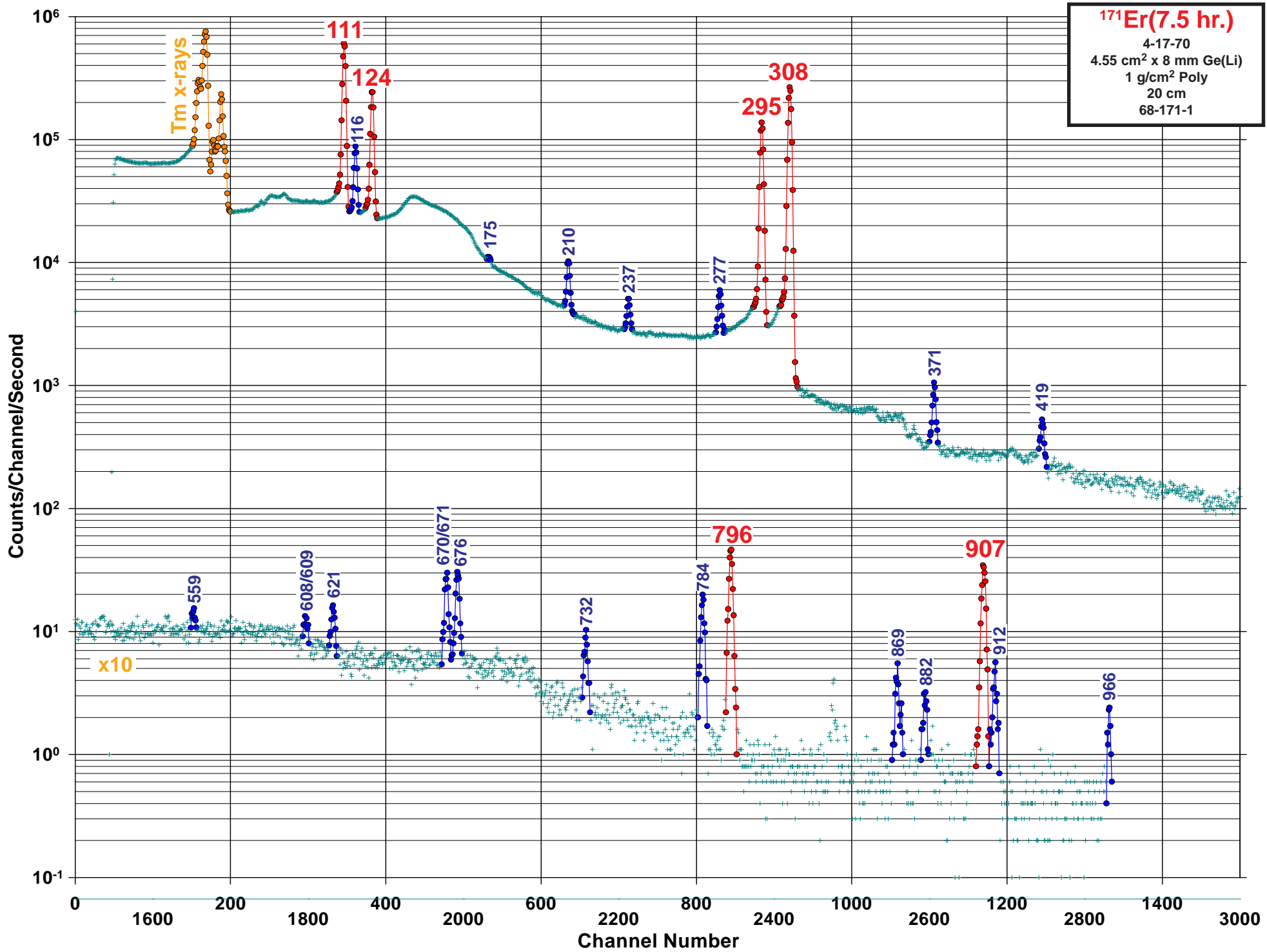
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁶⁵Ho(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
80.574	0.008		6.71	0.08	2
184.40	0.10	0.215	0.0020	0.0002	4
520.8	0.4		0.0003	0.0001	4
674.00	0.04	2.1	0.0194	0.0022	3
705.30	0.04	1.61	0.0131	0.0005	3
785.89	0.03	1.4	0.0119	0.0005	3
1263.08	0.20		0.0014	0.0002	4
1379.40	0.06	100.	0.93	0.03	1
1447.59	0.20		0.0010	0.0001	4
1460.0					4
1528.2			0.0002		4
1581.89	0.08	19.5	0.187	0.004	1
1662.48	0.08	12.5	0.1200	0.0020	1
1749.91	0.06	2.68	0.0277	0.0005	1
1830.49	0.07	0.86	0.0085	0.0003	1

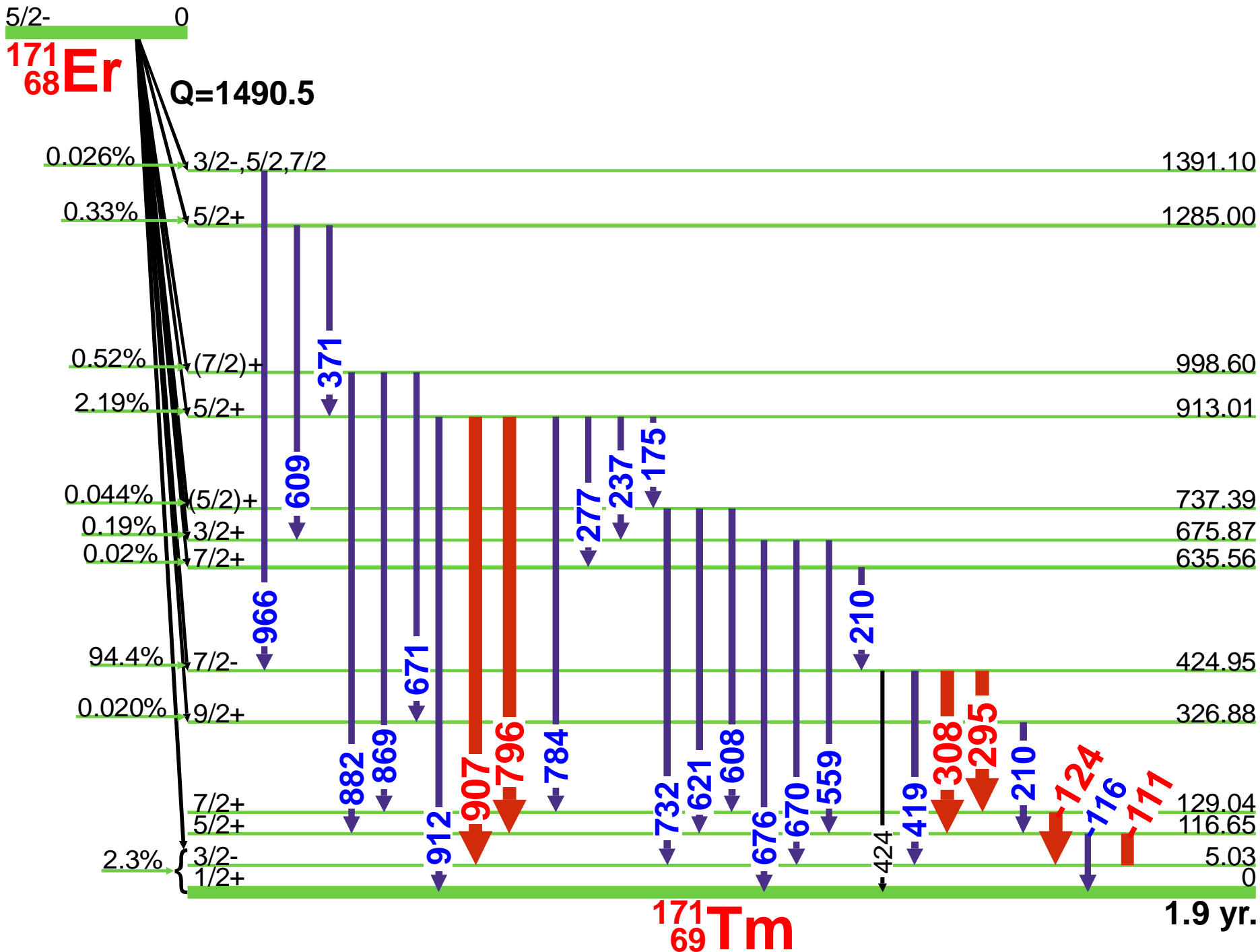
E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





7.5 hr.

¹⁷¹Er(7.5 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{171}Er E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

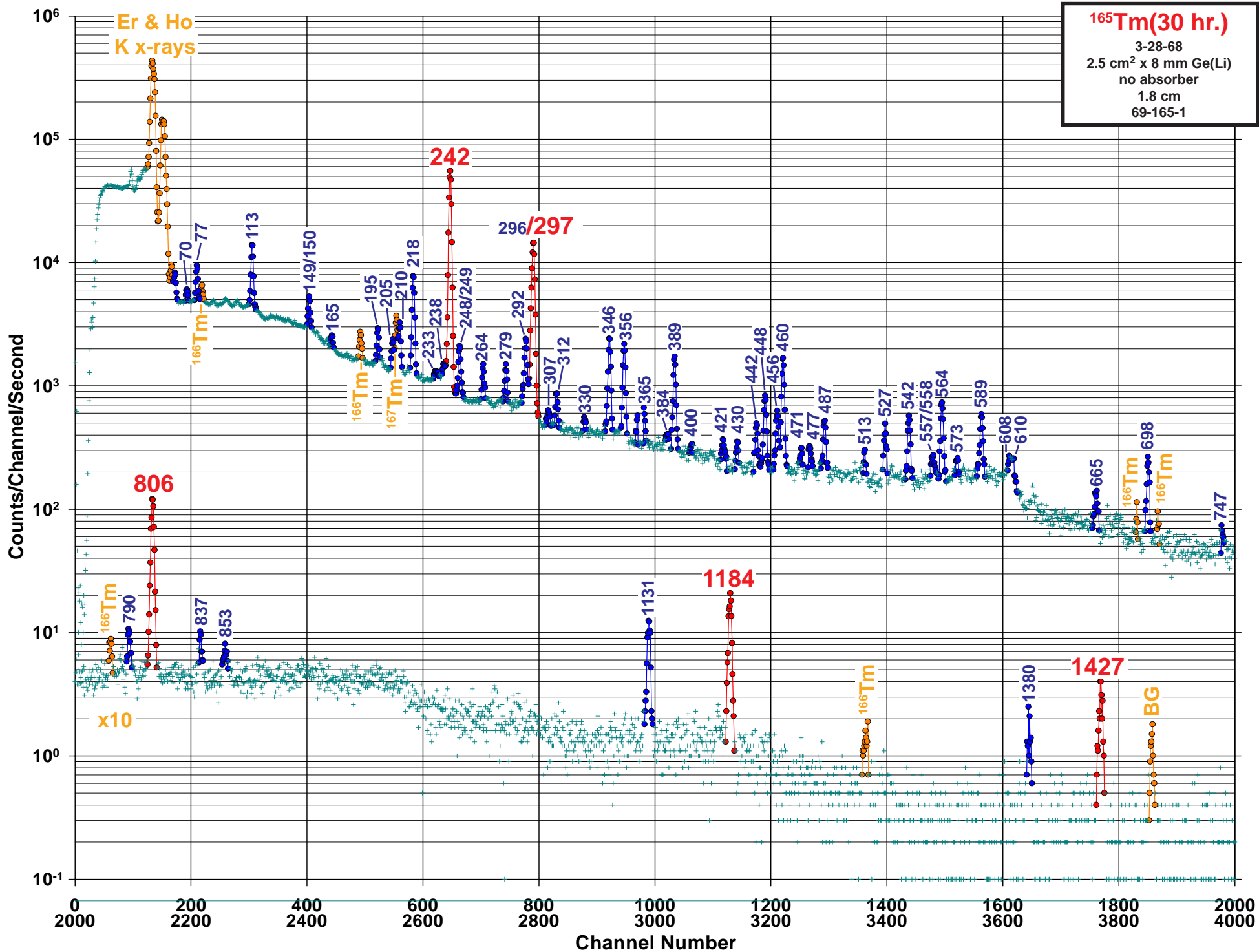
Half Life: 7.516(2) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{170}\text{Er}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	5.025	0.006				4
	12.385	0.008		0.0305	0.0020	4
	85.60	0.10		0.060	0.004	4
	111.621	0.004	30.44	20.5	1.0	1
	116.656	0.006	3.55	2.30	0.09	3
	124.017	0.004	14.39	9.1	0.4	1
	166.4	0.3				4
	175.63	0.04	0.09	0.089	0.009	4
	197.70	0.20		0.027	0.005	4
D	210.10	0.20	1.12	0.0070	0.0002	3
	210.60	0.03		0.642	0.027	
	237.14	0.04	0.56	0.302	0.014	3
	261.40	0.20		0.0200	0.0006	4
	277.43	0.05	0.99	0.580	0.026	3
	286.50	0.20		0.0080	0.0002	4
	295.901	0.014	45.7	28.9	1.2	1
	308.291	0.018	100.	64.4	2.5	1
	362.91	0.14		0.0197	0.0012	4
	371.96	0.09	0.37	0.257	0.013	3
	419.9	0.3	0.51	0.083	0.005	3
	424.9	0.5	0.06	0.0224	0.0024	4
	455.60	0.20		0.0060	0.0020	4
	487.90	0.20		0.0050	0.0020	4
	495.40	0.20		0.0020	0.0010	4
	506.9	0.6		0.0227	0.0021	4
	519.2	0.6		0.0177	0.0017	4
	547.8	0.5		0.017	0.004	4
	559.5	0.4		0.0466	0.0024	4
	573.50	0.20		0.0098	0.0015	4
	586.00	0.20		0.0040	0.0020	4
D	608.60	0.20	0.13	0.0370	0.0011	4
	609.00	0.20		0.0200	0.0006	
	621.03	0.23	0.15	0.089	0.004	4

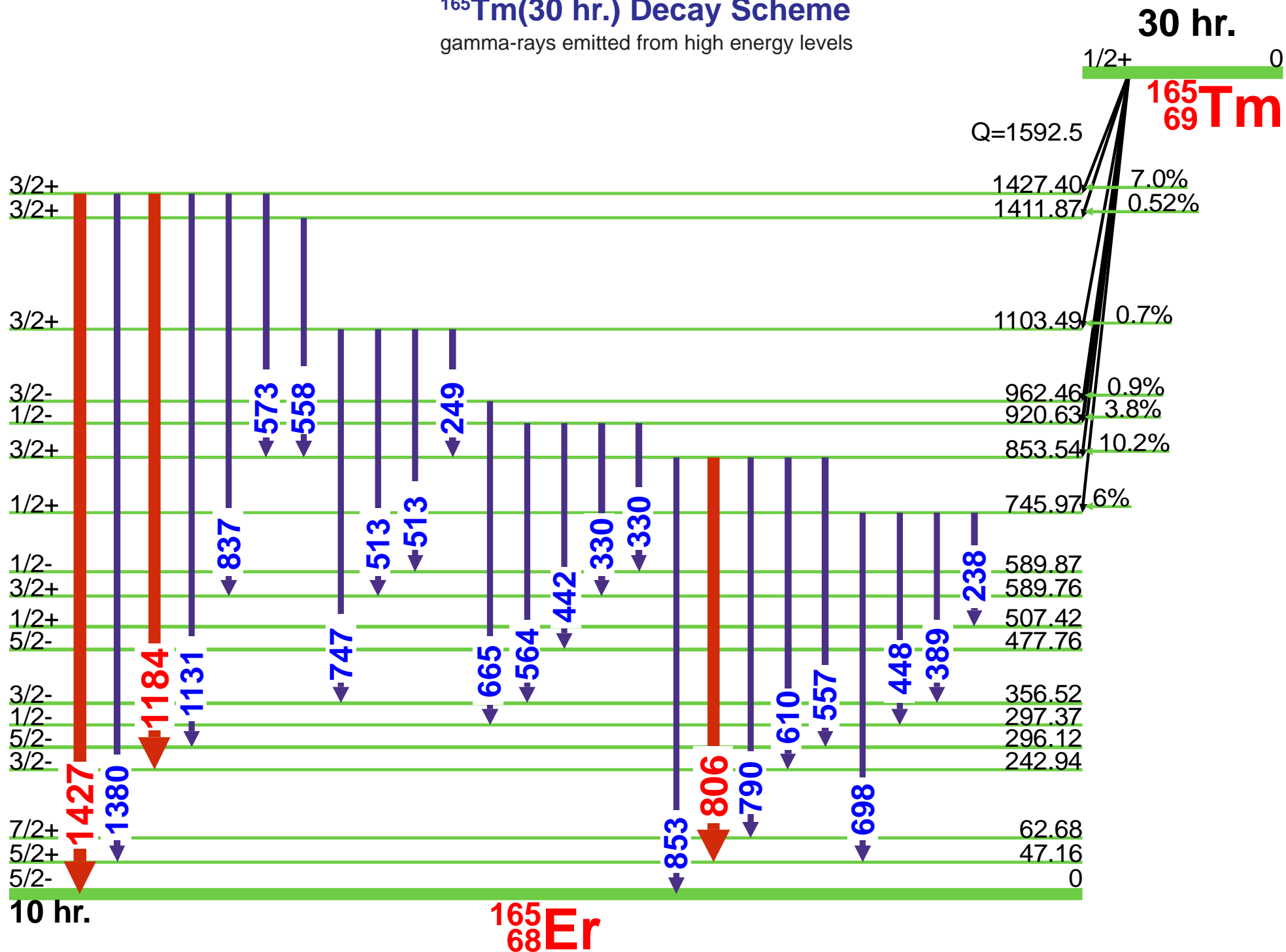
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	630.70	0.20		0.0050	0.0010	4
D	670.70	0.20	0.42	0.252	0.009	3
	671.70	0.20		0.022	0.005	
	676.1	0.3	0.47	0.285	0.010	3
	693.9	0.5		0.0150	0.0017	4
	705.8	0.2		0.012	0.004	4
	732.5	0.3	0.18	0.098	0.004	3
	745.0	0.5		0.0066	0.0008	4
	767.80	0.20		0.0045	0.0005	4
	784.09	0.17	0.37	0.2400	0.0088	2
	796.55	0.13	1.09	0.640	0.023	1
	860.00	0.20		0.0015	0.0002	4
	869.7	0.3	0.14	0.055	0.005	3
	871.50	0.20		0.020	0.005	4
	882.0	0.4	0.08	0.0385	0.0022	4
	907.7	0.4	1.06	0.635	0.023	1
	912.6	0.5	0.15	0.077	0.006	3
	966.1	0.4		0.0264	0.0011	4
	976.2	0.5		0.0007	0.0003	4
	994.0	0.5		0.0006	0.0003	4
	1051.0	0.5		0.0004	0.0002	4
	1096.9	0.8		0.0011	0.0002	4
	1109.0	0.5		0.0068	0.0003	4
	1156.0	0.5		0.0006	0.0002	4
	1168.4	0.5		0.0018	0.0002	4
	1172.9	0.5		0.0008	0.0003	4
	1182.0	0.5		0.0003	0.0002	4
	1220.5	0.8		0.0028	0.0002	4
	1271.2	0.5		0.0003	0.0002	4
	1279.9	0.5		0.0025	0.0002	4
	1284.4	0.5		0.0024	0.0002	4
	1395.5	0.5		0.0028	0.0008	4
	1400.5	0.5		0.0025	0.0001	4





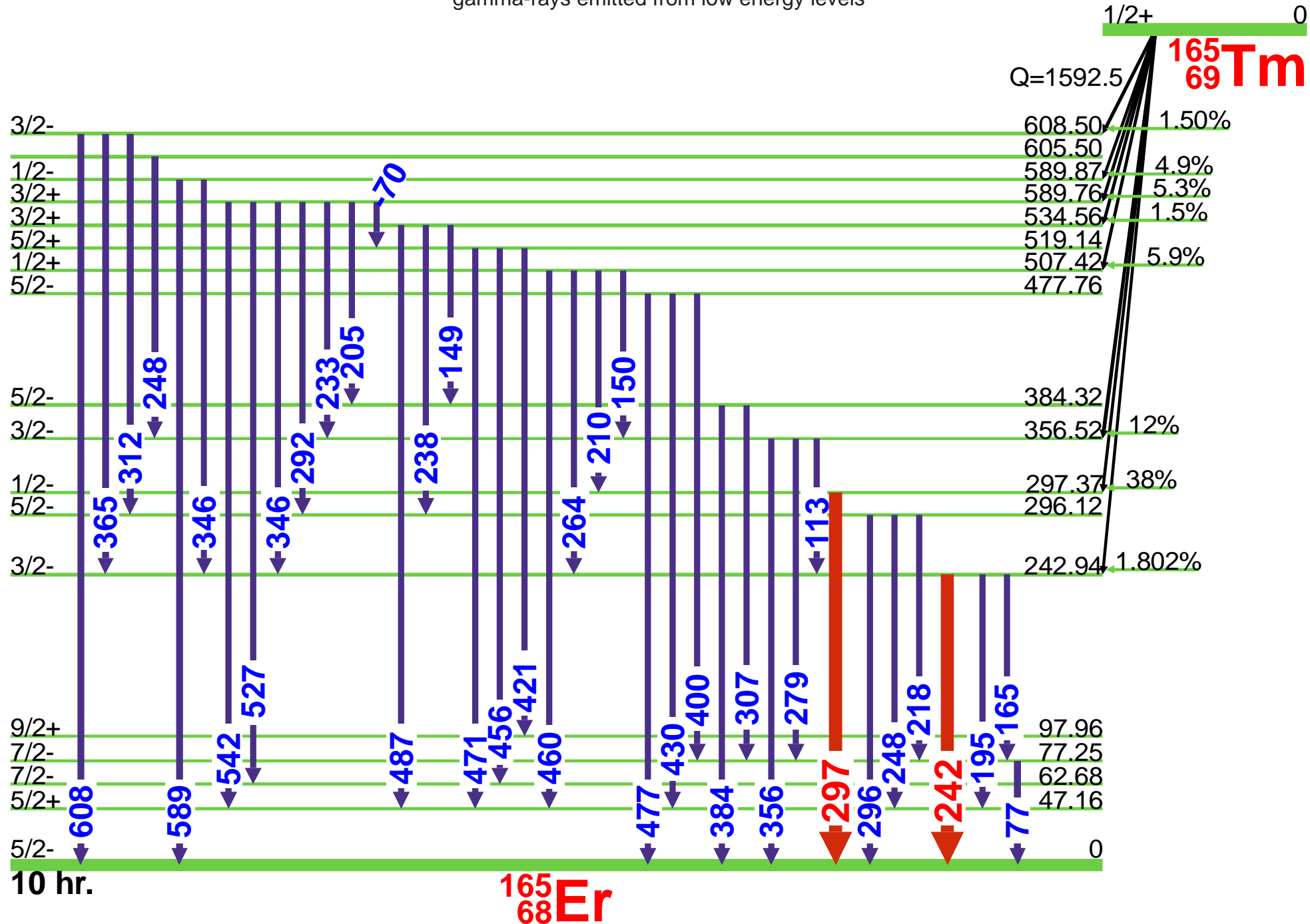
¹⁶⁵Tm(30 hr.) Decay Scheme

gamma-rays emitted from high energy levels



^{165}Tm (30 hr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{165}Tm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 30.06(3) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{166}\text{Er}(p,2n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
11.600	0.020				4
14.560	0.020				4
15.512	0.010				4
20.710	0.020				4
27.879	0.015				4
30.106	0.008				4
35.280	0.018				4
47.155	0.006		16.9	0.8	4
50.770	0.020				4
53.182	0.015		0.57	0.05	4
54.415	0.011		7.2	0.4	4
59.129	0.022		0.058	0.005	4
60.399	0.004		0.71	0.03	4
62.676	0.005		0.511	0.024	4
70.610	0.005	0.39	0.211	0.011	4
76.560	0.020				4
77.253	0.005	1.63	0.73	0.04	4
82.330	0.010				4
86.930	0.010				4
88.205	0.015		0.047	0.005	4
98.60	0.05				4
113.599	0.004	4.3	1.56	0.07	3
120.34	0.04				4
125.17	0.04				4
127.69	0.04				4
129.82	0.04				4
D 141.36	0.07				4
D 141.36	0.07		0.030	0.005	4
144.08	0.04				4
D 149.65	0.06	1.8	0.029	0.006	4
D 150.894	0.005		0.564	0.028	4
D 156.10	0.03		0.012	0.006	4
D 156.21	0.03		0.017	0.006	4
162.60	0.03		0.064	0.014	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
165.659	0.015	0.75	0.156	0.022	4
175.86	0.07		0.0224	0.0027	4
181.61	0.04		0.0174	0.0019	4
195.773	0.007	1.84	0.575	0.028	4
197.70	0.04				4
205.402	0.011	1.6	0.427	0.020	4
210.053	0.007	2.0	0.84	0.04	3
218.859	0.006	9.9	3.34	0.23	2
221.15	0.05				4
222.0	0.7				4
224.02	0.08		0.028	0.006	4
233.280	0.013		0.103	0.005	4
234.789	0.022		0.065	0.004	4
238.471	0.018		0.160	0.016	4
D 238.471	0.018				4
242.917	0.007	100.	35.5	1.7	1
248.962	0.007	2.94	0.80	0.03	3
D 248.962	0.007		0.142	0.015	
249.83	0.04				
253.45	0.05		0.064	0.014	4
264.492	0.007	1.58	0.554	0.027	4
275.7			0.213	0.009	4
277.66	0.03		0.0387	0.0024	4
279.264	0.007	1.80	0.60	0.03	4
282.40	0.15				4
286.30	0.15		0.33	0.07	4
292.410	0.014	4.4	1.27	0.07	3
296.119	0.009	47.0	3.88	0.18	1
D 297.369	0.006		12.7	0.6	
304.00	0.20				4
307.067	0.011	0.44	0.158	0.008	4
309.4	0.3				4
312.327	0.012	1.75	0.47	0.03	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{165}Tm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 30.06(3) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{166}\text{Er}(p,2n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	318.84	0.07		0.0110	0.0025	4
	323.40	0.20				4
D	330.777	0.010	0.57	0.088	0.006	4
	330.885	0.010		0.114	0.007	
	334.34	0.10		0.0149	0.0022	4
D	346.825	0.011	8.9	0.220	0.012	2
	346.933	0.011		2.88	0.16	
	356.519	0.012	8.0	2.75	0.14	2
	362.30	0.20				4
	365.577	0.008	1.54	0.490	0.025	4
	372.8	0.4				4
	377.40	0.20				4
	384.55	0.04		0.153	0.019	4
	389.404	0.014	8.0	2.82	0.14	2
	400.520	0.011		0.140	0.007	4
	410.02	0.07		0.034	0.004	4
	413.294	0.023		0.082	0.007	4
	415.12	0.03		0.061	0.004	4
	416.88	0.10		0.0199	0.0026	4
	421.179	0.010	1.1	0.327	0.016	4
	427.56	0.12		0.0355	0.0026	4
	430.594	0.021	0.95	0.280	0.018	4
	442.980	0.016	1.8	0.73	0.04	3
	448.580	0.014	4.8	1.63	0.09	3
	456.459	0.015	3.2	1.25	0.08	3
	460.263	0.016	12.2	4.12	0.22	2
	471.979	0.010	0.9	0.353	0.017	4
	477.791	0.023	1.4	0.401	0.022	4
	480.23	0.08		0.048	0.004	4
	484.73	0.03		0.107	0.008	4
	487.399	0.010	3.1	1.04	0.05	3
	492.41	0.03		0.098	0.008	4
	494.94	0.05		0.052	0.004	4
	496.98	0.13		0.016	0.005	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	513.627	0.014	1.13	0.082	0.004	4
	513.735	0.014		0.241	0.020	
	525.65	0.04		0.105	0.009	4
	527.106	0.012	3.5	0.94	0.05	3
	531.243	0.026		0.132	0.007	4
	534.72	0.07		0.033	0.004	4
	537.171	0.029		0.073	0.008	4
	542.622	0.011	4.9	1.43	0.10	3
D	557.38	0.04		0.185	0.023	4
	558.741	0.029		0.316	0.020	
	564.183	0.017	6.9	2.31	0.17	3
	570.4	0.8		0.0082	0.0022	4
	573.882	0.012		0.344	0.020	4
	578.049	0.016		0.166	0.008	4
	589.912	0.015	5.6	1.82	0.11	3
	595.95	0.13		0.023	0.007	4
	605.93	0.03		0.162	0.012	4
	605.93	0.03		0.162	0.007	4
	608.527	0.016	2.8	0.451	0.024	4
	610.616	0.017		0.479	0.025	4
	623.393	0.027		0.195	0.010	4
	654.54	0.08		0.024	0.003	4
	660.62	0.21		0.017	0.005	4
	665.067	0.020	1.2	0.377	0.019	4
	677.85	0.03		0.148	0.008	4
	680.613	0.019		0.092	0.005	4
	698.843	0.016	3.8	1.29	0.07	3
	703.66	0.19		0.0178	0.0026	4
	712.59	0.06		0.023	0.004	4
	716.96	0.05		0.031	0.003	4
D	719.58	0.08		0.0174	0.0023	4
	719.58	0.08		0.0174	0.0023	
	742.84	0.06		0.028	0.004	4
	747.00	0.06	0.5	0.178	0.013	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{165}Tm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

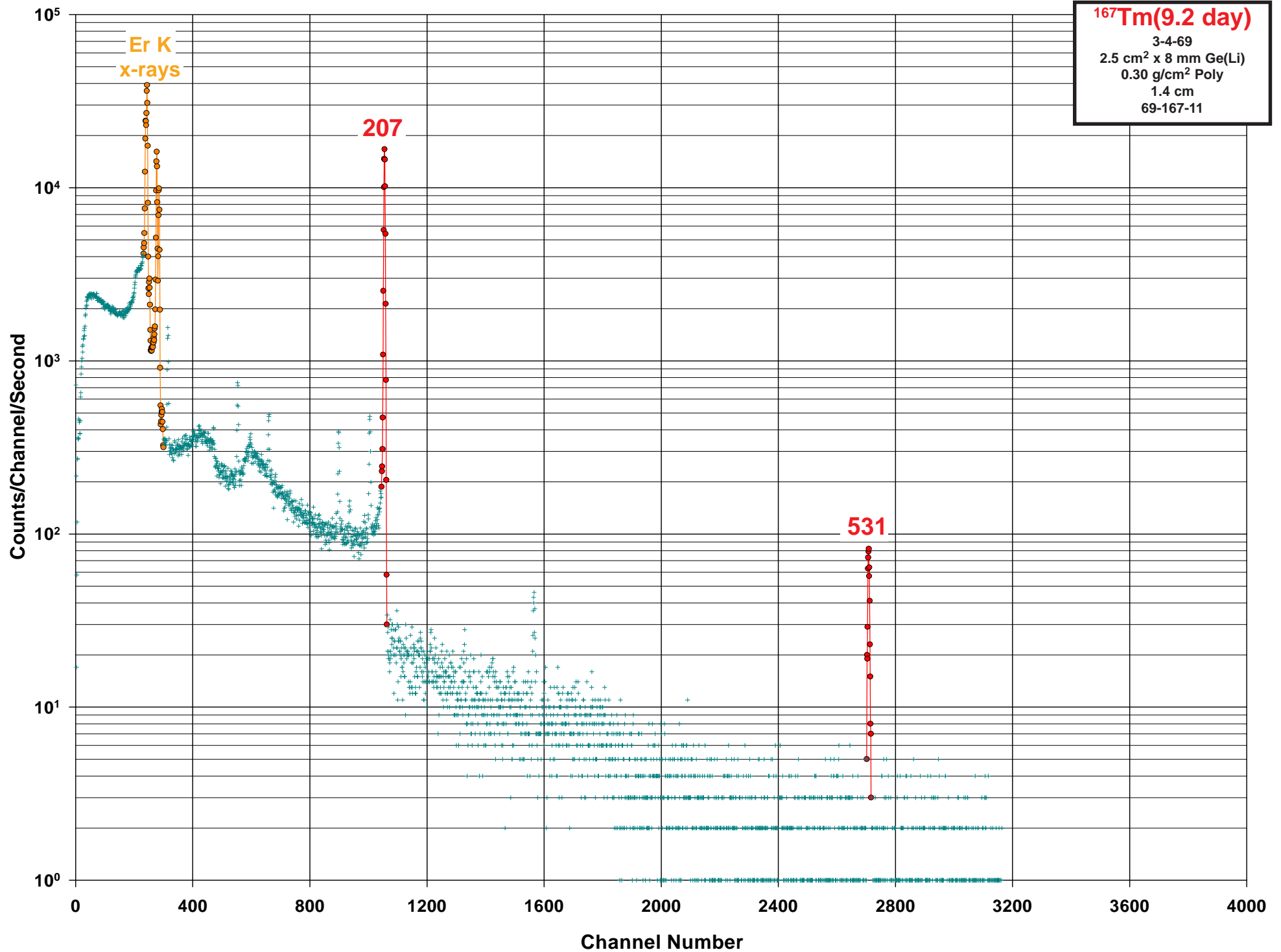
Half Life: 30.06(3) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{166}\text{Er}(p,2n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
749.01	0.13		0.075	0.008	4
773.42	0.18		0.018	0.004	4
790.873	0.018	1.8	0.458	0.022	3
793.72	0.10		0.029	0.004	4
806.372	0.017	27.6	9.5	0.5	1
821.535	0.028		0.102	0.008	4
826.04	0.06		0.046	0.003	4
827.43	0.07		0.043	0.005	4
837.646	0.023	1.8	0.486	0.025	3
837.646	0.023				
853.568	0.022	1.0	0.161	0.010	4
880.93	0.07		0.0316	0.0028	4
884.48	0.21		0.0124	0.0025	4
892.79	0.07		0.028	0.004	4
908.26	0.11		0.021	0.005	4
920.24	0.08		0.040	0.004	4
932.56	0.04		0.069	0.012	4
937.39	0.10		0.0192	0.0023	4
949.78	0.07		0.058	0.003	4
952.711	0.028		0.139	0.012	4
955.28	0.13		0.0188	0.0023	4

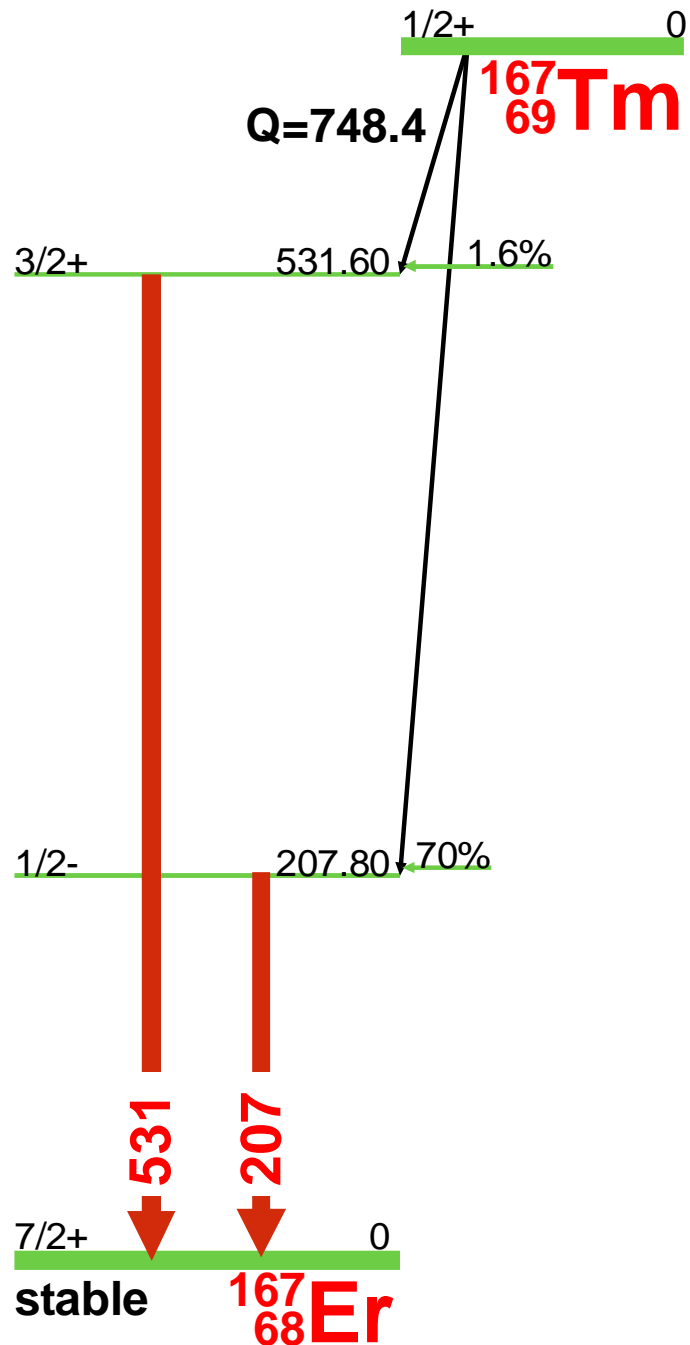
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
988.75	0.28		0.0082	0.0022	4
991.77	0.06		0.042	0.004	4
1013.59	0.18		0.0064	0.0018	4
1043.05	0.04		0.077	0.004	4
1046.07	0.07		0.077	0.005	4
1070.80	0.12		0.0117	0.0018	4
1096.47	0.07		0.0135	0.0015	4
1118.77	0.13		0.0082	0.0015	4
1131.262	0.028	5.20	1.73	0.11	2
1184.446	0.027	8.8	2.95	0.19	1
1231.86	0.11		0.0288	0.0028	4
1262.09	0.09		0.0124	0.0029	4
1277.79	0.06		0.015	0.004	4
1285.22	0.06		0.055	0.003	4
1289.04	0.03		0.104	0.005	4
1339.39	0.06		0.021	0.004	4
1339.39	0.06		0.021	0.004	
1364.75	0.03		0.065	0.003	4
1380.21	0.03	0.68	0.39	0.03	2
1416.80	0.10		0.0320	0.0020	4
1427.40	0.04	1.8	0.81	0.06	1





¹⁶⁷Tm(9.2 day) Decay Scheme

9.2 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁶⁷Tm

Half Life: 9.25(2) day

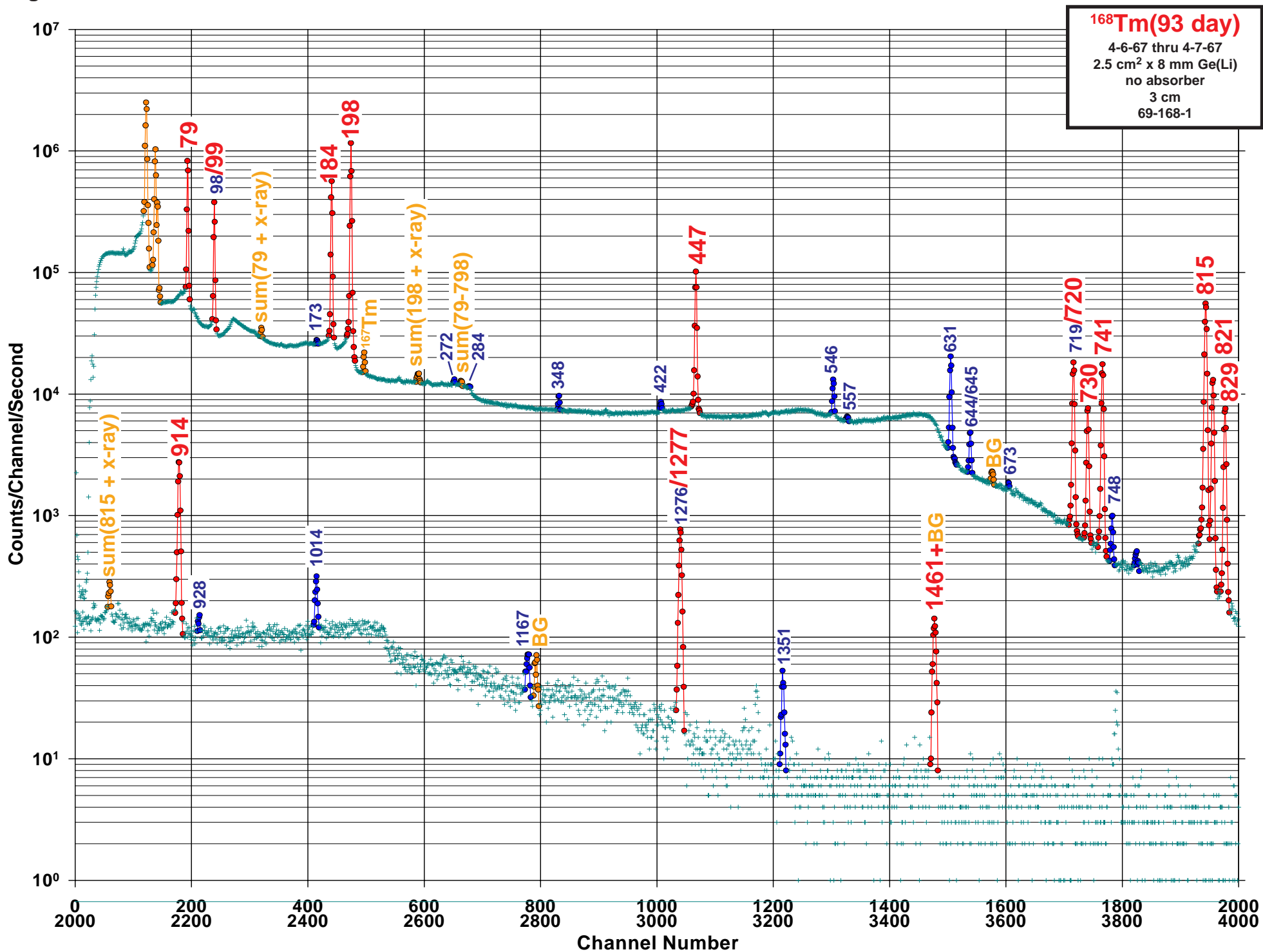
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁶⁷Er(p,n)

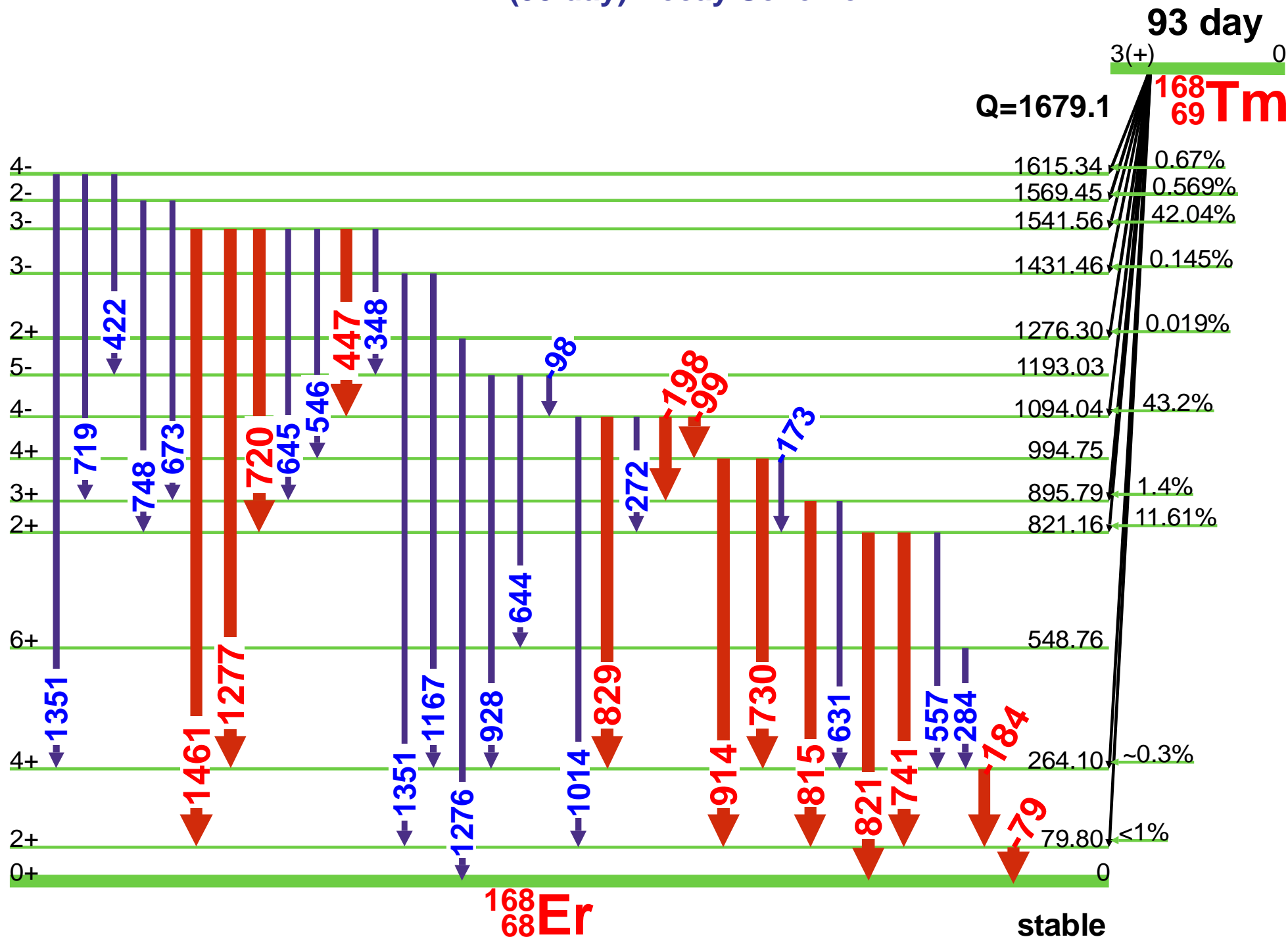
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
16.7	0.3				4
57.10	0.09		4.6	1.0	4
73.80	0.20				4
207.80	0.20	100.	41.	8.	1
250.2	0.5		0.0022	0.0006	4
264.9			0.075	0.010	4
266.5	0.5		0.0022	0.0006	4
323.7	0.5		0.0021	0.0005	4
346.5	0.3		0.025	0.005	4
531.5	0.8	4.18	1.59	0.21	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁶⁸Tm(93 day) Decay Scheme



stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{168}Tm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 93.1(2) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{168}\text{Er}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	59.13	0.15				4
	73.784	0.003		0.0102	0.0022	4
	74.626	0.003		0.018	0.005	4
	79.804	0.002	22.0	10.8	0.4	1
D	98.982	0.002	8.7	0.151	0.022	1
	99.289	0.002		4.18	0.13	
	122.821	0.001		0.0001		4
	173.591	0.019	0.18	0.0414	0.0025	4
	184.295	0.002	33.0	17.9	0.6	1
	198.251	0.002	100.	53.8	1.6	1
	221.8	0.5		0.0022	0.0011	4
	272.896	0.013	0.20	0.092	0.005	4
	284.655	0.014	0.18	0.089	0.005	4
	348.509	0.002	0.62	0.349	0.011	4
	422.305	0.007	0.54	0.301	0.010	4
	445.995	0.004		0.075	0.022	4
	447.515	0.003	44.0	23.7	0.7	1
	497.78	0.06		0.037	0.004	4
	521.13	0.07		0.031	0.004	4
	535.642	0.021		0.0003	0.0001	4
	537.76	0.06		0.0003	0.0001	4
	546.80	0.03	4.8	2.62	0.08	4
	557.083	0.012	0.39	0.221	0.013	4
	559.5	0.4		0.0081	0.0027	4
	568.8	0.4		0.0059	0.0027	4
	582.57	0.25		0.0016	0.0011	4
	620.59	0.07		0.0075	0.0027	4
	631.705	0.003	16.0	9.15	0.28	2
D	644.277	0.005	2.8	0.0124	0.0022	3
	645.775	0.015		1.46	0.04	
	673.670	0.015	0.26	0.161	0.007	4
D	719.550	0.005	22.0	0.20	0.03	1
	720.392	0.005		12.1	0.4	

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	730.660	0.004	9.0	5.21	0.16	1
	737.7	0.7		0.011	0.005	4
	741.355	0.004	23.0	12.6	0.4	1
	748.282	0.007	0.67	0.420	0.014	3
	812.287	0.011		0.009	0.005	4
	815.989	0.005	93.0	50.3	1.5	1
	821.162	0.002	22.0	11.8	0.4	1
	829.948	0.006	12.0	6.89	0.21	1
	832.36	0.04		0.0008	0.0003	4
	853.468	0.003		0.0339	0.0019	4
	862.6	0.3		0.0015	0.0008	4
	914.933	0.004	5.8	3.08	0.09	1
	928.916	0.007	0.11	0.0629	0.0025	4
	1012.26	0.06		0.0113	0.0011	4
	1014.226	0.010	0.13	0.073	0.003	3
	1025.4	0.4				4
	1137.36	0.15		0.0004	0.0002	4
	1146.998	0.009		0.0006	0.0002	4
	1167.357	0.006	0.14	0.0732	0.0027	4
	1196.51	0.05		0.0040	0.0005	4
	1229.08	0.11		0.0008	0.0005	4
D	1276.27	0.03	3.2	0.0040	0.0009	1
	1277.451	0.005		1.66	0.05	
	1279.100	0.023		0.0355	0.0024	4
	1310.0	0.3		0.0001		4
	1323.909	0.009		0.0215	0.0008	4
	1331.39	0.09		0.0008	0.0002	4
D	1351.2		0.16	0.0118	0.0004	2
	1351.54	0.04		0.075	0.010	
	1358.904	0.014		0.0102	0.0006	4
	1392.209	0.013				4
	1413.35	0.15		0.0004	0.0001	4
	1431.7	0.4		0.0004	0.0001	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{168}Tm E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

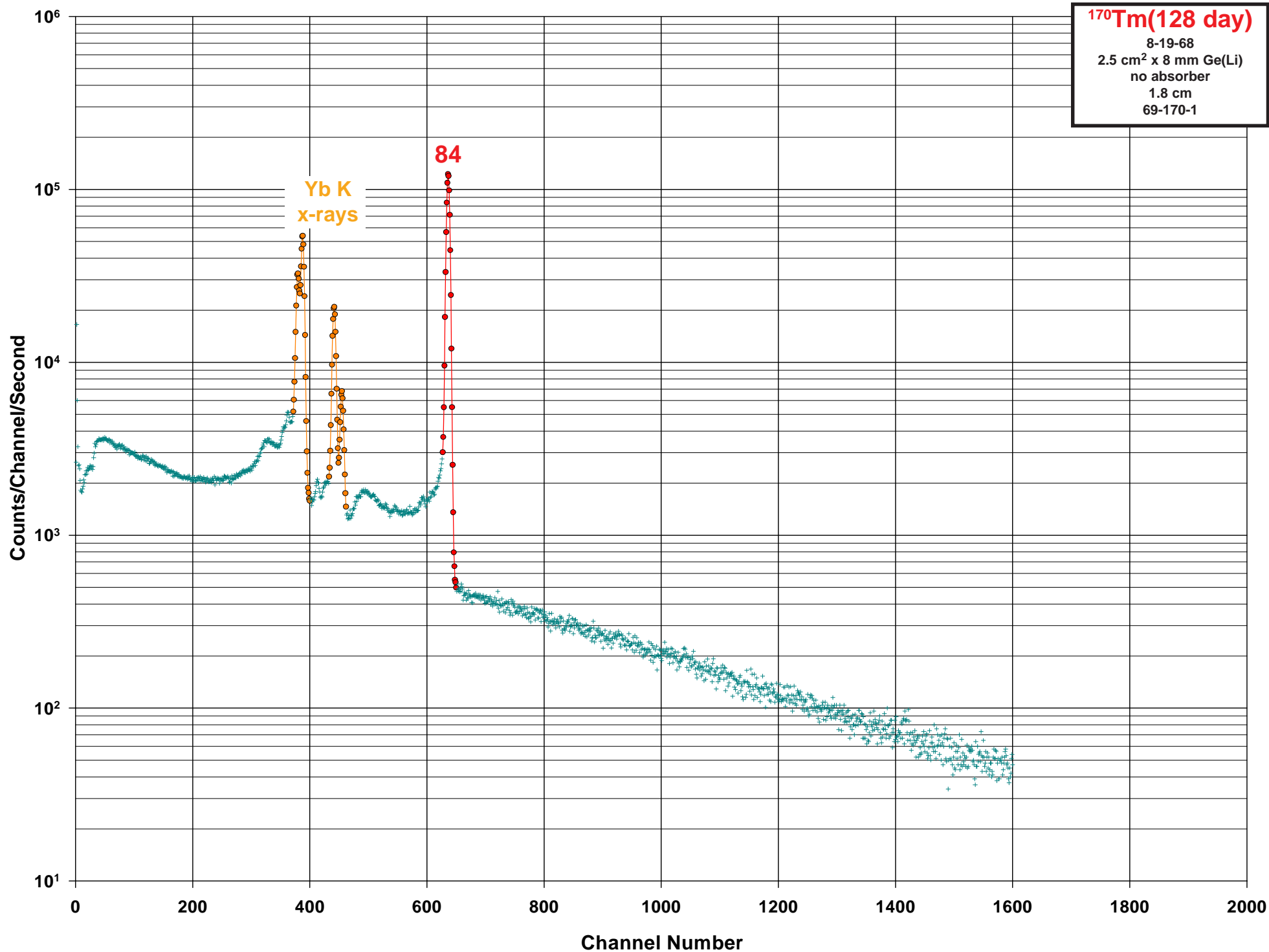
Half Life: 93.1(2) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{168}\text{Er}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1461.750	0.004	0.67	0.244	0.008	1
1489.66	0.03		0.0021	0.0001	4
1493.70	0.20		0.0002		4

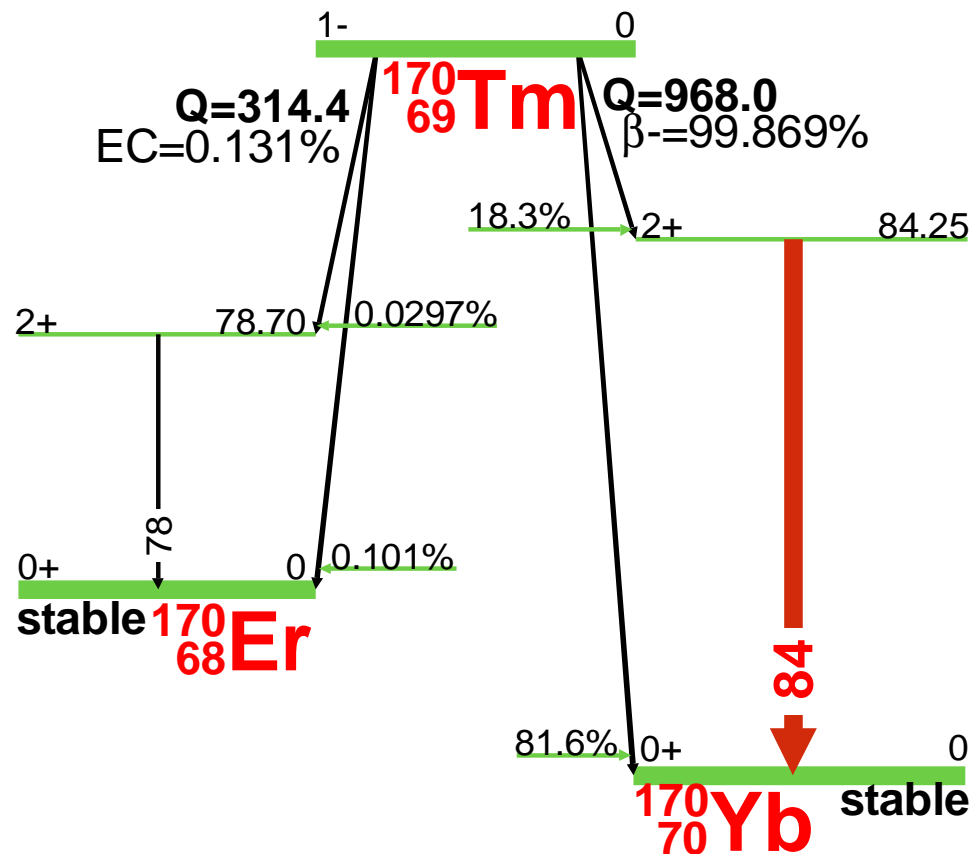
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1541.56	0.03		0.0023	0.0001	4
1553.5	0.7				4
1569.5	0.4				4





¹⁷⁰Tm(128 day) Decay Scheme

128 day



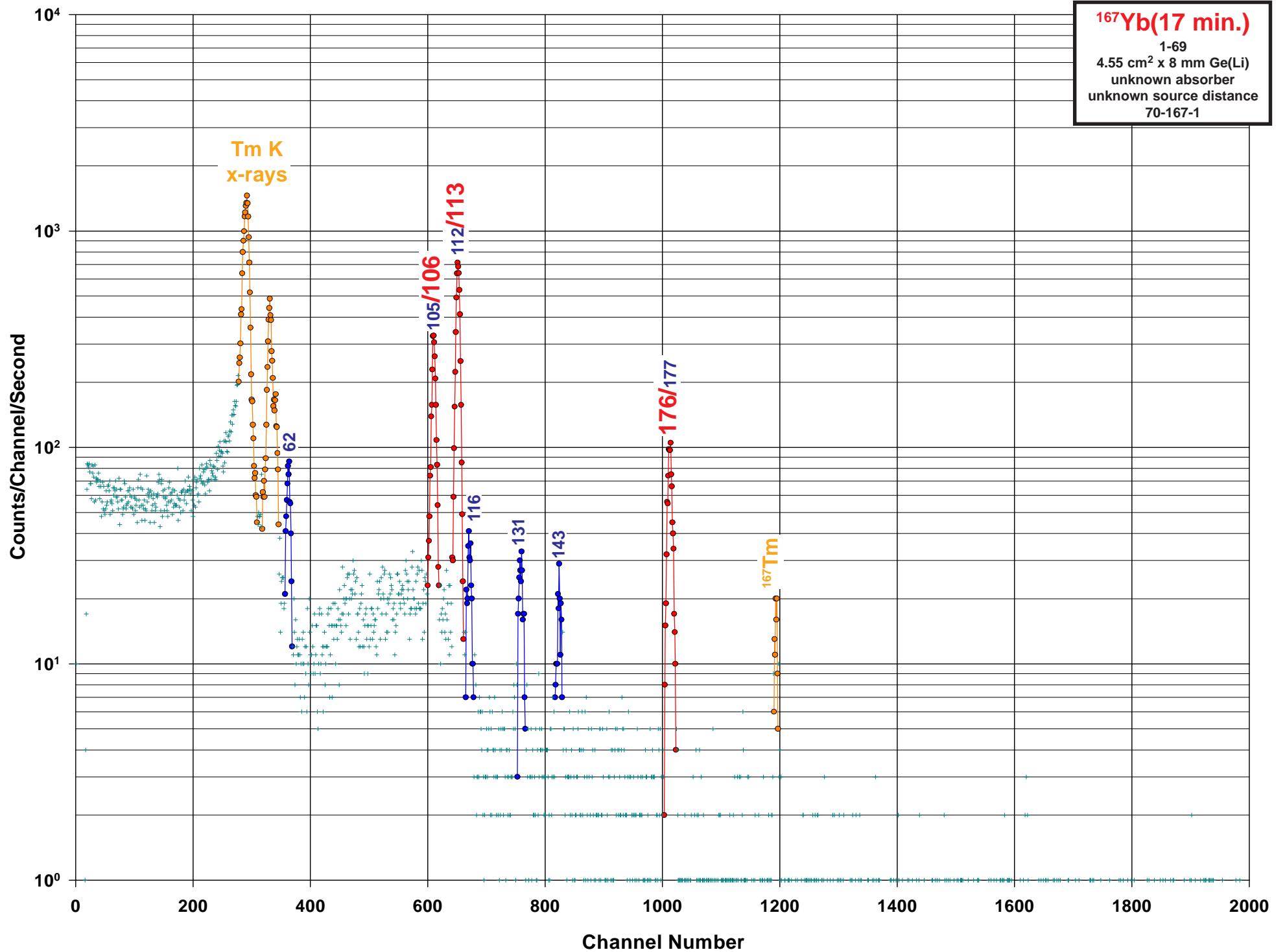
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁷⁰Tm Half Life: 128.6(3) day
 Detector: 2.5 cm² x 8 mm Ge (Li) Method of Production: ¹⁶⁹Tm(n,γ)

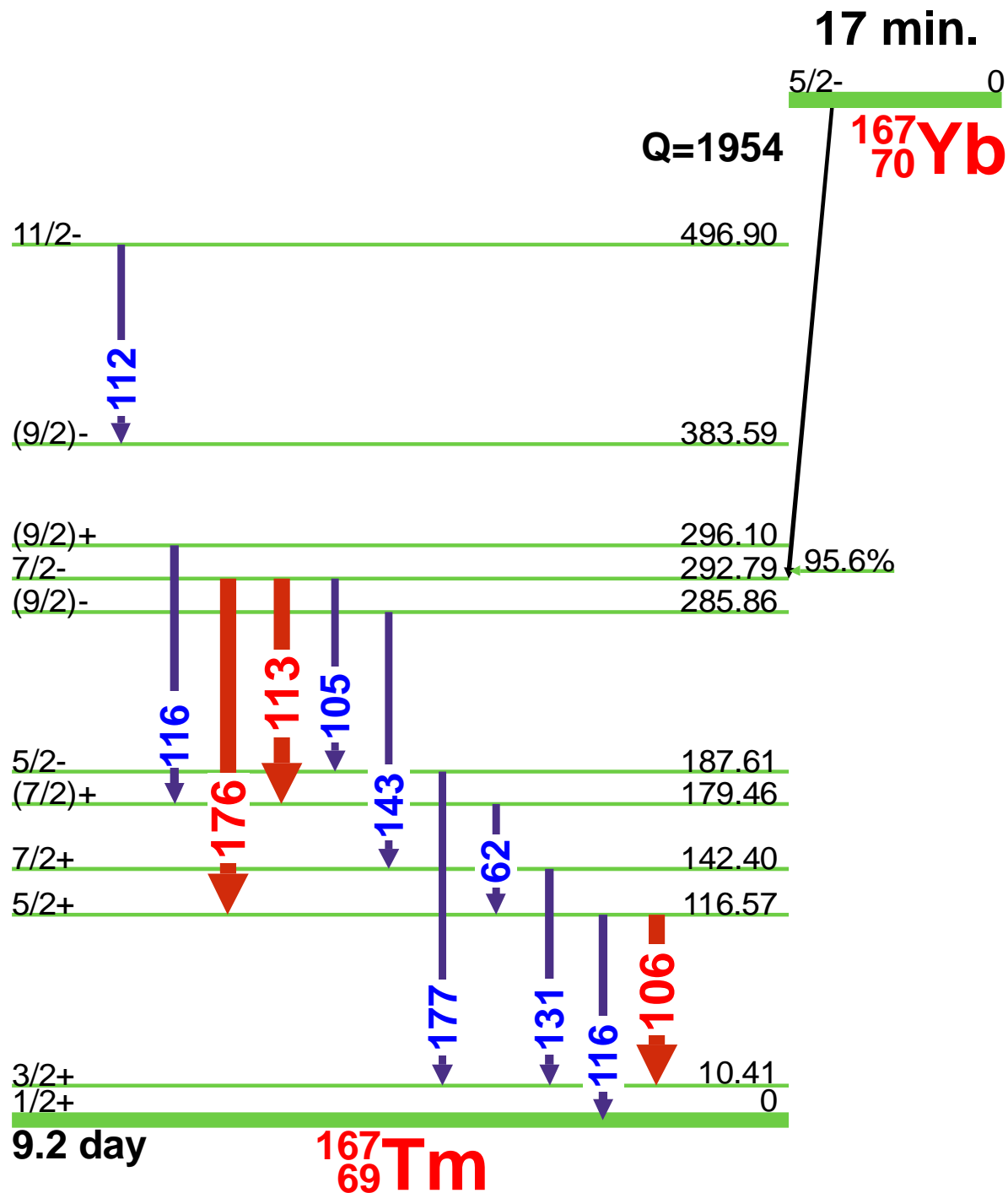
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
78.7	0.5		0.0035	0.0001	4
84.255		100	2.48	0.06	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁶⁷Yb(17 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{167}Yb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 17.5(2) min.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{168}\text{Yb}(\gamma, n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	6.93	0.04				4
	10.41	0.03		0.18	0.06	4
	25.830	0.020		0.045	0.014	4
	37.050	0.020		0.19	0.07	4
	62.900	0.020	9.1	4.9	0.8	2
	90.83	0.06		0.018	0.008	4
	98.24	0.03		0.082	0.009	4
	103.32	0.05		0.017	0.007	4
D	105.190	0.020	39.0	0.59	0.07	1
	106.160	0.020		22.6	1.4	
D	112.88	0.04	100.	0.0021	0.0006	1
	113.320	0.020		55.	3.	
D	116.570	0.020	5.6	2.83	0.13	2
	116.60	0.10		0.045	0.006	
	131.990	0.020	7.1	2.79	0.14	1
	143.460	0.020		2.11	0.10	4
	150.40	0.03		0.037	0.010	4
	161.32	0.08		0.035	0.010	4
	169.04	0.03		0.158	0.016	4
	171.75	0.08		0.037	0.010	4
	174.25	0.07		0.013	0.005	4
D	176.23	0.03	36.9	20.5	0.8	1
	177.22	0.03		2.73	0.15	
	184.10	0.20		0.014	0.008	4
	203.75	0.04				4
	209.920	0.020		0.006	0.004	4
	272.10	0.20		0.0027	0.0008	4
	280.50	0.20		0.0062	0.0015	4
	282.40	0.20		0.0084	0.0017	4
	290.86	0.07		0.058	0.007	4
	321.1	0.5		0.0023	0.0010	4
	323.5	0.5		0.0035	0.0010	4
	343.29	0.08		0.034	0.004	4
	351.8	0.4		0.0033	0.0012	4
	354.0	0.4		0.0025	0.0012	4
	375.90	0.20		0.0068	0.0017	4
	379.9	0.3		0.0043	0.0014	4
	387.0	0.4		0.0023	0.0010	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	398.10	0.20		0.0047	0.0010	4
	405.57	0.08		0.0144	0.0021	4
	415.40	0.20		0.0041	0.0010	4
	421.40	0.20		0.0041	0.0010	4
	441.20	0.10		0.0113	0.0023	4
	446.8	0.3		0.0025	0.0008	4
	457.00	0.10		0.0068	0.0015	4
	460.36	0.09		0.027	0.004	4
	470.65	0.09		0.023	0.003	4
	486.60	0.20		0.0068	0.0017	4
	511.0					4
Ann.	511.006			0.93	0.04	
	541.40	0.20		0.0045	0.0012	4
	547.50	0.10		0.0125	0.0021	4
	561.8	0.4		0.0029	0.0010	4
	571.30	0.20		0.0066	0.0015	4
	590.9	0.4		0.0047	0.0017	4
	600.2	0.4		0.0041	0.0012	4
	664.90	0.20		0.0090	0.0025	4
	672.10	0.20		0.0080	0.0021	4
	680.3	0.5		0.0043	0.0014	4
	686.9	0.5		0.0053	0.0027	4
	688.50	0.20		0.012	0.003	4
	694.5	0.6		0.0041	0.0027	4
	697.1	0.6		0.0041	0.0029	4
	707.7	0.4		0.0033	0.0018	4
	719.5	0.3		0.0039	0.0012	4
	733.2	0.3		0.0070	0.0021	4
	791.50	0.20		0.0129	0.0025	4
	829.4	0.3		0.0070	0.0019	4
	846.10	0.20		0.0133	0.0025	4
	903.30	0.20		0.0068	0.0019	4
	920.32	0.08		0.117	0.019	4
	923.7	0.4		0.0062	0.0025	4
	927.1	0.8		0.0041	0.0019	4
	933.8	0.3		0.0053	0.0021	4
	936.7	0.3		0.0072	0.0023	4
	977.9	0.3		0.0043	0.0014	4
	998.3	0.3		0.0043	0.0014	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{167}Yb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

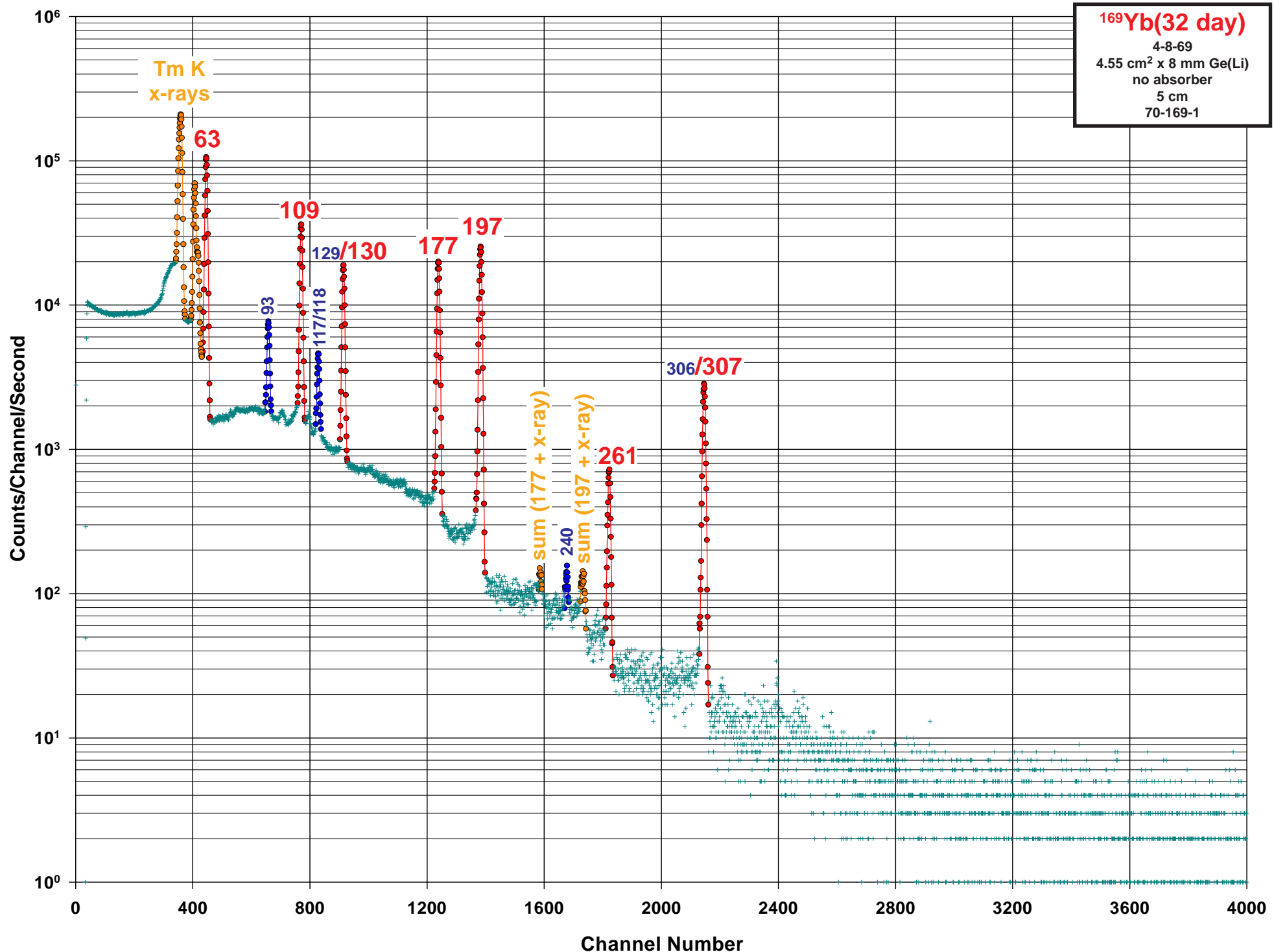
Half Life: 17.5(2) min.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{168}\text{Yb}(\gamma, n)$

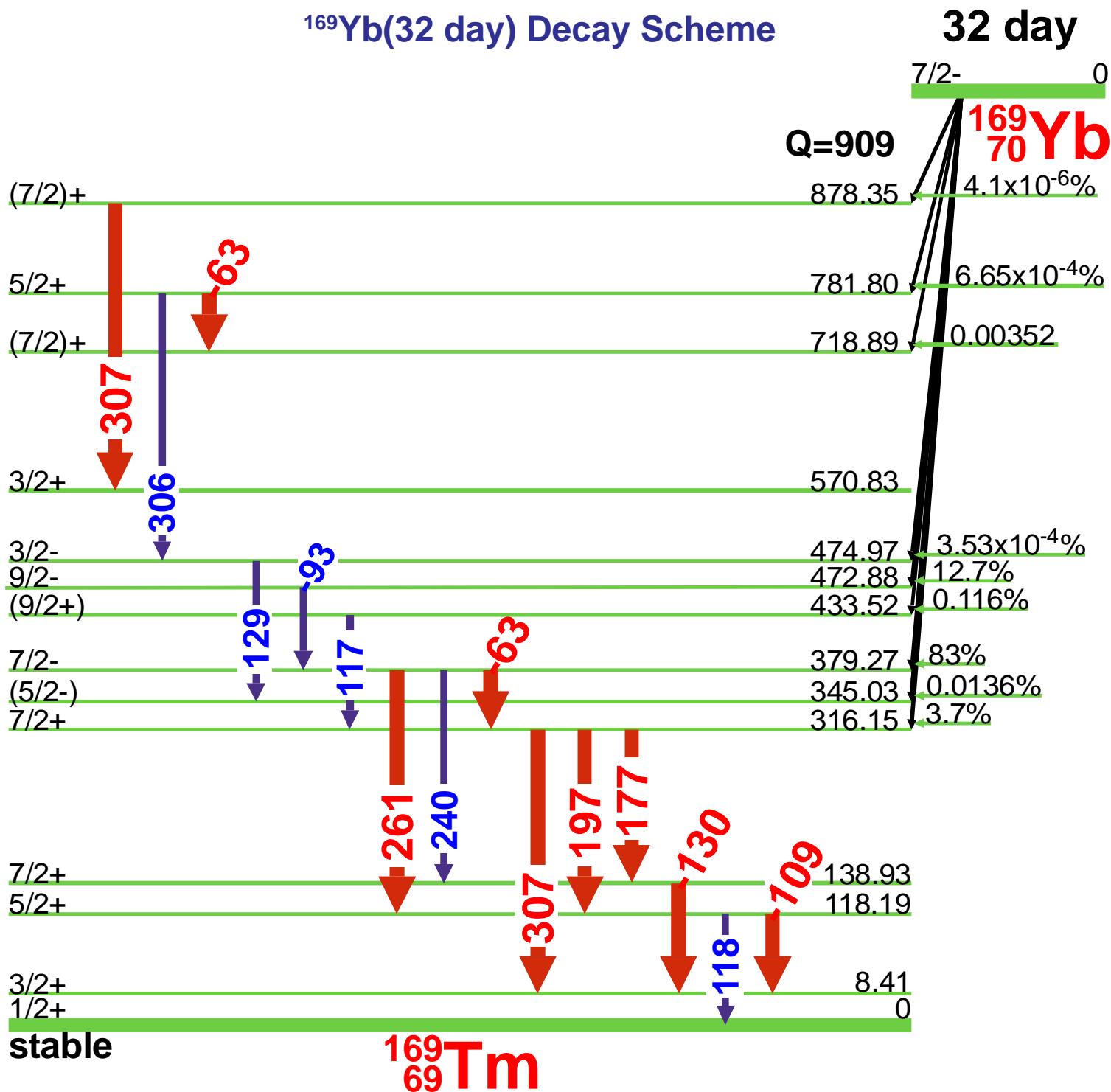
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1008.6	0.5		0.0037	0.0014	4
1022.90	0.20		0.0109	0.0021	4
1025.9	0.3		0.0045	0.0016	4
1037.07	0.07		0.62	0.08	4
1048.5	0.3		0.012	0.006	4
1050.30	0.20		0.039	0.010	4
1068.2	0.4		0.0070	0.0027	4
1070.3	0.6		0.0035	0.0021	4
1110.30	0.10		0.0107	0.0021	4
1139.50	0.10		0.040	0.006	4
1165.5	0.4		0.0031	0.0012	4
1213.30	0.20		0.0062	0.0021	4
1217.10	0.20		0.0068	0.0021	4
1234.63	0.07		0.158	0.020	4
1242.00	0.10		0.0166	0.0029	4
1254.5	0.4		0.0027	0.0010	4
1288.10	0.10		0.034	0.005	4
1298.2	0.6		0.0023	0.0010	4
1304.90	0.10		0.033	0.005	4
1320.90	0.10		0.0125	0.0021	4
1332.50	0.20		0.0055	0.0015	4
1337.2	0.5		0.0029	0.0014	4
1340.1	0.4		0.0041	0.0014	4
1342.4	0.4		0.0039	0.0014	4
1361.50	0.10		0.018	0.004	4
1366.5	0.7		0.0031	0.0012	4
1370.20	0.10		0.0119	0.0023	4
1384.80	0.20		0.0084	0.0019	4
1393.10	0.20		0.0062	0.0013	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1401.9	0.3		0.0029	0.0010	4
1410.7	0.4		0.0031	0.0010	4
1427.8	0.3		0.0031	0.0010	4
1433.7	0.3		0.0029	0.0010	4
1438.30	0.10		0.022	0.003	4
1455.10	0.10		0.023	0.003	4
1464.80	0.20		0.0059	0.0013	4
1481.1	0.3		0.0025	0.0010	4
1487.40	0.20		0.0088	0.0021	4
1498.2	0.3		0.0041	0.0012	4
1511.90	0.20				4
1511.90	0.20		0.0131	0.0021	4
1517.00	0.20		0.0086	0.0017	4
1525.7	0.3		0.0021	0.0006	4
1533.1	0.4		0.0016	0.0006	4
1537.5	0.4		0.0031	0.0014	4
1542.0	0.5		0.0010	0.0006	4
1549.5	0.4		0.0012	0.0006	4
1570.40	0.20		0.029	0.004	4
1587.10	0.20		0.028	0.004	4
1619.20	0.20		0.0115	0.0017	4
1631.7	0.3		0.0014	0.0006	4
1643.80	0.20		0.0148	0.0019	4
1675.0	0.7		0.0006	0.0004	4
1680.7	0.6		0.0010	0.0006	4
1693.6	0.5		0.0008	0.0004	4
1793.4	0.6		0.0006	0.0004	4
1807.8	0.5		0.0012	0.0006	4





¹⁶⁹Yb(32 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{169}Yb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 32.026(5) day

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{169}\text{Tm}(p,n)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	8.410			0.333	0.015	4
	20.752	0.009		0.190	0.015	4
	42.760			0.251	0.004	4
	45.940			0.0107	0.0002	4
	50.610			0.537	0.009	4
	50.855			0.537	0.009	4
	51.510			0.0179	0.0003	4
D	63.012		164.	2.15	0.04	1
	63.121			44.2	1.0	
	65.860			0.0104	0.0002	4
	72.028			0.0036	0.0001	4
	85.093			0.0029		4
	93.615		6.77	2.61	0.06	3
D	95.704			0.0021		4
	95.854			0.0021		4
	98.005			0.0018		4
	101.405			0.0072	0.0001	4
	105.19	0.10		0.0026	0.0008	4
	109.780		46.4	17.5	0.3	1
D	113.620			0.0107	0.0002	4
	113.976			0.0086	0.0001	
D	117.377	0.019	5.46	0.0397	0.0022	3
	118.190			1.87	0.04	
D	129.942		31.2	0.537	0.009	1
	130.524			11.31	0.21	
	156.725	0.011		0.0100	0.0004	4
	173.879			0.0029		4
	177.214		61.5	22.2	0.4	1
	193.15	0.05		0.0074	0.0010	4
	197.958		100.	35.8	0.7	1
	199.772			0.0322	0.0005	4
	205.99	0.06		0.0041	0.0001	4
	213.936	0.017		0.0029	0.0002	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	226.3	0.7		0.0003	0.0002	4
	228.71	0.05		0.0004		4
	240.332	0.003		0.1138	0.0024	4
	261.079		4.93	1.71	0.03	1
	291.190	0.011		0.0043	0.0002	4
	294.54	0.11		0.0010	0.0003	4
	301.732			0.0047	0.0001	4
D	306.830		29.8	0.179	0.003	1
	307.520			0.501	0.008	
	307.738			10.05	0.18	
	333.965	0.013		0.0018	0.0001	4
	336.620	0.004		0.0091	0.0002	4
	356.74	0.05		0.0001		4
	370.856	0.008		0.0072	0.0006	4
	379.286	0.018		0.0012	0.0002	4
	386.673	0.013		0.0003		4
	452.62	0.08				4
	464.72	0.09				4
	465.657	0.006		0.0002		4
	466.562	0.008				4
	474.973	0.009		0.0002		4
	494.360	0.008		0.0015		4
	500.35	0.10				4
	507.8	0.3				4
	515.104	0.006		0.0041	0.0001	4
	528.572	0.010		0.0002		4
	546.16	0.22				4
	562.413	0.012		0.0001		4
	570.89	0.03		0.0001		4
	579.854	0.005		0.0019		4
	600.607	0.008		0.0011		4
	624.885	0.004		0.0049	0.0002	4
	633.32	0.10				4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{169}Yb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

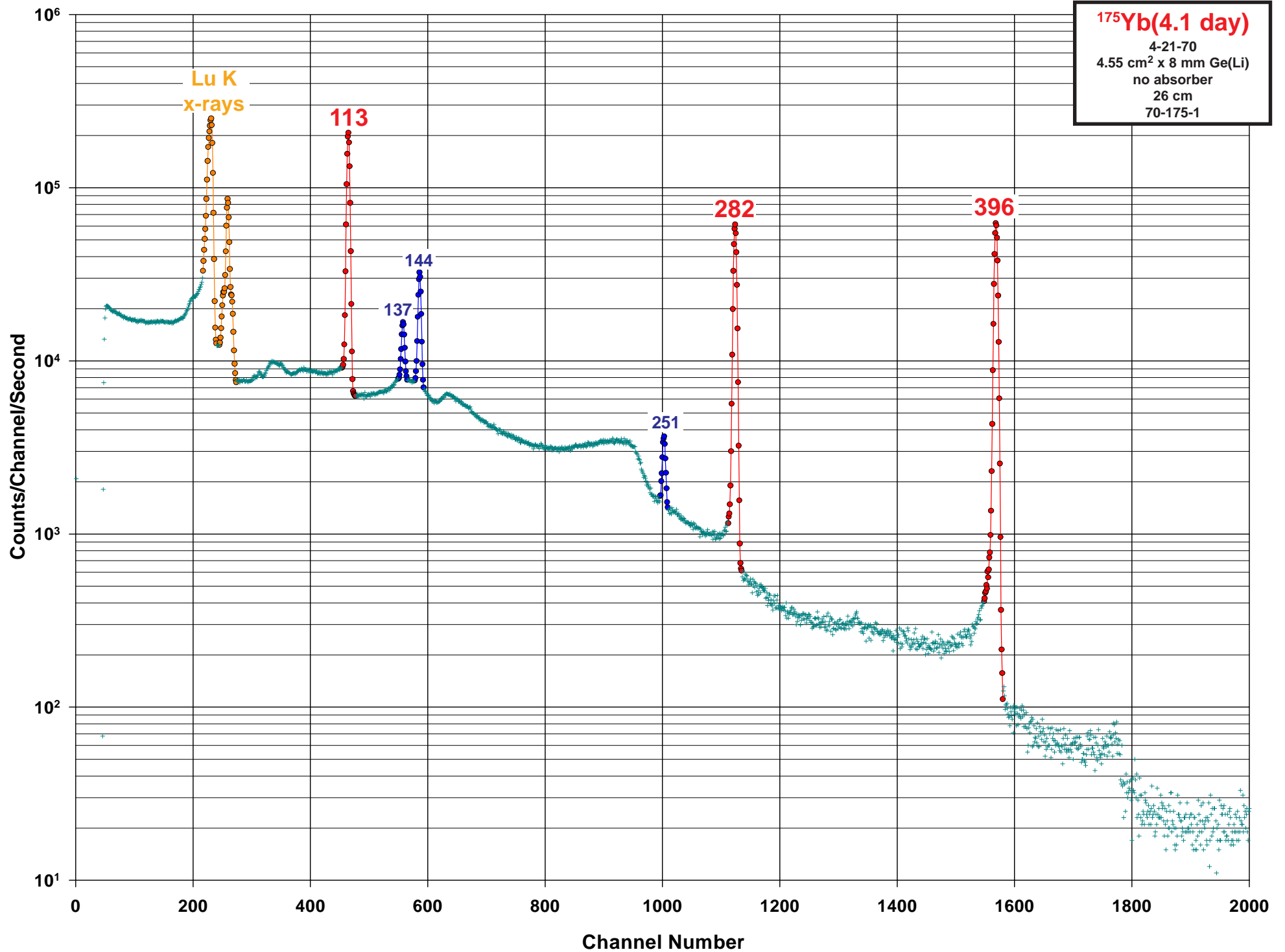
Half Life: 32.026(5) day

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{169}\text{Tm}(\text{p},\text{n})$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
642.877	0.009		0.0001		4
663.603	0.007		0.0002		4
693.46	0.08				4
710.358	0.015				4

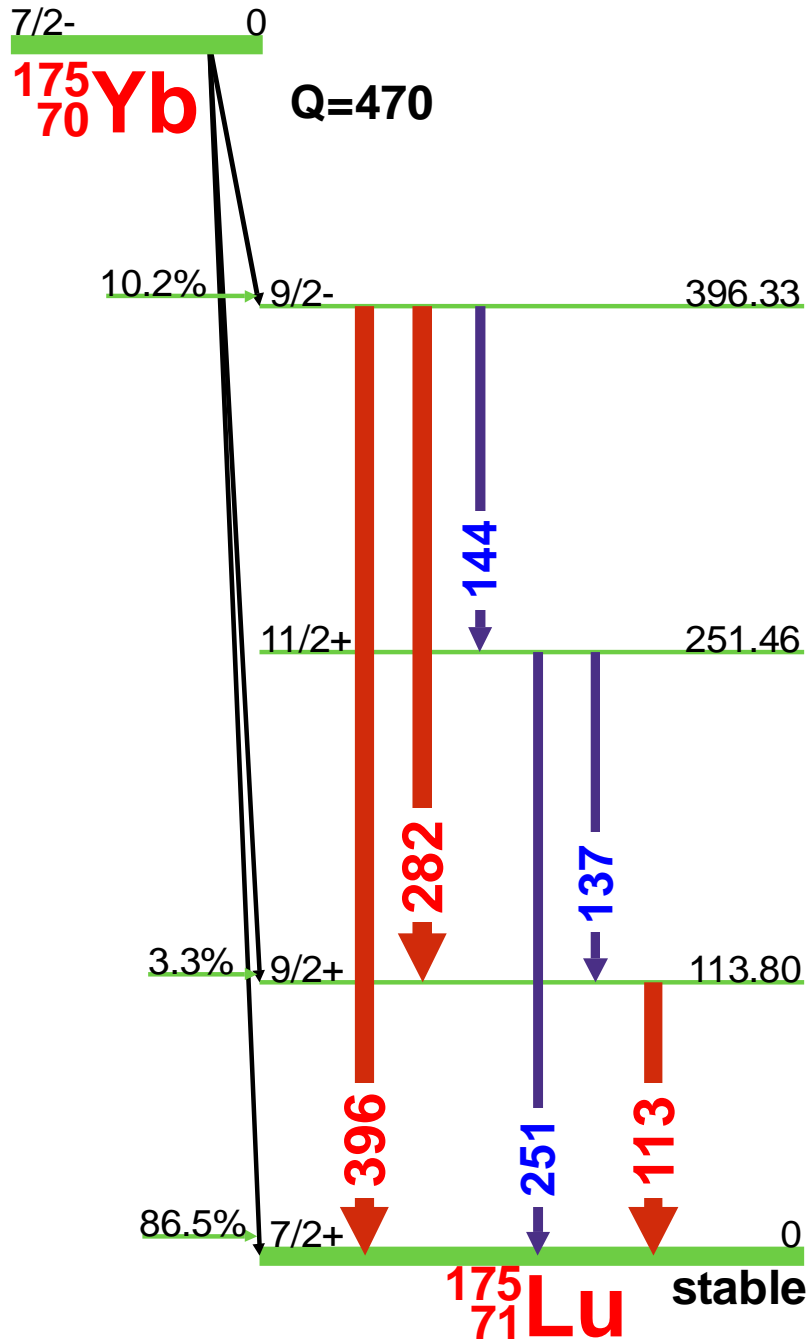
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
739.42	0.11				4
760.24	0.24				4
773.390	0.014		0.0002		4
781.64	0.08				4





¹⁷⁵Yb(4.1 day) Decay Scheme

4.1 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁷⁵Yb

Half Life: 4.185(1) day

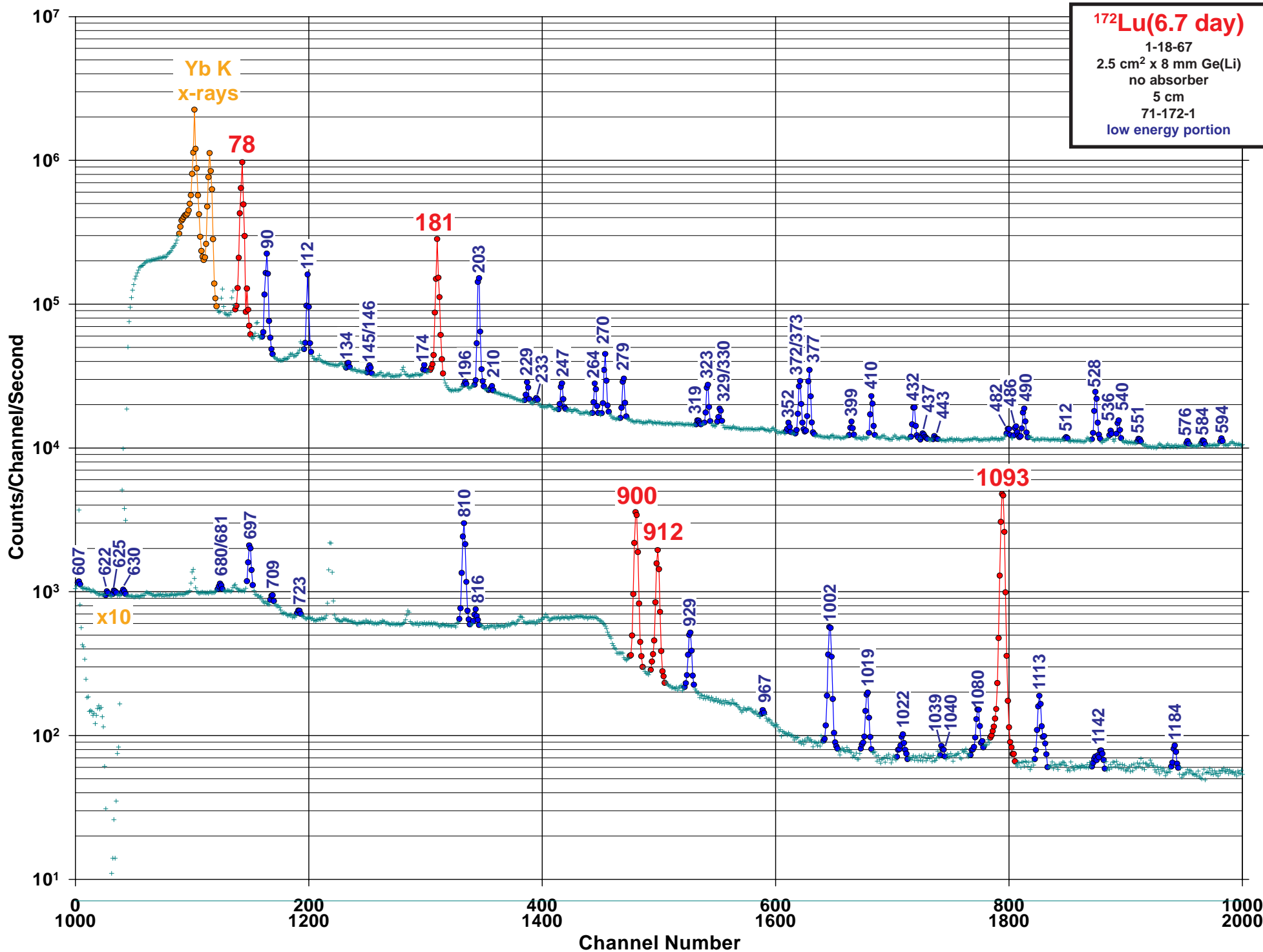
Detector: 4.55 cm² x 8 mm Ge (Li)

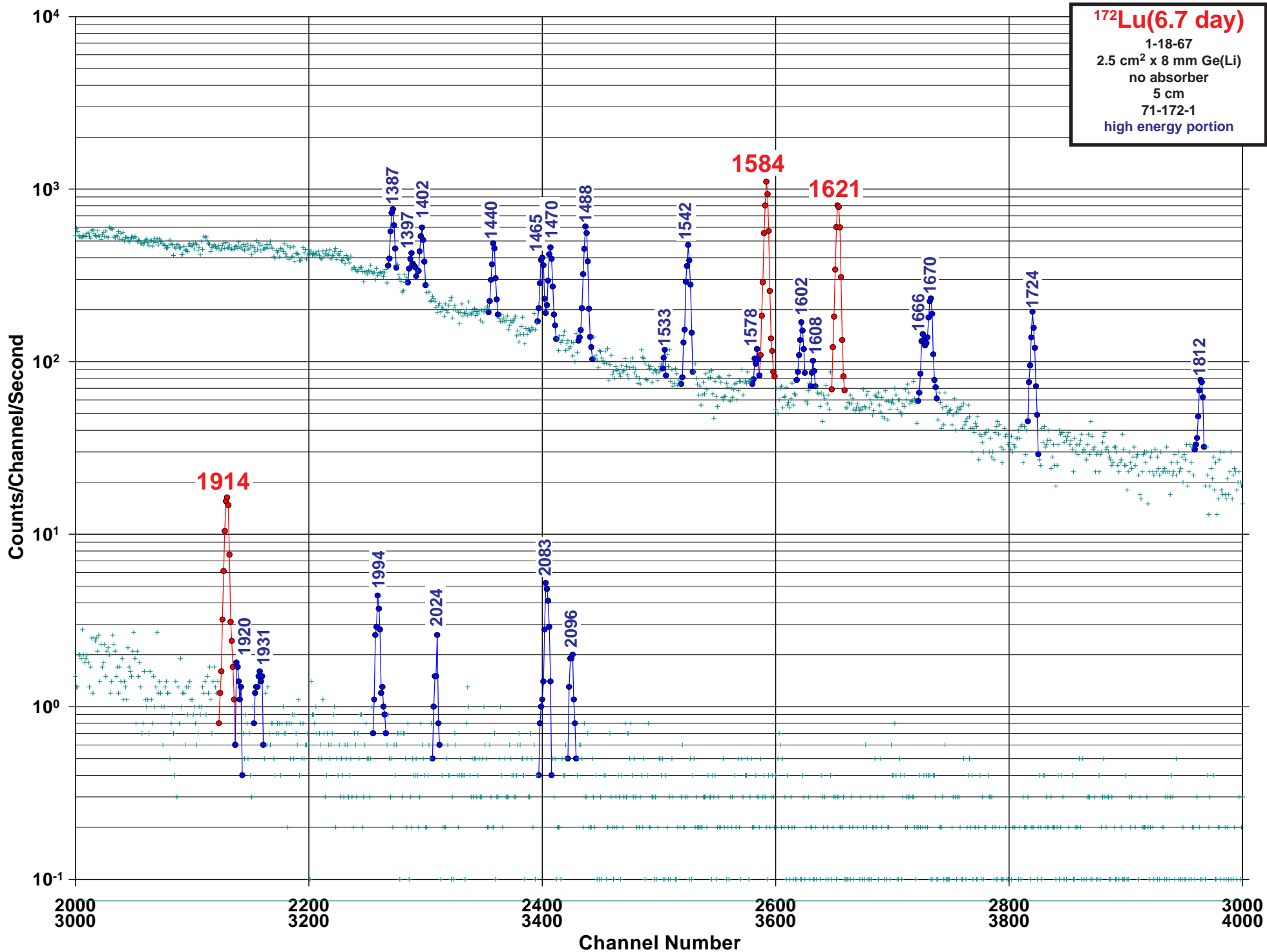
Method of Production: ¹⁷⁴Yb(n,γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
113.805	0.004	25.0	1.88	0.24	1
137.658	0.006	2.1	0.103	0.015	3
144.863	0.005	5.1	0.33	0.04	2
251.474	0.017	1.7	0.084	0.011	3
282.522	0.014	47.0	3.0	0.4	1
396.329	0.020	100.	6.4	0.8	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



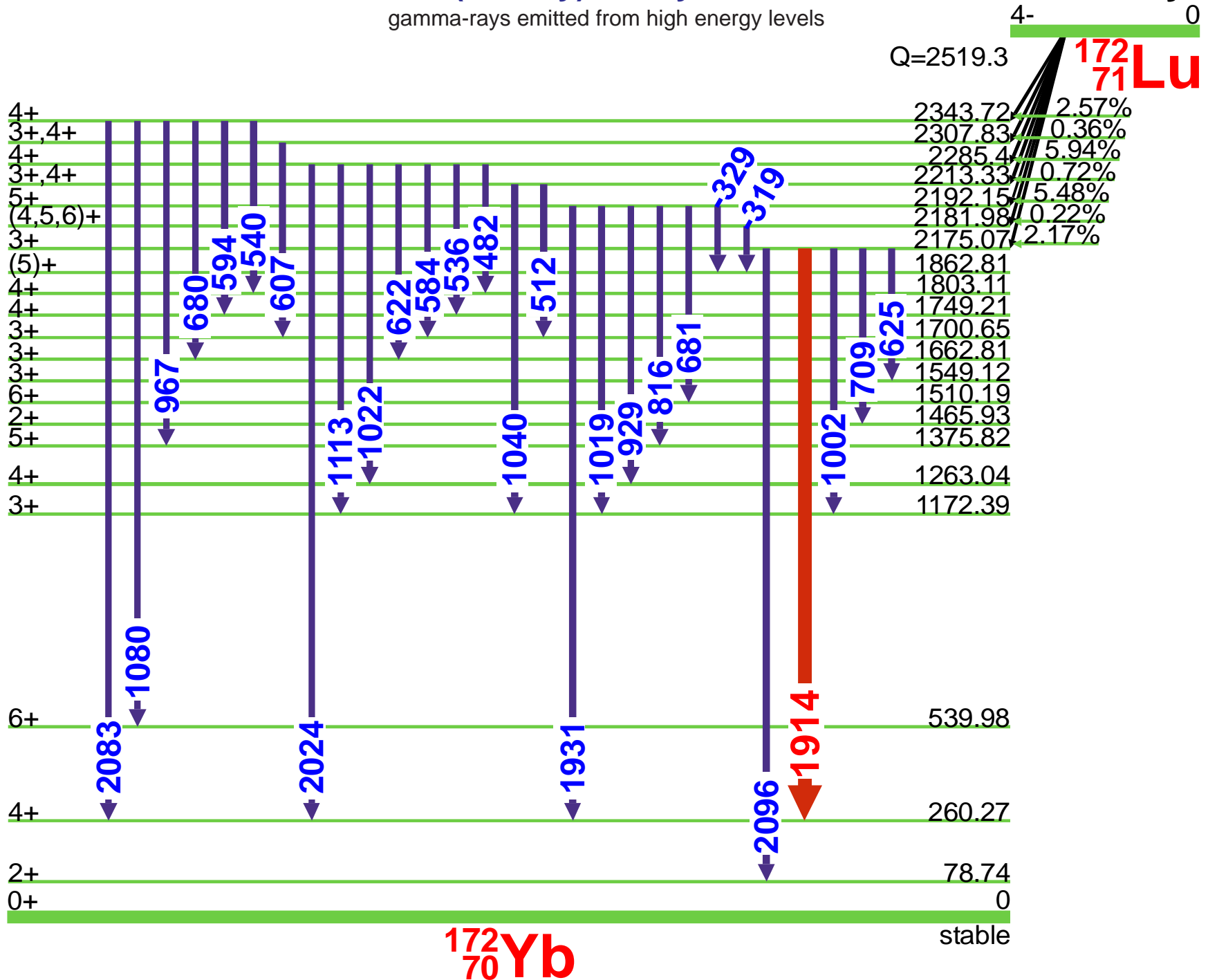




¹⁷²Lu(6.7 day) Decay Scheme

gamma-rays emitted from high energy levels

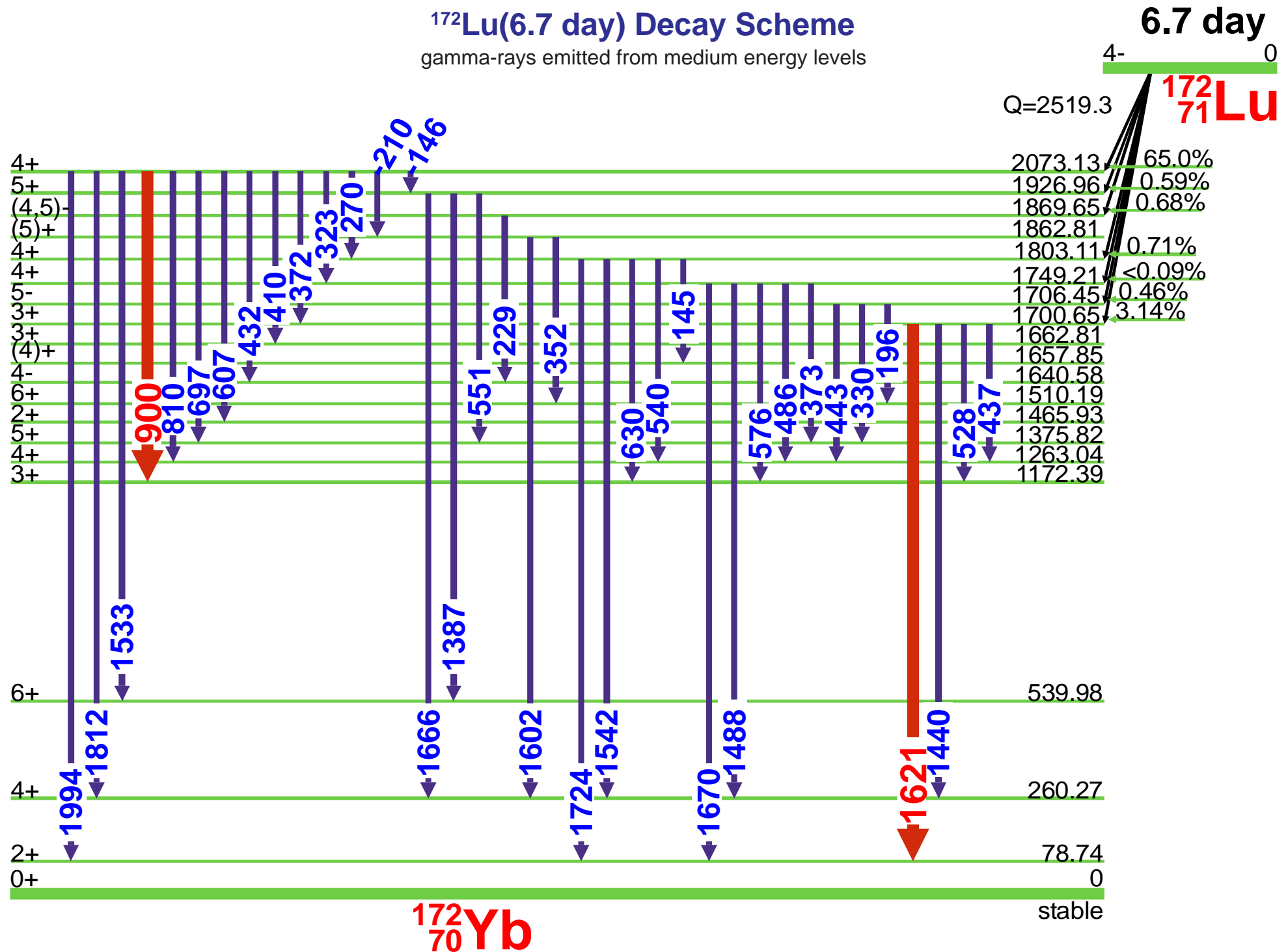
6.7 day



¹⁷²₇₀Yb



^{172}Lu (6.7 day) Decay Scheme gamma-rays emitted from medium energy levels



¹⁷²Lu(6.7 day) Decay Scheme

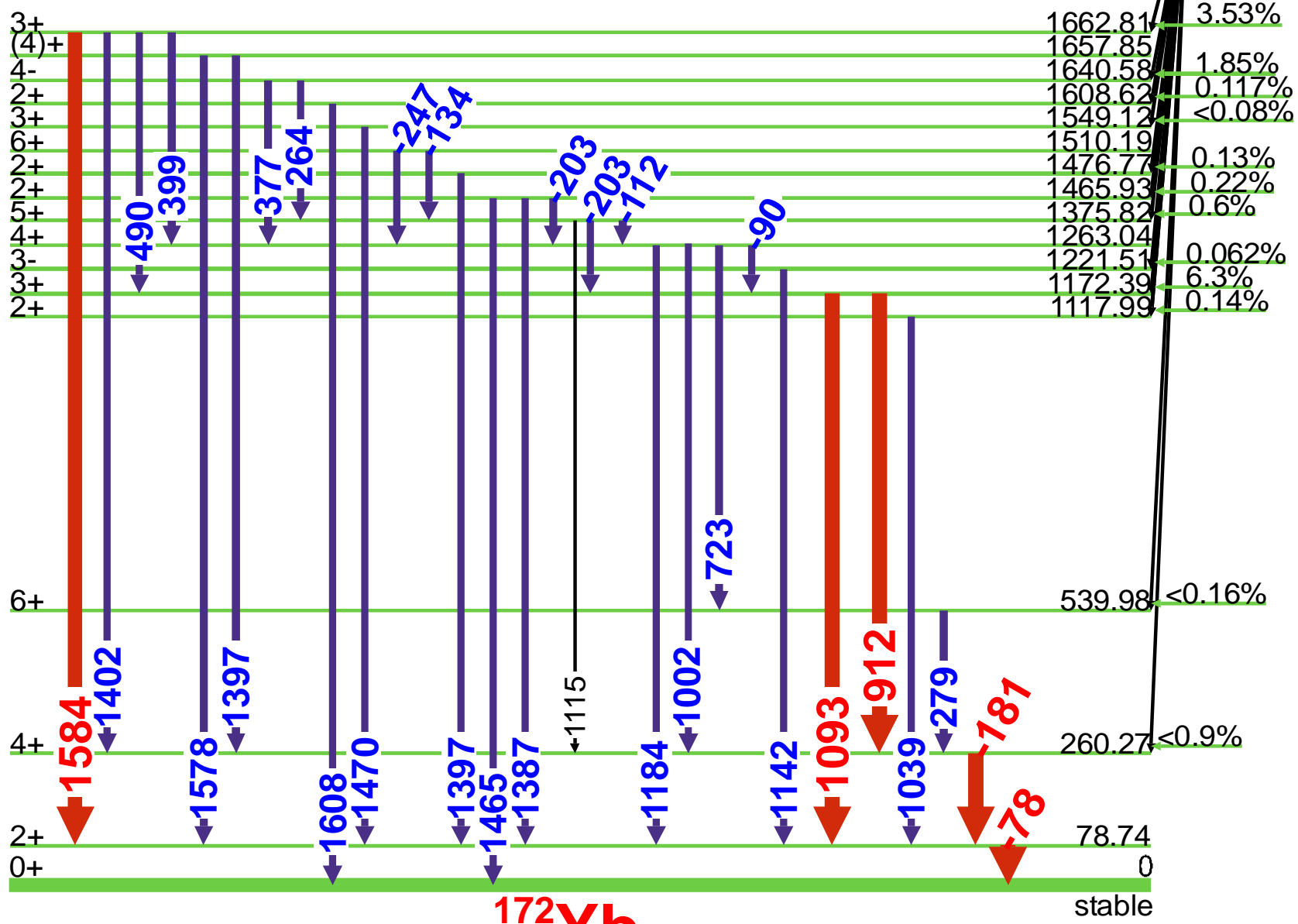
gamma-rays emitted from low energy levels

6.7 day

4- 0

Q=2519.3

¹⁷²₇₁Lu



¹⁷²₇₀Yb



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ¹⁷²LuE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 6.70(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁷²Yb(p,n)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	66					4
	78.743	0.001	14.83	10.6	0.5	1
	90.644	0.002	6.95	4.54	0.24	2
	112.778	0.003	1.85	1.27	0.07	3
	119.023	0.015		0.03	0.006	4
	134.363	0.018	0.09	0.064	0.004	4
D	145.21	0.05	0.15	0.037	0.006	4
	146.03	0.04		0.073	0.01	
D	151.55	0.06		0.04	0.007	4
	151.55	0.06				
	155.87	0.07		0.02	0.004	4
	163.165	0.02		0.067	0.005	4
	174.671	0.019	0.18	0.112	0.007	4
	181.525	0.005	29.8	20.6	0.9	1
	196.38	0.04	0.14	0.101	0.007	4
D	200.5	0.4		0.049	0.01	4
	200.5	0.4				
D	203		7.10			2
	203.433	0.013		5.02	0.23	
	210.28	0.03	0.15	0.088	0.008	4
	229.08	0.01	0.54	0.356	0.017	4
	233.46	0.2	50	0.34	0.09	4
	247.155	0.016	0.96	0.58	0.03	4
	251.46	0.15		0.033	0.006	4
	254.39	0.24		0.056	0.016	4
	264.798	0.011	1.00	0.75	0.04	4
	270.028	0.008	2.52	1.93	0.09	3
	279.705	0.012	1.51	1.19	0.06	3
	319.174	0.022	0.18	0.134	0.011	4
	323.899	0.015	2.00	1.5	0.06	3
D	329.39	0.05	0.80	0.136	0.012	4
	330.619	0.021		0.52	0.04	

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	337.85	0.09		0.046	0.007	4
D	348.6	0.4		0.015	0.008	4
	348.83	0.22		0.009	0.007	
	352.55	0.04		0.064	0.01	4
	358.45	0.03		0.121	0.007	4
	366.684	0.024		0.288	0.016	4
D	372.507	0.012	3.86	2.66	0.12	3
	373					
	377.523	0.012	5.20	3.35	0.15	3
	389.44	0.05		0.07	0.009	4
	399.766	0.015	0.85	0.551	0.026	4
	410.308	0.012	3.21	1.98	0.08	3
	413.2	0.3		0.038	0.014	4
	415.7	0.4		0.05	0.025	4
D	416.65	0.08	2.55	0.086	0.011	4
	416.65	0.08				
	422.61	0.03		0.137	0.008	4
	427.19	0.05		0.123	0.008	4
	432.549	0.013		1.64	0.08	3
	437.6	0.02	0.38	0.234	0.012	4
	443.29	0.04	0.30	0.139	0.009	4
	480.84	0.1		0.122	0.013	4
	482.23	0.04	0.76	0.58	0.04	4
	486.16	0.018	0.93	0.66	0.04	4
	490.437	0.014	2.83	1.91	0.1	3
	493.83	0.09		0.066	0.016	4
	512.54	0.05	0.25	0.196	0.016	4
	517.29	0.1		0.04	0.007	4
D	524.05	0.06		0.224	0.013	4
	524.05	0.04				
	528.26	0.014	5.87	4.04	0.18	3
	534.29	0.07		0.125	0.019	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ¹⁷²LuE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 6.70(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁷²Yb(p,n)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	536.194	0.019	0.86	0.64	0.05	4
D	540.187	0.016	2.22			4
	540.187	0.016		1.4	0.07	
	551.078	0.019	0.59	0.412	0.022	4
	566.49	0.05		0.077	0.008	4
	576.835	0.018	0.42	0.302	0.018	4
	584.725	0.017	0.49	0.336	0.017	4
	594.538	0.019	0.66	0.42	0.03	4
	596.75	0.15		0.064	0.015	4
D	599.86	0.04		0.138	0.02	4
	599.86	0.04				
	604.65	0.19		0.031	0.014	4
D	607.141	0.018	0.77	0.49	0.05	4
	607.141	0.018				
	622.605	0.022		0.161	0.014	4
	625.95	0.04	0.34	0.311	0.018	4
	630.706	0.017	0.6	0.438	0.026	4
	643.04	0.03		0.226	0.014	4
	644.86	0.06		0.118	0.01	4
	649.6	0.5		0.043	0.013	4
D	664.07	0.05		0.108	0.009	4
	664.07	0.05				
D	680.7	0.4	1.0	0.11	0.04	4
	681.82	0.04		0.69	0.04	
	697.3	0.016	9.57	6.13	0.27	3
	703.06	0.08		0.136	0.015	4
	709.133	0.017	1.22	0.82	0.05	4
	723.02	0.02	0.68	0.456	0.023	4
	746.5					4
	758.74	0.08		0.071	0.012	4
	810.064	0.015	25.5	16.6	0.7	2
	816.327	0.02	1.57	1.15	0.05	4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	835.85	0.07		0.131	0.01	4
	857.76	0.11		0.084	0.011	4
	900.724	0.02	45.4	29.8	1.2	1
	909.7	0.06		0.65	0.06	4
	912.079	0.017	23.2	15.2	0.7	1
	929.106	0.02	4.78	3.04	0.14	3
	950.37	0.07		0.057	0.01	4
	961.03	0.12		0.033	0.013	4
	967.89	0.05	0.3	0.19	0.012	4
	970	0.4		0.07	0.04	4
	990.75	0.15		0.08	0.04	4
D	1002.74	0.02	8.63	0.25	0.13	2
	1002.74	0.02		5.25	0.24	
	1010.71	0.17		0.037	0.013	4
	1012.6	0.3		0.031	0.013	4
	1019.79	0.04		0.114	0.01	4
	1022.37	0.021	2.15	1.41	0.07	3
	1026.21	0.05		0.067	0.005	4
	1039.25	0.11	0.25	0.07	0.007	4
	1040.99	0.03	0.62	0.351	0.018	4
	1055.4	0.4		0.014	0.006	4
	1070.66	0.18		0.027	0.006	4
	1080.68	0.04	1.93	0.91	0.04	3
	1093.63	0.02	100	62.5	2.8	1
	1113.05	0.05	2.62	1.65	0.1	3
	1115.54	0.05	0.5	0.37	0.03	4
	1125.22	0.04		0.106	0.007	4
	1142.98	0.13	0.15	0.029	0.004	4
	1148.5	0.3	0.80	0.014	0.006	4
	1166.5	0.05		0.068	0.007	4
	1171.31	0.11		0.025	0.006	4
	1184.29	0.03	0.46	0.331	0.018	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

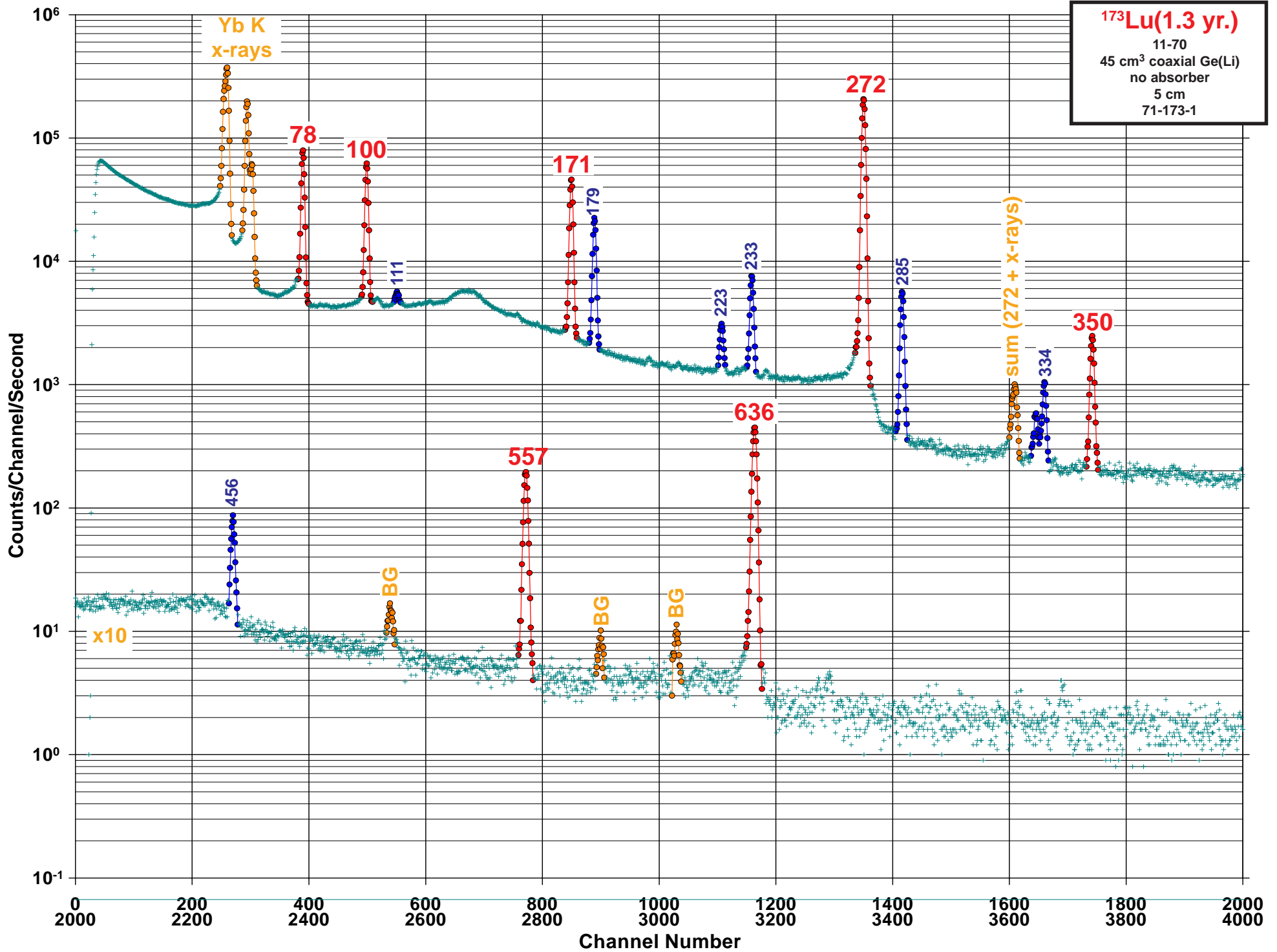
Nuclide: ¹⁷²LuE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 6.70(3) day

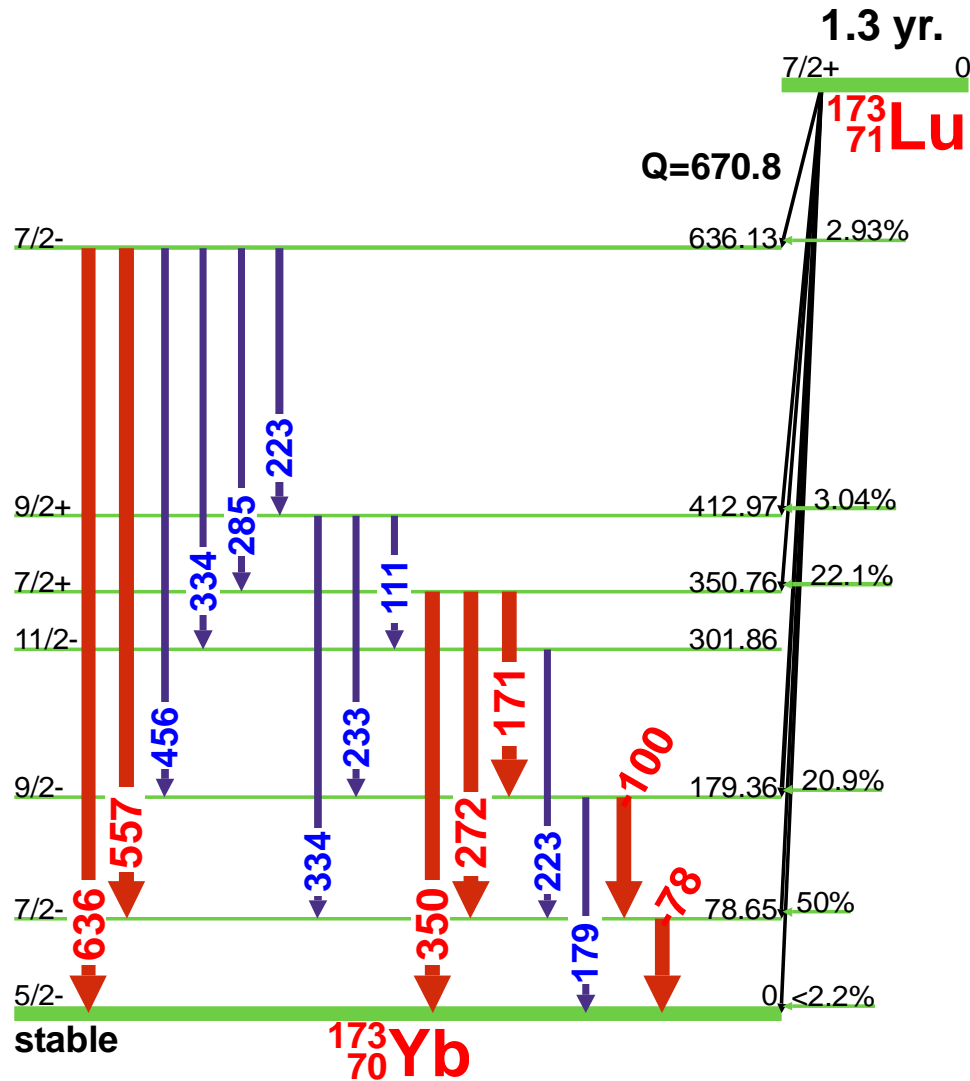
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁷²Yb(p,n)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	1205.65	0.13		0.029	0.008	4		1602.54	0.03	0.40	0.298	0.015	3
	1209.13	0.1		0.052	0.005	4		1608.81	0.06	0.15	0.109	0.008	4
	1238.73	0.08		0.058	0.007	4		1621.92	0.03	3.18	2.16	0.09	1
	1263.16	0.09		0.044	0.006	4		1635.2	0.7		0.015	0.004	4
	1288.84	0.03		0.193	0.011	4		1652.32	0.1		0.014	0.003	4
	1322.66	0.09		0.1	0.01	4		1666.84	0.04	0.37	0.278	0.012	4
	1329.72	0.07		0.035	0.005	4		1670.49	0.03	0.82	0.529	0.024	3
	1372.79	0.14		0.034	0.006	4		1724.35	0.03	0.85	0.438	0.02	2
	1380.23	0.1		0.041	0.014	4		1742.9	0.09		0.0219	0.0021	4
D	1387.18	0.02	1.36	0.125	0.005	3		1803.97	0.15		0.0119	0.0019	4
	1387.18	0.02		0.87	0.04				1809.42	0.22		0.0113	0.0019
D	1397.5	0.03	0.35	0.094	0.019	4		1812.85	0.04	0.31	0.192	0.011	3
	1397.5	0.03		0.181	0.02				1914.8	0.03	0.97	0.597	0.026
	1402.53	0.03	0.89	0.72	0.03	3		1920.5	0.14	0.08	0.0181	0.002	4
	1440.38	0.03	1.00	0.6	0.03	3		1931.76	0.07	0.04	0.038	0.004	4
	1446.2	0.06		0.034	0.003	4		1994.36	0.06	0.25	0.149	0.011	3
	1465.98	0.04	0.93	0.67	0.03	3		2015.17	0.08		0.058	0.007	4
	1470.39	0.03	0.80	0.71	0.04	3		2024.9	0.3	0.1	0.056	0.006	3
	1476.77	0.07		0.035	0.006	4		2044.6	0.5		0.005	0.0025	4
	1488.94	0.03	1.70	1.15	0.05	2		2047.55	0.15		0.0106	0.0025	4
	1518.68	0.06		0.046	0.004	4		2083.41	0.06	0.45	0.218	0.011	2
	1529.78	0.05		0.087	0.009	4		2096.33	0.05	0.17	0.069	0.004	3
	1533.27	0.12		0.028	0.003	4		2127.8	0.2		0.0049	0.0014	4
	1542.85	0.023	1.39	1.02	0.04	3		2134.81	0.09		0.0088	0.0025	4
	1554.38	0.15		0.014	0.004	4		2137.8	0.3		0.0038	0.0019	4
	1572.12	0.17		0.028	0.013	4		2206.72	0.15		0.008	0.004	4
	1578.97	0.12	0.22	0.1	0.019	4		2212.71	0.23		0.0044	0.0019	4
	1584.12	0.04	3.81	2.64	0.11	1		2265.02	0.08		0.0131	0.0019	4





¹⁷³Lu(1.3 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁷³Lu

Half Life: 1.37(1) y r.

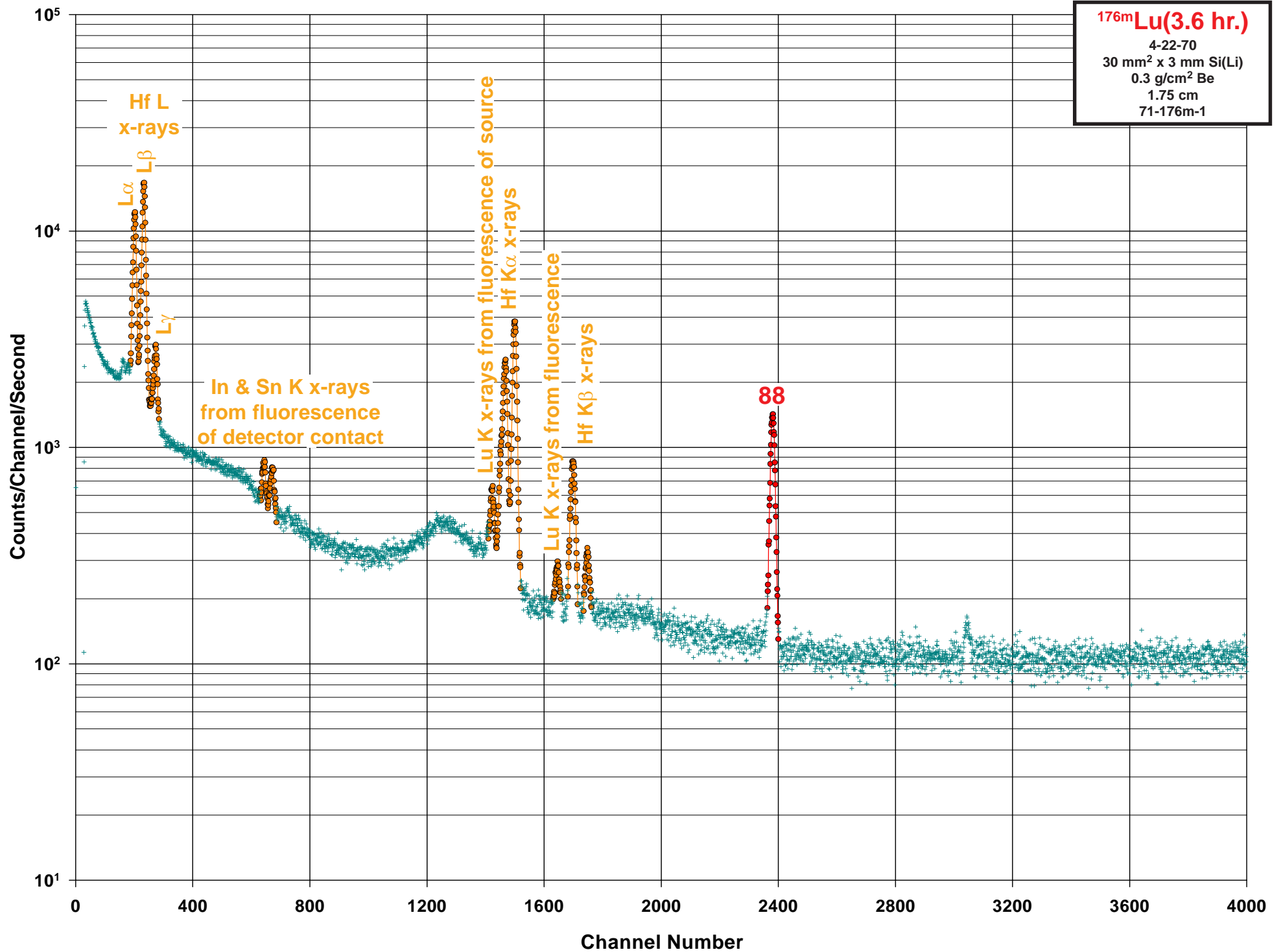
Detector: 45 cm³ coaxial Ge (Li)

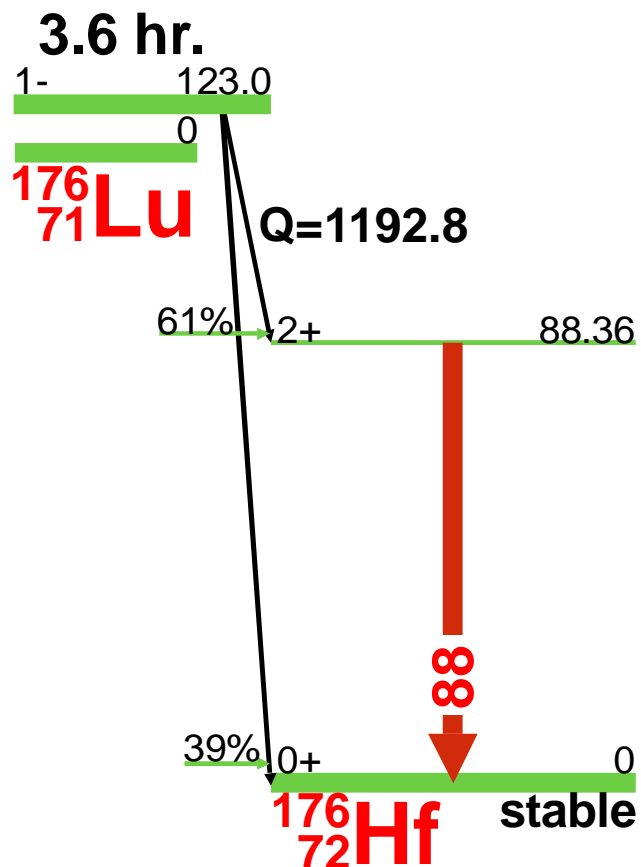
Method of Production: ¹⁷³Yb(p,n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
62.17	0.03		0.168	0.010	4
78.63	0.03	25.0	11.8720	0.4	1
100.724	0.020	15.0	5.24	0.19	1
111.109	0.012	0.45	0.0534	0.0028	4
122.55	0.03		0.0167	0.0008	4
171.393	0.013	13.0	2.90	0.14	1
179.365	0.011	6.0	1.38	0.05	2
208.78			0.0006		4
223.163	0.020	0.84	0.0127	0.0026	3
223.163	0.020		0.140	0.008	
233.605	0.012	2.5	0.553	0.021	2
272.105	0.015	100.	21.2	0.8	1
285.362	0.006	2.9	0.611	0.026	3
319.4			0.0005		4
334.263	0.015	0.70	0.0055	0.0002	3
334.321	0.011		0.109	0.006	
350.774	0.018	1.60	0.301	0.014	1
412.9			0.0002		4
442.08			0.0004		4
456.79	0.03	0.87	0.141	0.007	2
543.24			0.0006		4
557.497	0.025	3.0	0.519	0.026	1
621.8			0.0002		4
636.11	0.03	8.0	1.452	0.07	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





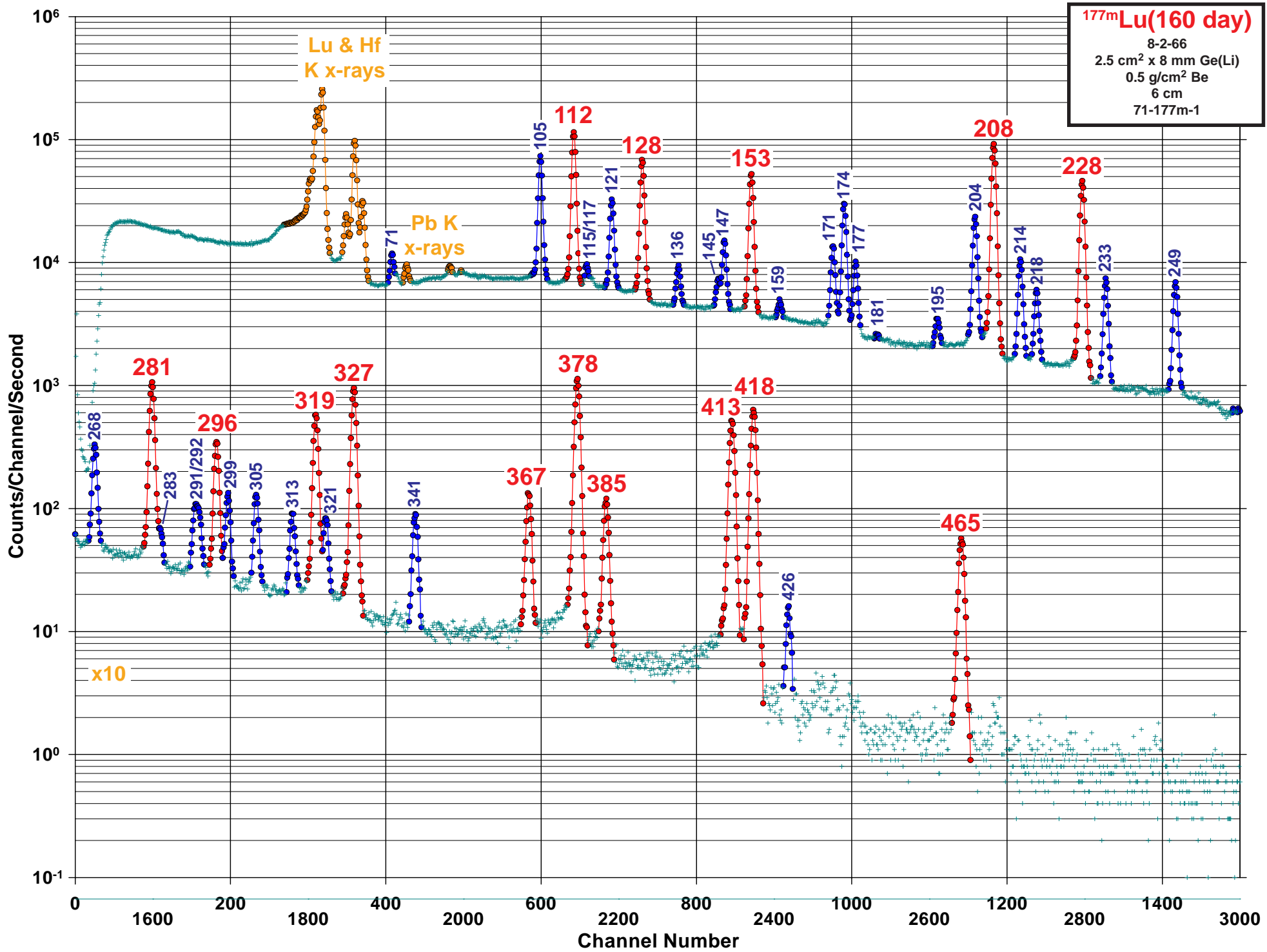
$^{176\text{m}}\text{Lu}$ (3.6 hr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: $^{176\text{m}}\text{Lu}$

Half Life: 3.635(3) hr.

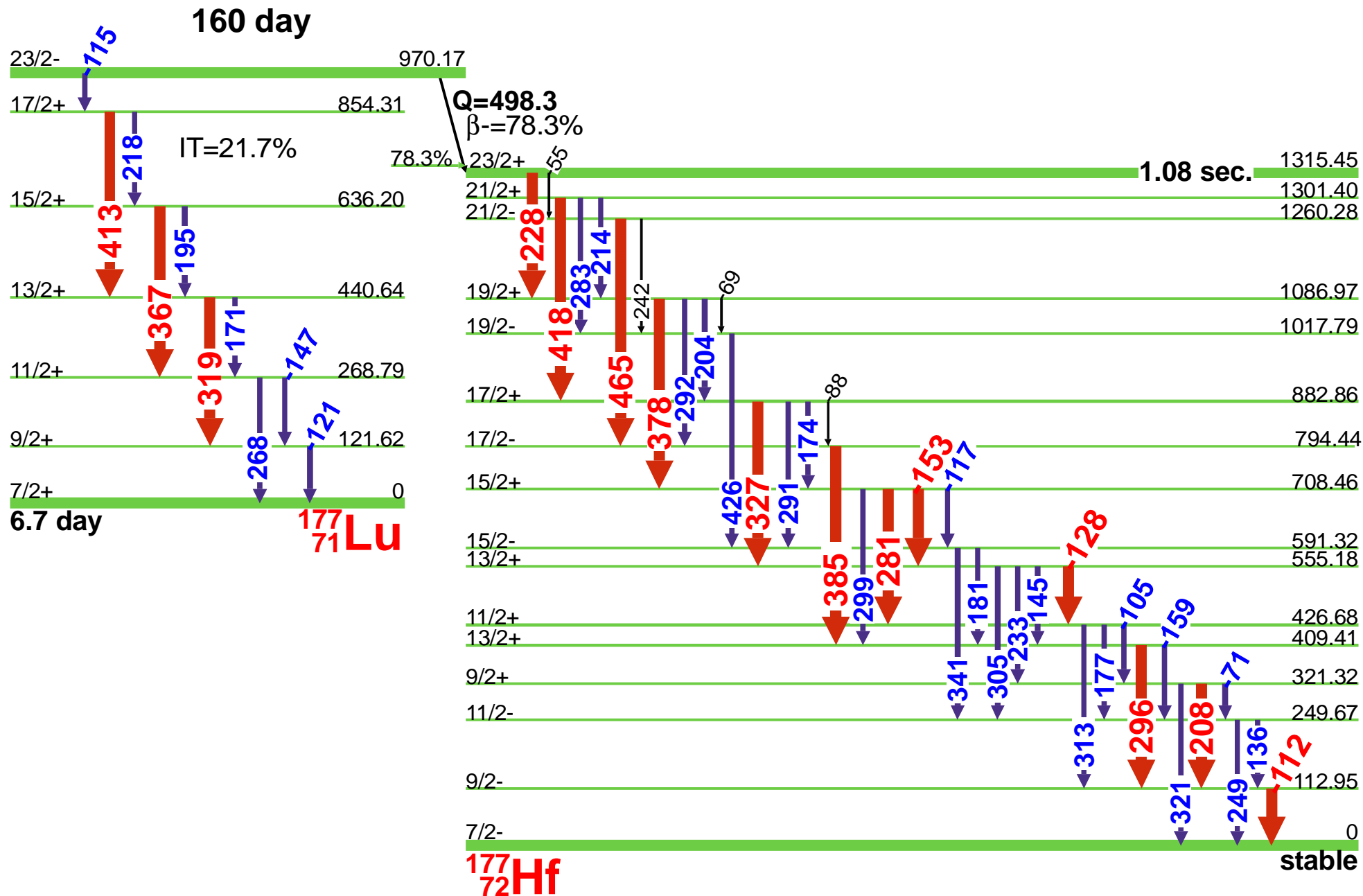
Detector: 30 mm² x 3 mm Si (Li)Method of Production: $^{175}\text{Lu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
82.1			0.0070	0.0014	4
88.361	0.009		8.90	0.4	1
202.2	0.3		0.0007		4
936.25	0.20		0.0002		4
956.8	0.3				4
1061.42	0.08		0.0008		4
1138.25	0.15		0.0002		4
1159.26	0.07		0.0014		4
1204.70	0.18		0.0001		4
1226.61	0.16		0.0001		4
1247.62	0.09				4

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data



^{177m}Lu(160 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{177m}Lu E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

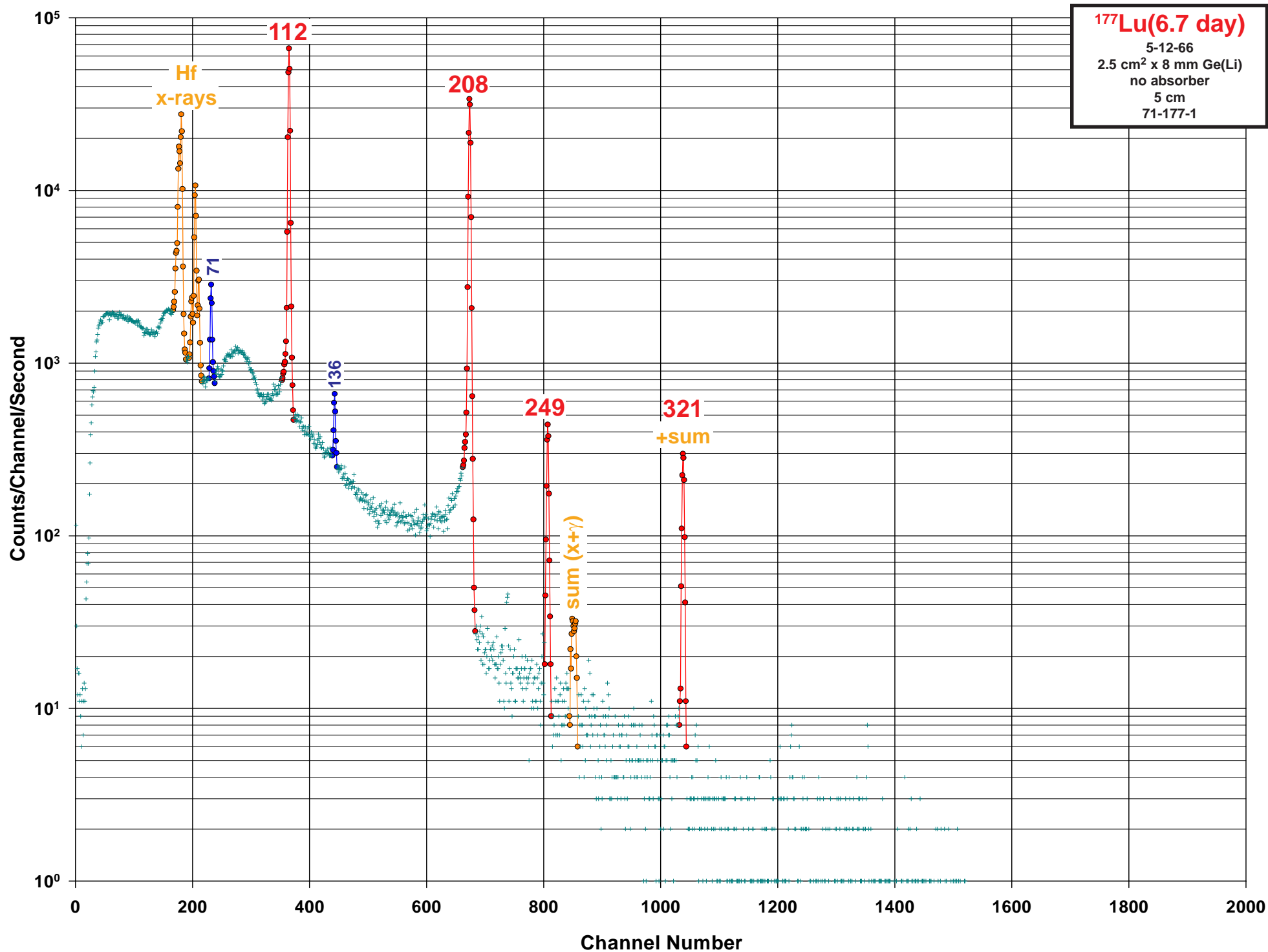
Half Life: 160.4(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{176}\text{Lu}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
55.15	0.02		1.78	0.10	4
69.20			0.010	0.004	4
71.646	0.002	1.65	0.90	0.04	4
88.40			0.037	0.009	4
105.3595	0.0006	19.53	12.3	0.3	2
112.9498	0.0005	35.18	20.4	0.5	1
115.868	0.002	0.93	0.65	0.04	4
117.01	0.04	0.37	0.187	0.025	4
121.621		9.69	5.91	0.15	2
128.5030	0.0005	25.37	15.5	0.4	1
136.7248	0.0012	2.39	1.40	0.06	3
145.7694	0.0020	1.63	0.91	0.05	4
147.164	0.001	5.90	3.51	0.14	3
153.2843	0.0005	28.37	16.9	0.4	1
159.7342	0.0017	0.89	0.530	0.025	4
171.858	0.001	8.16	4.81	0.12	3
174.3991	0.0005	21.19	12.6	0.3	2
177.0008	0.0005	5.92	3.43	0.13	3
181.98	0.10		0.124	0.012	4
195.560	0.002	1.49	0.84	0.04	4
204.1052	0.0005	22.41	13.8	0.4	2
208.3664	0.0005	100.	57.7	1.2	1
214.4339	0.0006	10.71	6.59	0.17	2
218.104	0.001	5.39	3.28	0.12	3

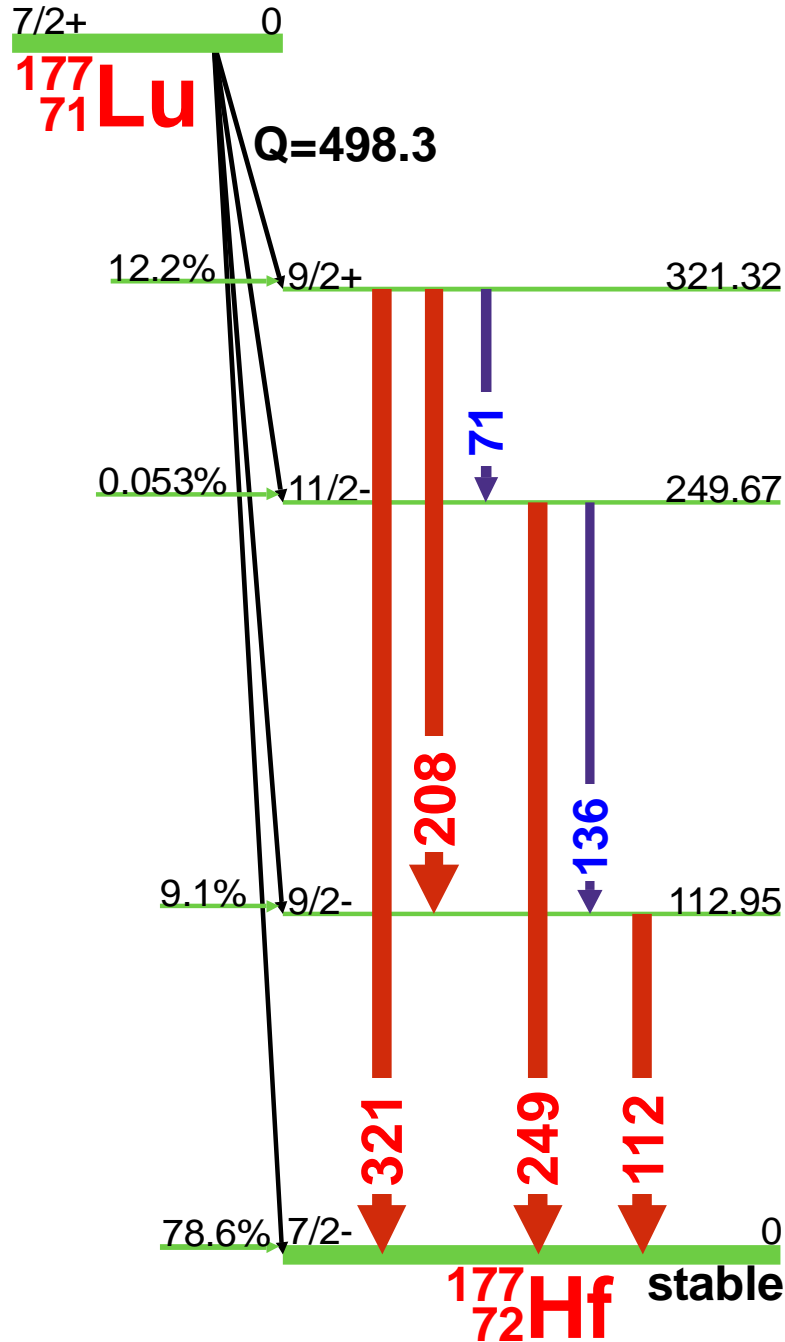
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
228.4838	0.0006	60.69	37.0	0.8	1
233.8608	0.0008	9.04	5.58	0.15	2
242.5			0.037	0.012	4
249.6741	0.0010	10.45	6.14	0.19	2
268.785	0.001	5.79	3.43	0.12	2
281.7873	0.0009	23.72	14.1	0.4	1
283.42	0.13	1.03	0.40	0.07	4
291.42	0.10	1.82	1.02	0.07	3
292.51	0.10	1.42	0.82	0.06	3
296.4581	0.0006	8.58	5.08	0.15	1
299.0506	0.0017	2.87	1.80	0.06	3
305.5028	0.0014	3.13	1.82	0.06	2
313.7251	0.0021	2.19	1.26	0.05	3
319.020	0.001	17.81	10.5	0.3	1
321.3162	0.0016	2.21	1.20	0.06	3
327.6829	0.0007	31.44	18.1	0.5	1
341.6432	0.0010	3.08	1.69	0.07	2
367.418	0.001	5.41	0.68	0.11	1
378.5029	0.0007	52.18	29.7	1.3	1
385.0304	0.0009	5.39	3.13	0.13	1
413.664	0.001	30.20	17.4	0.6	1
418.5391	0.0007	38.0	21.3	0.9	1
426.4726	0.0024	0.73	0.428	0.025	3
465.8416	0.0010	4.34	2.35	0.13	1





¹⁷⁷Lu(6.7 day) Decay Scheme

6.7 day



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁷⁷Lu

Half Life: 6.734(12) day

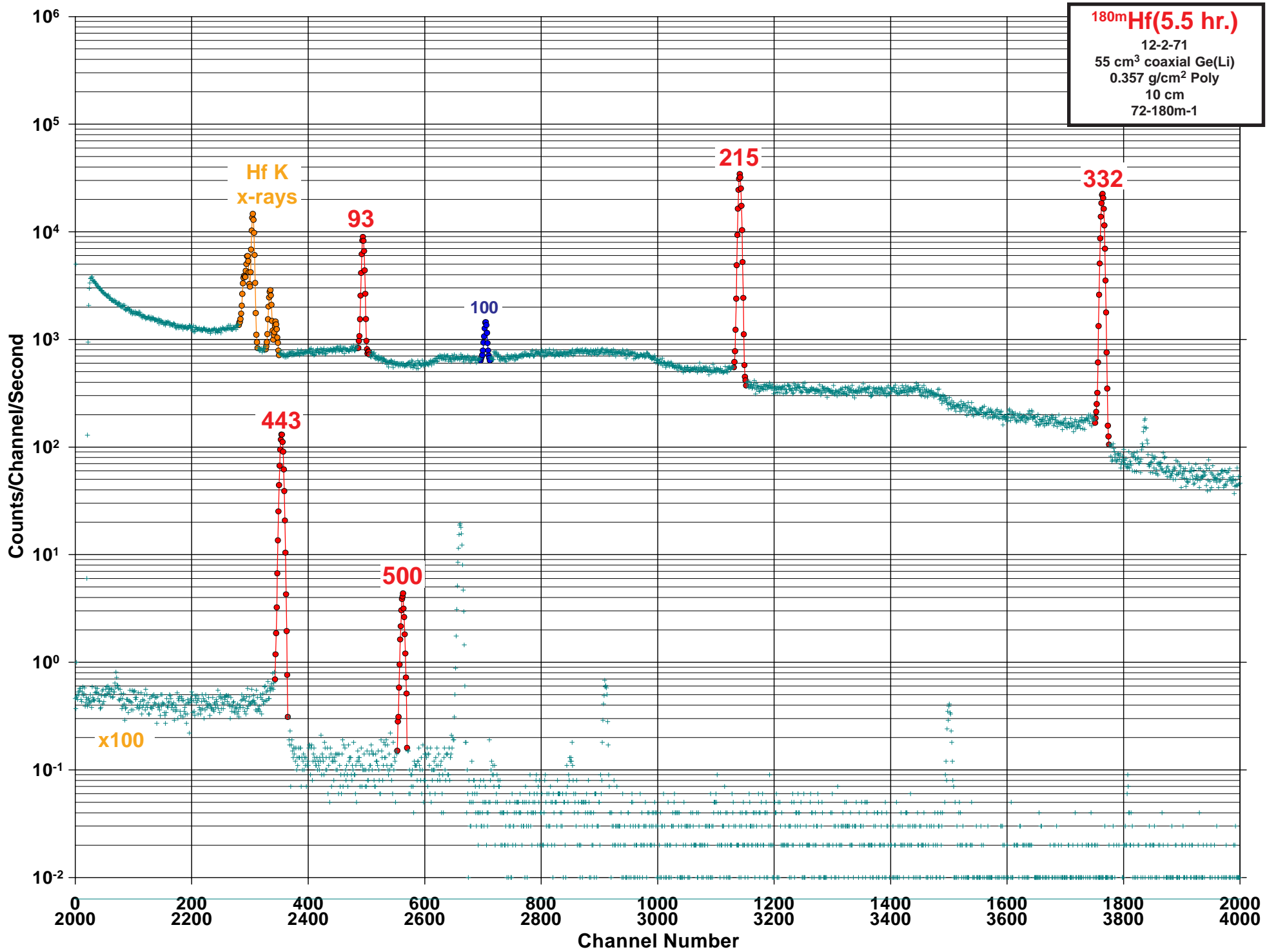
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁷⁶Lu(n,γ)

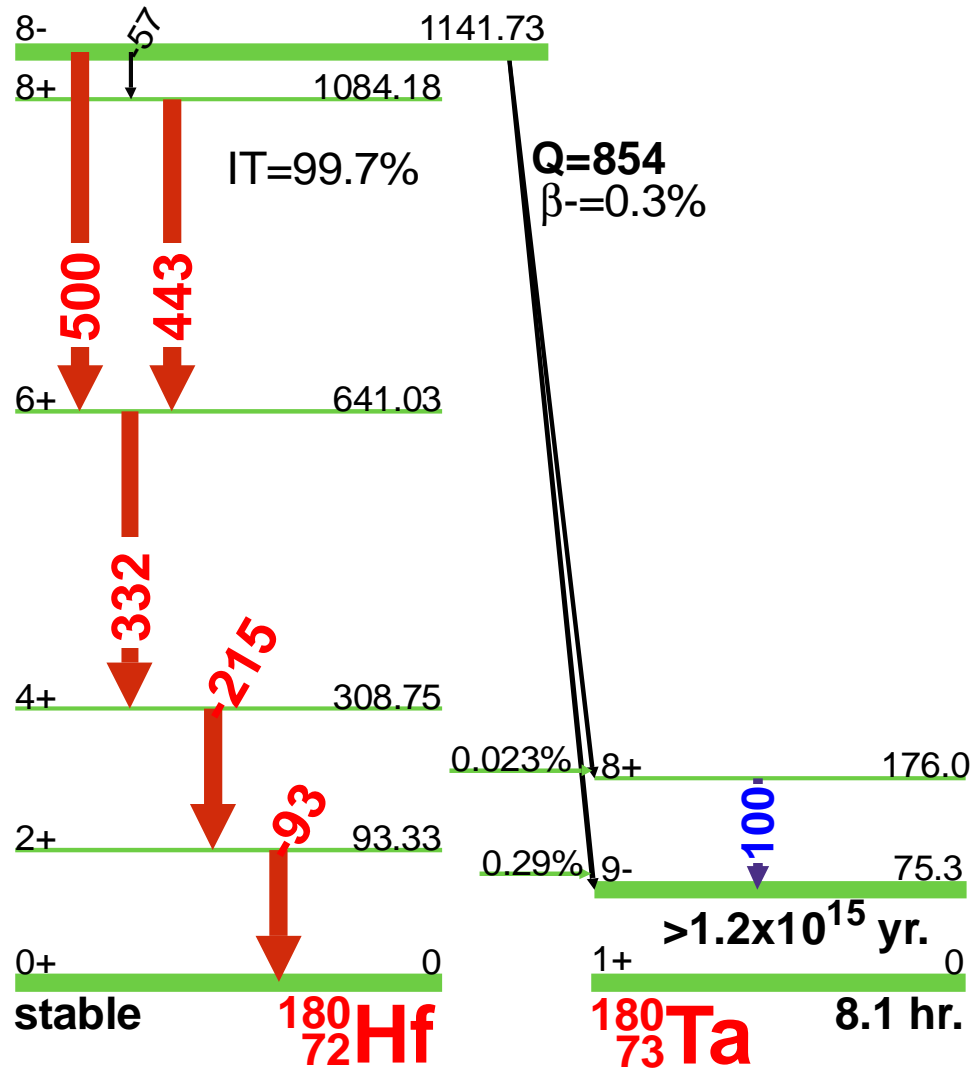
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
71.646	0.002	2.0	0.154	0.008	3
112.950		55.66	6.4	0.3	1
136.725	0.001	0.42	0.0480	0.0020	3
208.366		100.	11.0	0.6	1
249.674	0.001	1.95	0.212	0.011	1
321.316	0.002	2.69	0.219	0.011	1

$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{180m}Hf(5.5 hr.) Decay Scheme 5.5 hr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{180m}Hf

Half Life: 5.5(1) hr.

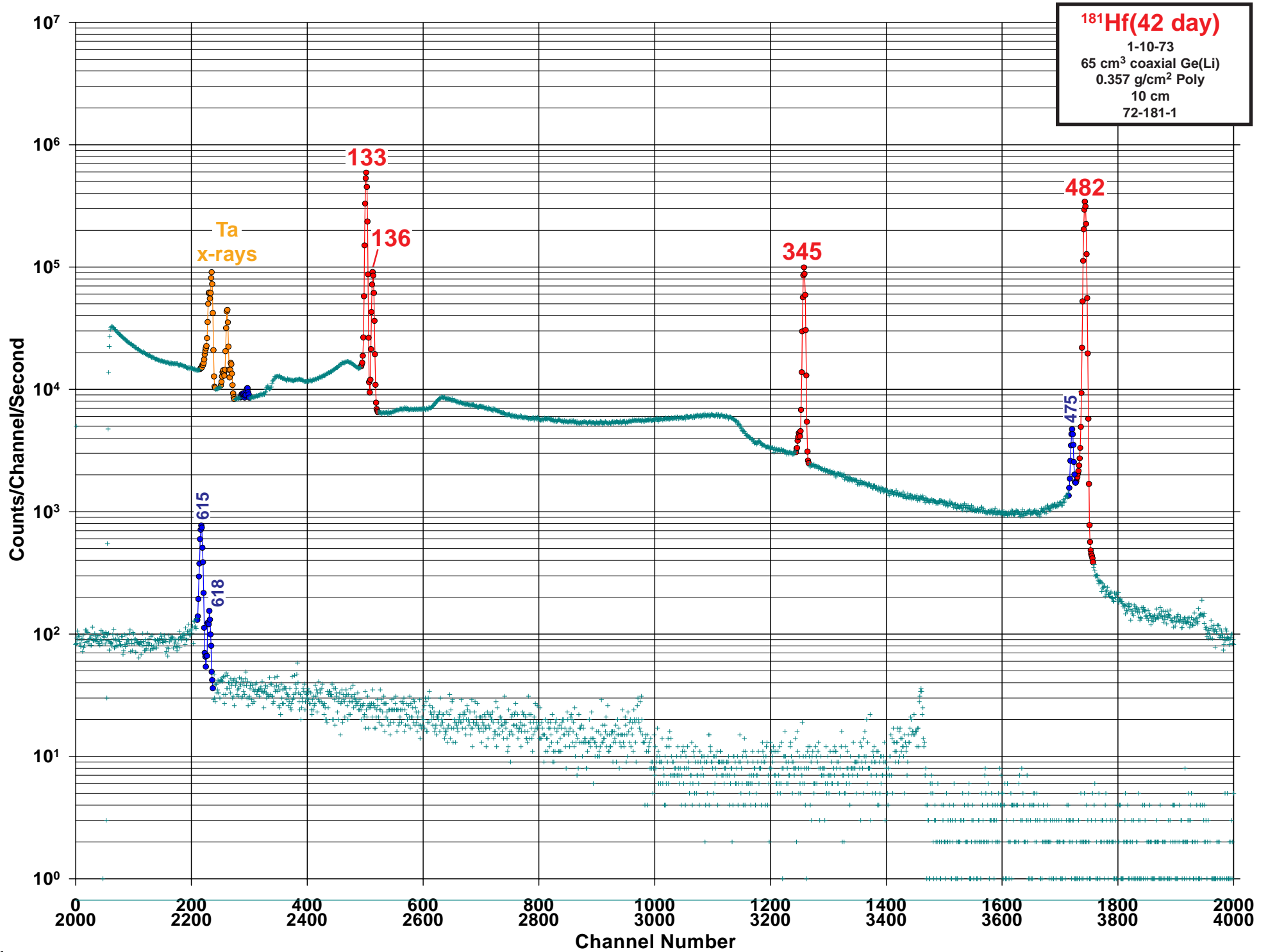
Detector: 55 cm³ coaxial Ge (Li)

Method of Production: ¹⁷⁹Hf(n,γ)

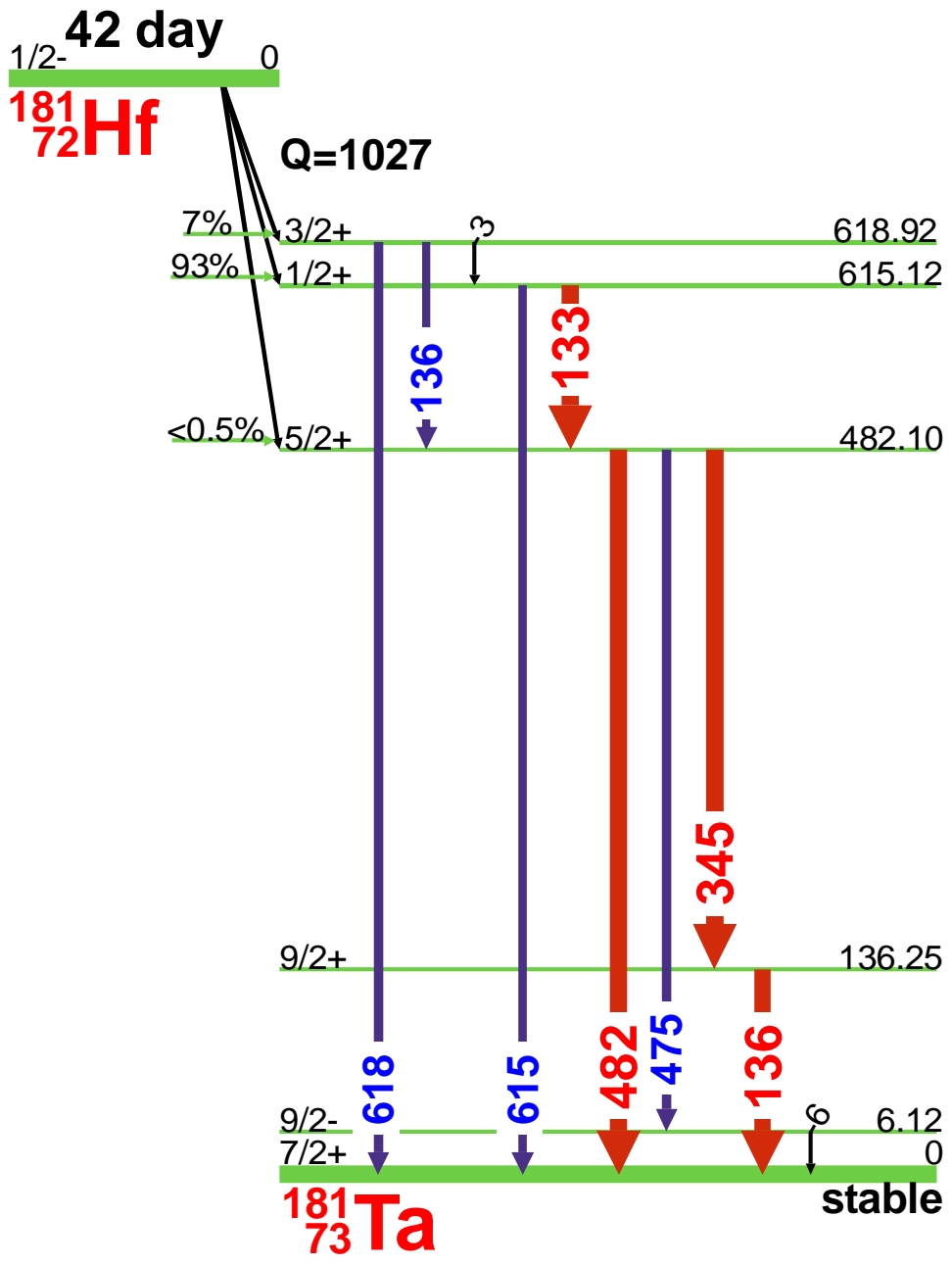
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
57.547	0.006	49.0	48.1	1.0	1
93.325	0.012	15.5	17.2	0.3	1
100.70	0.05		0.017	0.006	4
215.426	0.008	86.2	81.6	1.0	1
332.275	0.011	100.	94.4	1.2	1
443.163	0.015	86.4	82.1	1.2	1
500.697	0.013	15.1	14.3	0.3	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁸¹Hf(42 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁸¹Hf

Half Life: 42.39(6) day

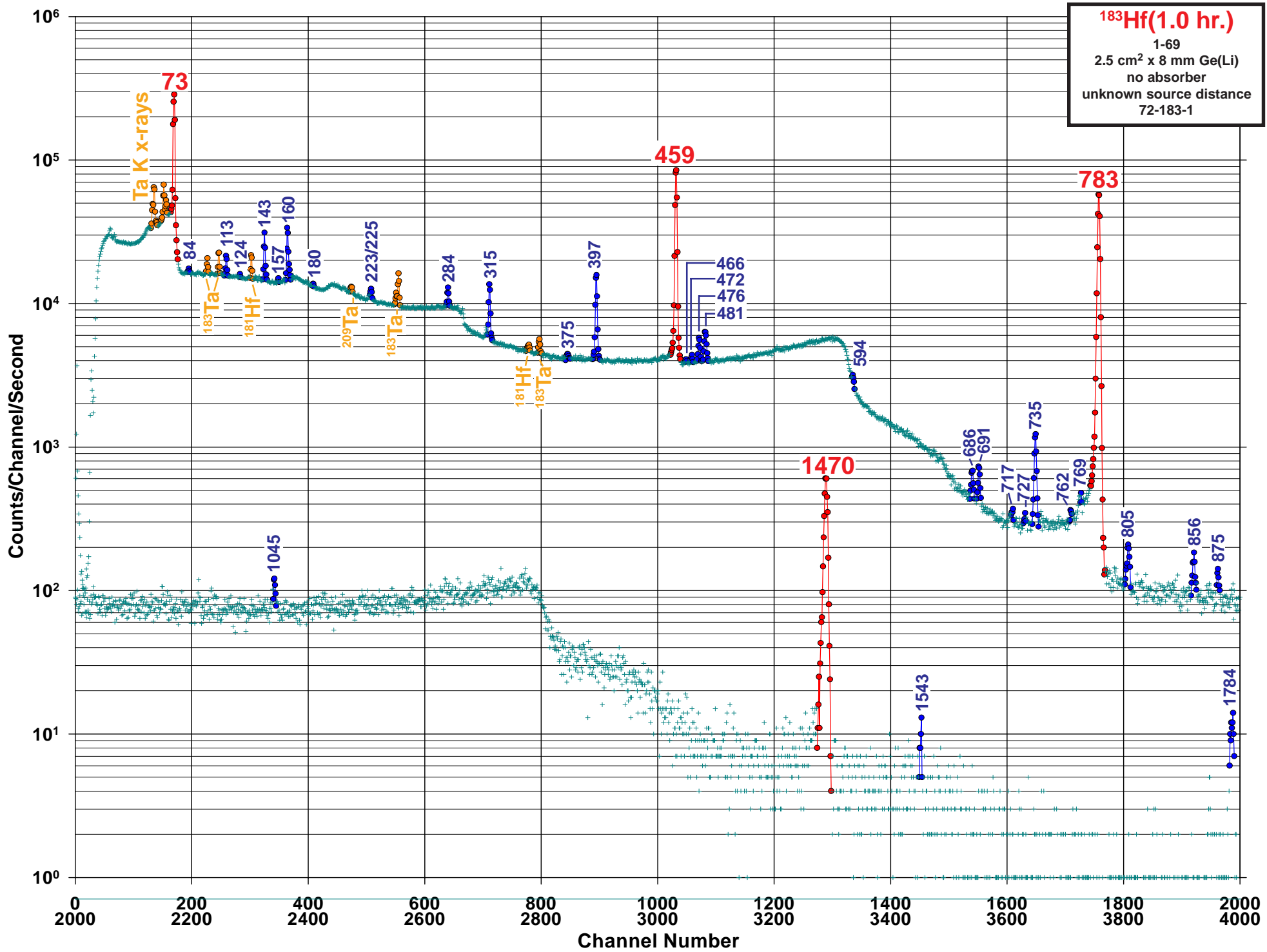
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ¹⁸⁰Hf(n,γ)

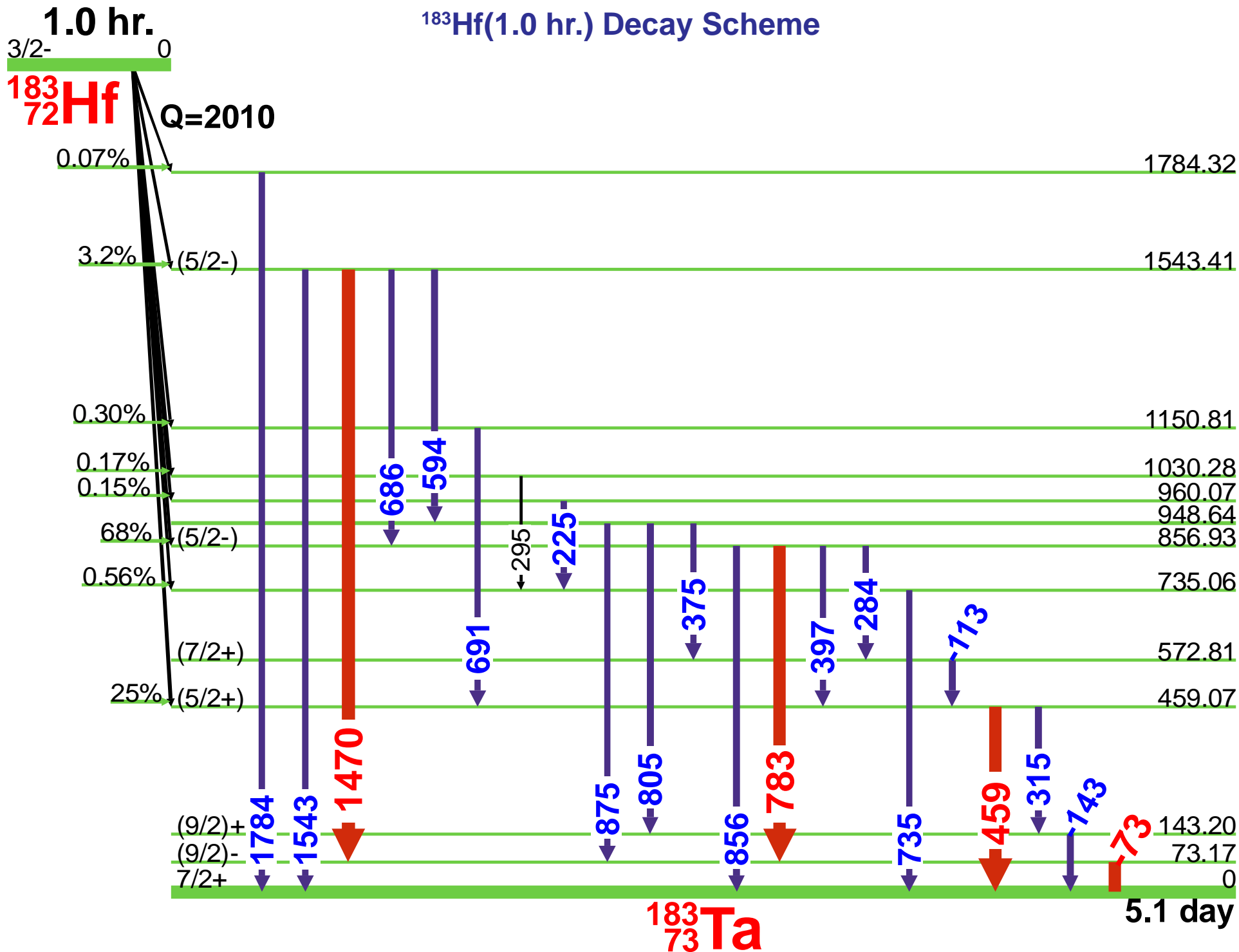
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
3.90	0.10				4
6.3	0.3		0.0115	0.0004	4
133.021	0.019	44.51	43.3	0.5	1
136.260	0.018	7.24	5.85	0.19	1
136.86	0.04		0.86	0.19	
345.93	0.06	18.71	15.12	0.12	1
475.99	0.09	1.45	0.703	0.007	3
482.18	0.09	100.	80.5	0.4	1
615.17	0.11	0.32	0.234	0.018	2
618.66	0.08	0.05	0.0250	0.0012	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





$^{183}\text{Hf}(1.0 \text{ hr.})$ Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{183}Hf E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 1.067(17) hr.

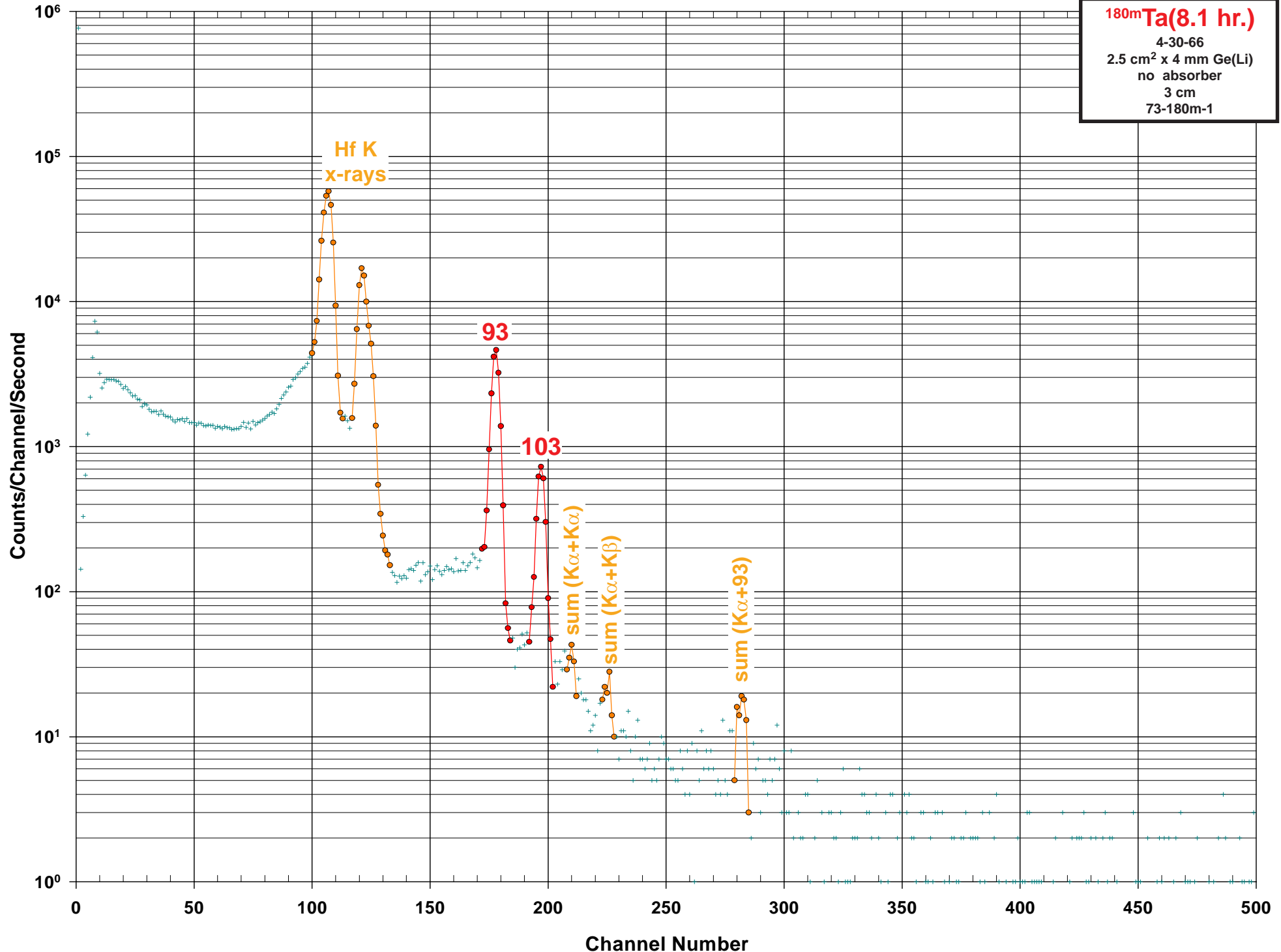
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{182}\text{Hf}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
73.173	0.014	58.46	38.	5.	1
84.69	0.06		0.030	0.006	4
113.74	0.03	0.21	0.141	0.015	4
124.10	0.20	0.038	0.025	0.008	4
131.0	0.3		0.018	0.012	4
139.00	0.20	0.038	0.025	0.012	4
143.200	0.016	0.72	0.48	0.06	3
149.10	0.20		0.019	0.010	4
153.75	0.15		0.034	0.008	4
157.90	0.15	0.05	0.033	0.012	4
160.780	0.020	0.80	0.525	0.065	3
165.20	0.15	0.055	0.036	0.012	4
180.40	0.20	0.048	0.031	0.012	4
223.40	0.15	0.12	0.08	0.03	4
225.01	0.10	0.23	0.152	0.024	4
284.12	0.03	0.55	0.36	0.05	4
295.22	0.08	0.26	0.172	0.024	4
315.870	0.016	1.87	1.23	0.16	3
375.83	0.12		0.091	0.021	4
397.858	0.017	4.46	2.9	0.4	3
459.070	0.015	42.0	27.	4	1
466.70	0.20	0.13	0.09	0.04	4
472.2	0.3	0.25	0.16	0.03	4
476.90	0.18	1.10	0.73	0.09	4
481.31	0.05		0.71	0.16	4

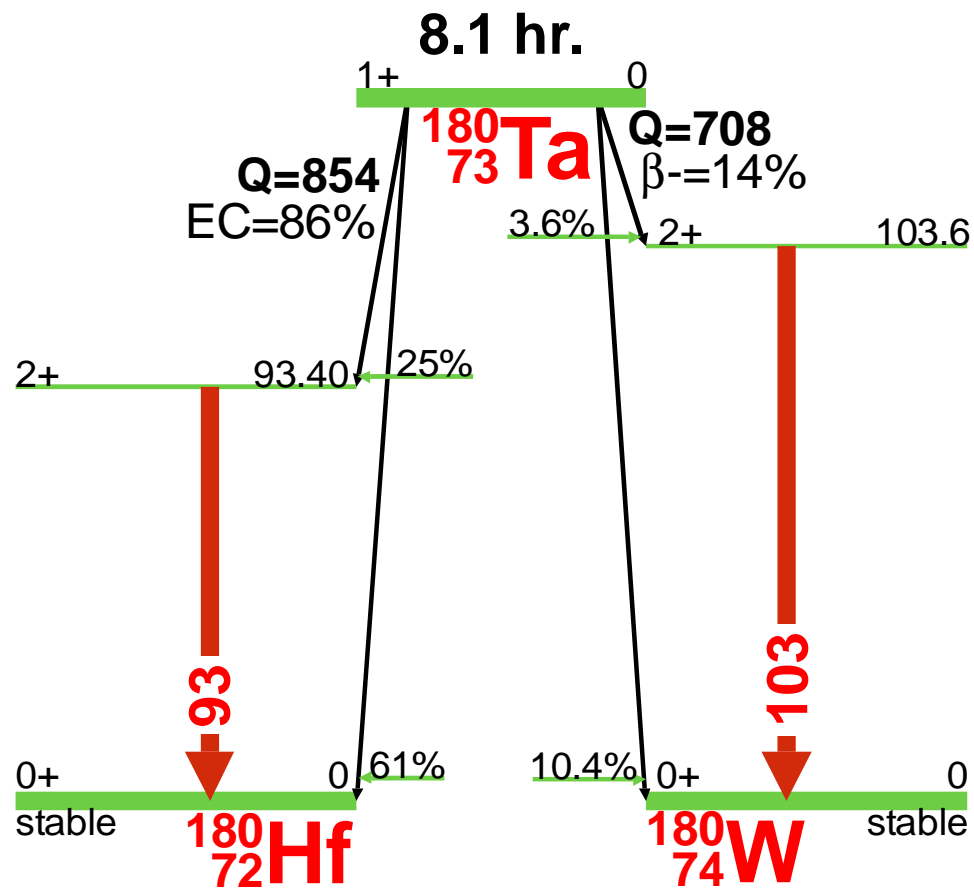
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
500.7	0.3		0.081	0.012	4
536.80	0.20		0.152	0.024	4
594.77	0.14	0.32	0.21	0.10	4
686.48	0.07	0.37	0.242	0.028	4
691.74	0.10	0.46	0.30	0.04	3
715.3	1.0	0.068	0.044	0.020	4
717.2	1.0	0.11	0.07	0.03	4
727.3	0.3	0.09	0.06	0.03	4
735.06	0.08	1.35	0.89	0.12	3
762.9	0.3	0.09	0.07	0.03	4
769.3	0.3	0.21	0.14	0.05	4
783.753	0.021	100.	66.	9.	1
797.2	0.5		0.0202	0.0026	4
805.44	0.12	0.21	0.14	0.03	4
856.926	0.020	0.17	0.11	0.03	4
868.50	0.20		0.040	0.005	4
875.46	0.12	0.095	0.06	0.03	4
959.6	1.0		0.026	0.020	4
987.1	0.3		0.040	0.005	4
1045.5	0.3	0.11	0.071	0.021	4
1112.7	0.3		0.040	0.005	4
1470.23	0.07	4.15	2.7	0.4	1
1543.41	0.07		0.0202	0.0016	4
1784.31	0.20	0.11	0.07	0.03	3



^{180m}Ta (8.1 hr.)
4-30-66
2.5 cm² x 4 mm Ge(Li)
no absorber
3 cm
73-180m-1



^{180m}Ta(8.1 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{180m}Ta

Half Life: 8.152(6) hr.

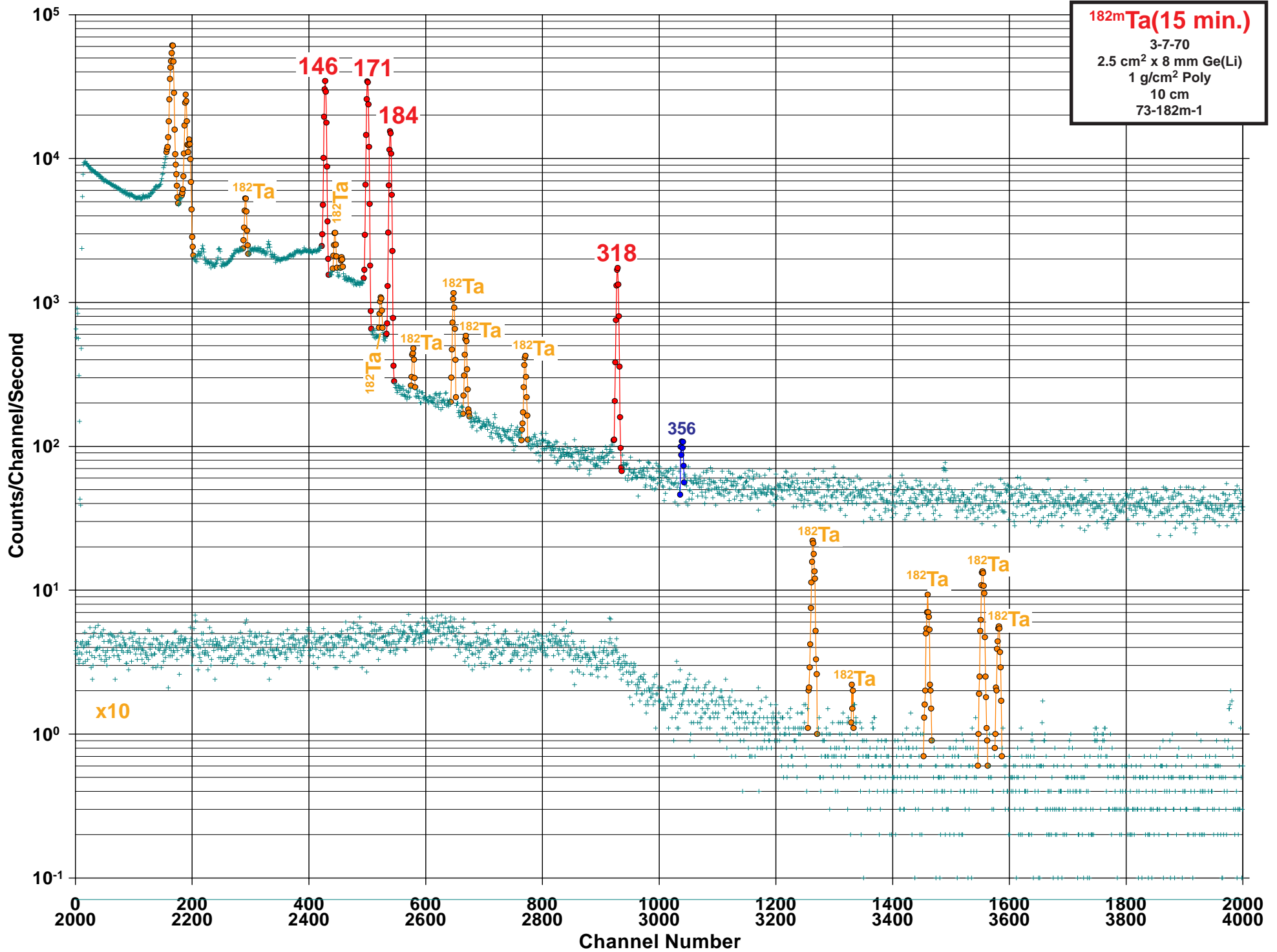
Detector: 2.5 cm² x 4 mm Ge (Li)

Method of Production: ¹⁸⁰Ta(γ , γ)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
93.40	0.20	100.	4.51	0.16	1
103.6	0.2	18.0	0.81	0.23	1

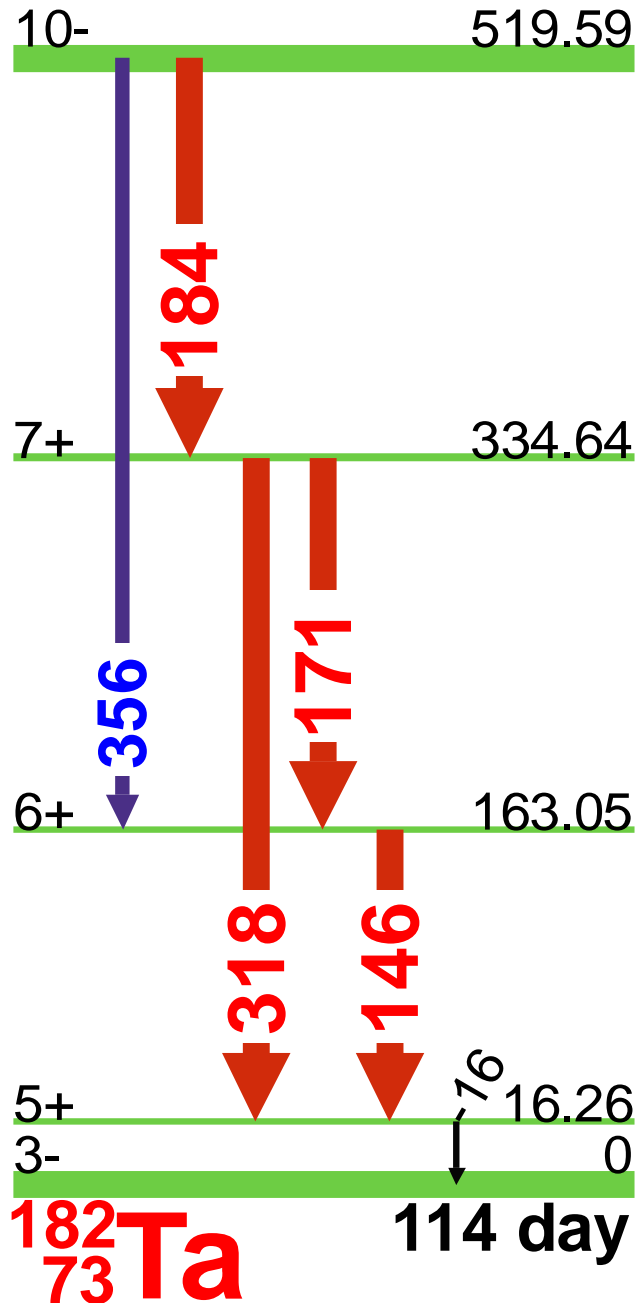
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data





^{182m}Ta(15 min.) Decay Scheme

15 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{182m}Ta

Half Life: 15.84(10) min.

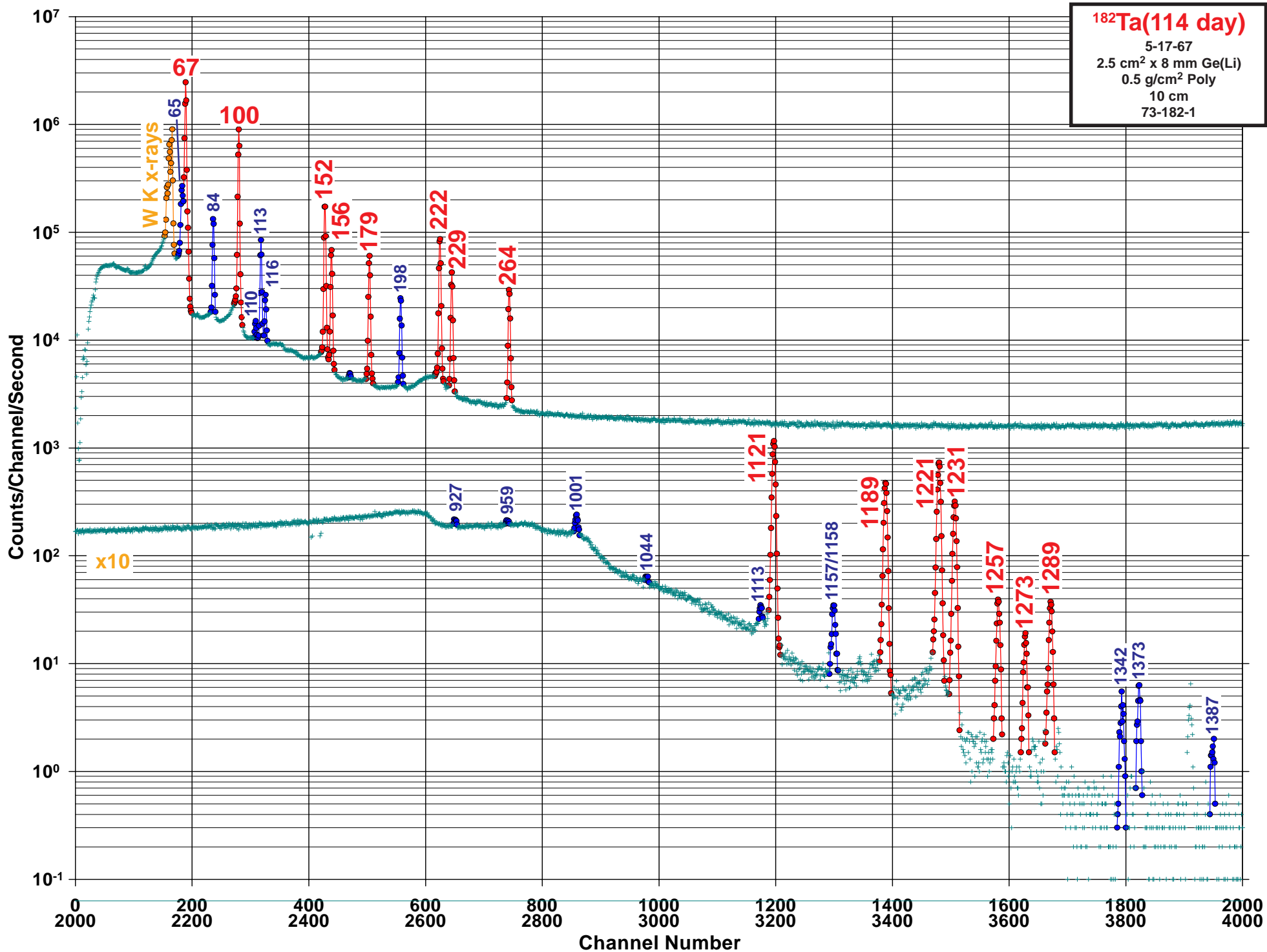
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ¹⁸¹Ta(n,γ)

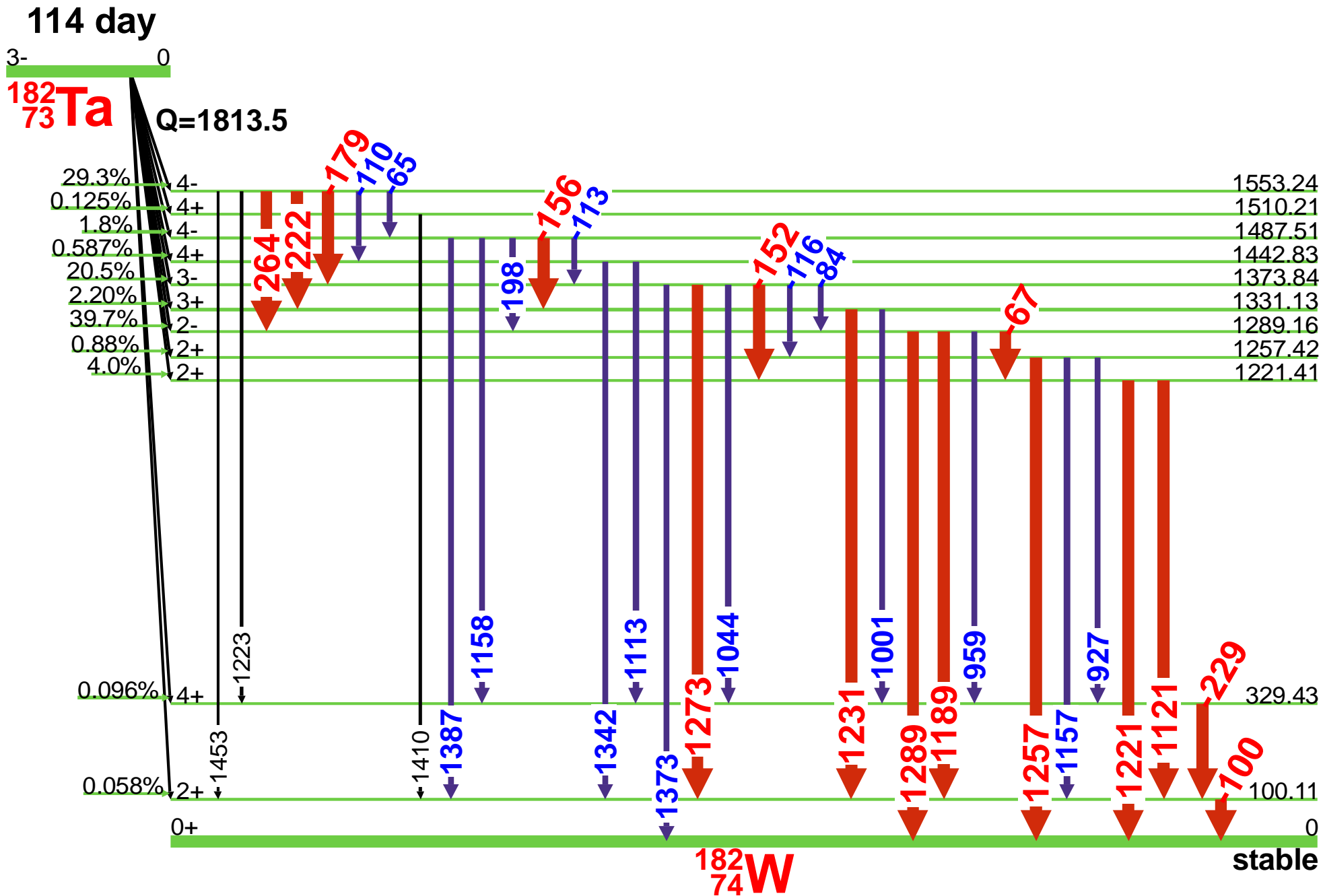
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
16.263	0.003				4
146.785	0.015	76.0	37.2	2.5	1
171.586	0.015	100.	49.0	2.0	1
184.951	0.015	50.0	24.5	1.8	1
318.40	0.05	14.0	6.9	0.6	1
356.47	0.10	0.6	0.29	0.05	3

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁸²Ta(114 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{182}Ta E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

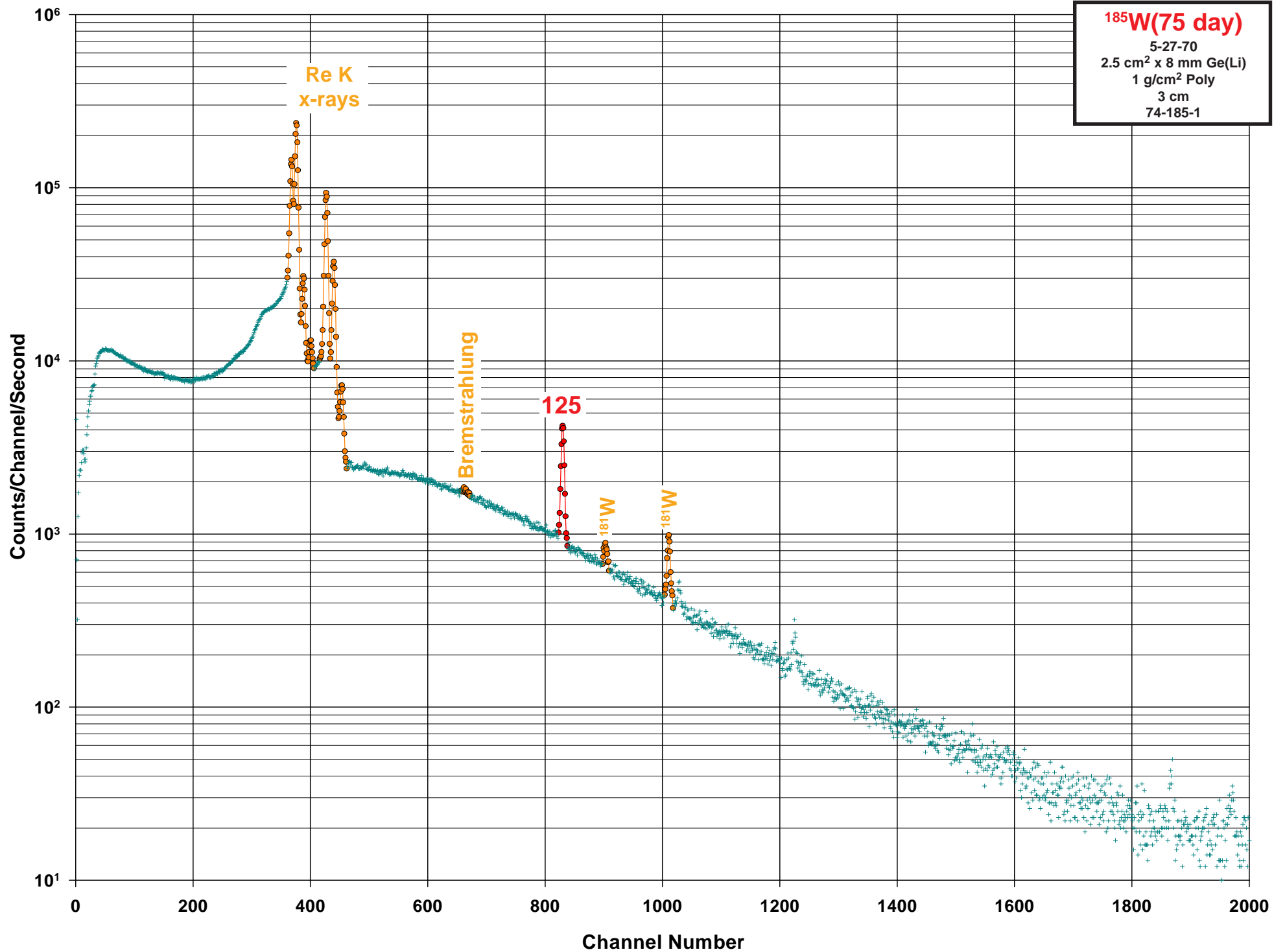
Half Life: 114.43(3) day

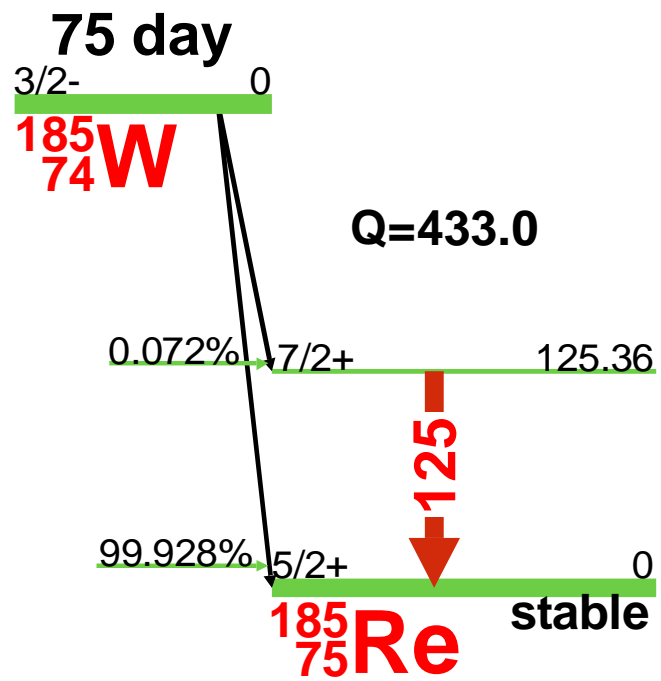
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{181}\text{Ta}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
31.738	0.001		0.486	0.011	4
42.715			0.278	0.006	4
65.722			2.92	0.07	4
67.750		100.	41.2	0.9	1
84.681		6.04	2.65	0.07	2
100.106		30.40	14.10	0.26	1
110.41	0.05	0.27	0.087	0.004	4
113.673		3.93	1.89	0.04	2
116.419	0.001	0.90	0.431	0.009	3
121.50	0.20		0.0026	0.0007	4
152.431		15.62	6.93	0.13	1
156.388		6.01	2.64	0.05	1
179.395		7.04	3.08	0.06	1
198.353		3.40	1.441	0.028	2
222.110		17.05	7.49	0.14	1
229.322	0.001	8.42	3.63	0.07	1
264.075		8.40	3.61	0.07	1
351.05	0.10		0.0091	0.0011	4
829.70	0.10		0.015	0.006	4
891.980	0.002		0.056	0.004	4
927.992	0.002	1.50	0.620	0.012	4
959.730	0.002		0.348	0.008	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1001.695	0.002	5.34	2.07	0.04	3
1035.80	0.20		0.0073	0.0024	4
1044.410	0.002		0.237	0.006	4
1113.40	0.05	0.83	0.446	0.009	3
1121.301	0.002	79.94	34.9	0.6	1
1135.90	0.20				4
1157.313	0.002	2.22	0.59	0.11	3
1158.082	0.002		0.40	0.06	
1180.78	0.10		0.086	0.005	4
1189.050	0.002	37.41	16.22	0.28	1
1221.407	0.002	62.10	27.0	0.5	1
1223.803	0.002		0.23	0.08	4
1231.016	0.002	26.02	11.44	0.20	1
1257.418	0.002	3.50	1.488	0.026	1
1273.730	0.002	1.49	0.650	0.011	1
1289.156	0.002	3.24	1.349	0.024	1
1342.72	0.05	0.61	0.251	0.004	2
1373.836	0.002	0.51	0.218	0.004	2
1387.402	0.002	0.15	0.0708	0.0015	3
1410.10	0.10		0.0394	0.0012	4
1453.124	0.002		0.0284	0.0009	4





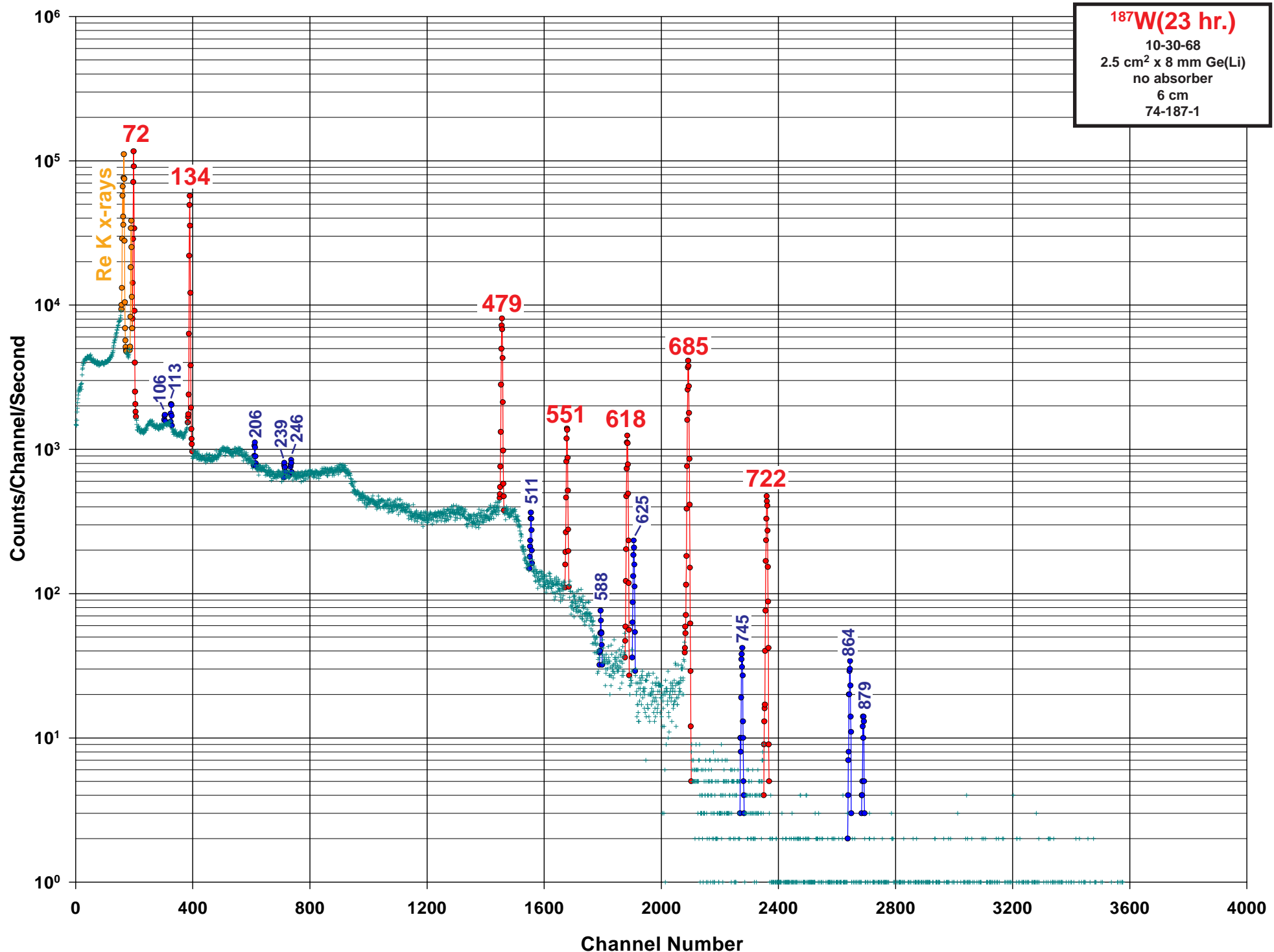
^{185}W (75 day) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{185}W

Half Life: 75.1(3) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{184}\text{W}(n,\gamma)$

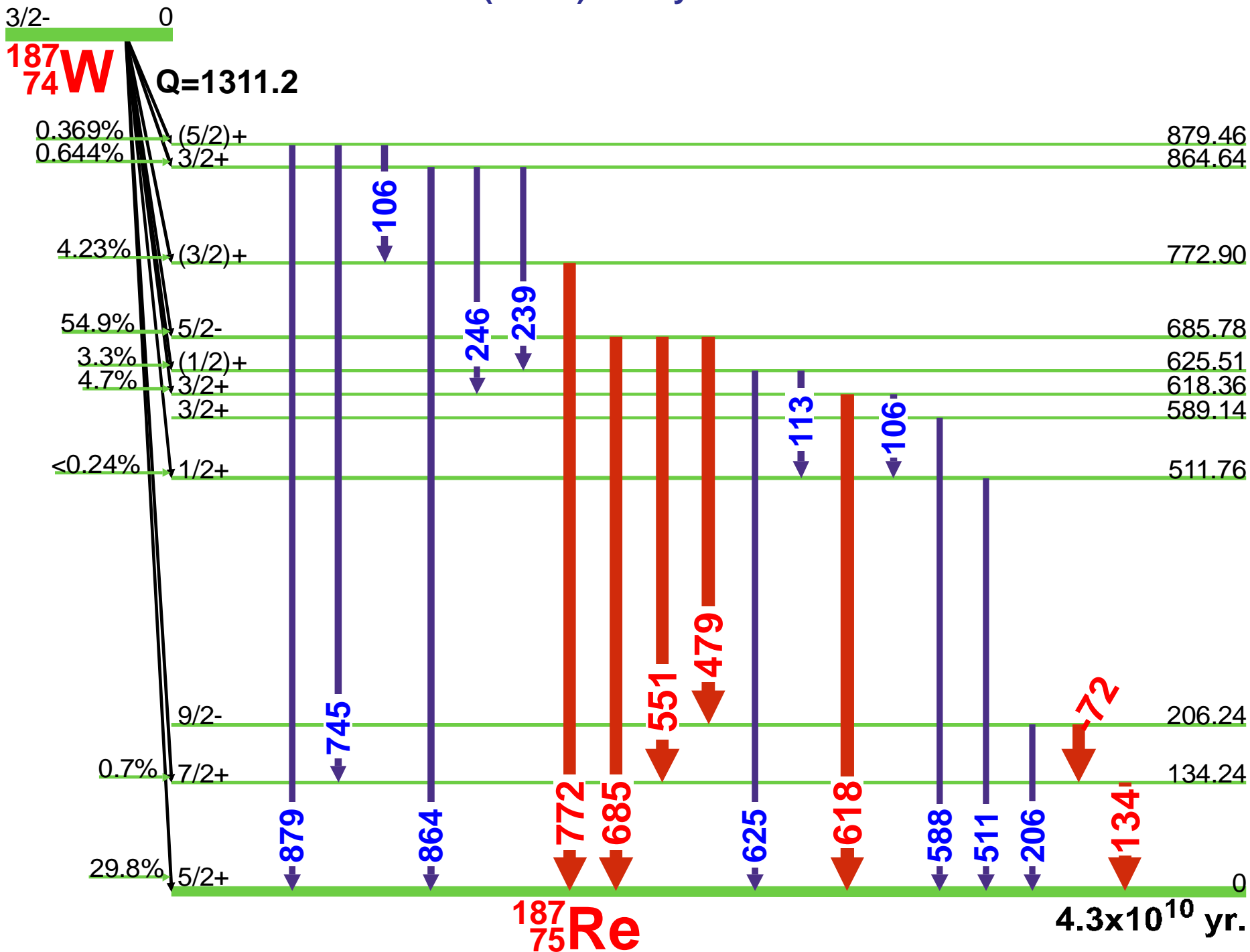
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
125.358	0.003	100.	0.0192	0.0007	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



23 hr.

¹⁸⁷W(23 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{187}W E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 23.72(6) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{186}\text{W}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
7.1	0.3		0.0034	0.0006	4
16.45	0.16		0.0063	0.0006	4
29.230	0.024		0.0060	0.0008	4
36.38	0.03		0.0074	0.0008	4
40.75	0.20		0.0020	0.0005	4
43.66	0.05		0.0020	0.0005	4
65.4	0.5				4
70.2	0.5				4
72.002	0.004	37.0	11.1	0.4	1
77.37	0.04		0.0071	0.0011	4
93.22	0.03		0.0052	0.0008	4
100.38	0.24		0.0087	0.0008	4
103.8	0.5		0.0101	0.0004	4
106.596	0.013	0.09	0.0262	0.0011	4
106.6	1.0				4
113.746	0.008	0.34	0.0773	0.0029	4
115.5	0.5		0.0052	0.0003	4
123.66	0.12		0.0251	0.0044	4
134.247	0.007	29.4	8.85	0.28	1
138.50	0.05		0.0044	0.0011	4
141.22	0.20		0.0066	0.0022	4
147.3	0.5				4
154.4	0.5		0.0158	0.0007	4
165.67	0.40		0.0009	0.0004	4
168.5	0.4		0.0025	0.0011	4
178.8	0.5		0.014	0.006	4
191.1	0.5				4
198.34	0.12		0.0017	0.0004	4
201.3	0.5				4
206.242	0.018	0.53	0.143	0.006	4
208.29	0.16		0.0007	0.0003	4
239.193	0.024	0.28	0.086	0.004	4
246.280	0.021	0.38	0.119	0.005	4
261.0	1.0		0.0109	0.0027	4
262.7	0.5		0.0109	0.0027	4
275.61	0.12		0.0021	0.0006	4
303.10	0.10		0.0005	0.0003	4
345.7	0.5				4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
352.86	0.17		0.0016	0.0006	4
374.31	0.14		0.0025	0.0008	4
375.93	0.13		0.0035	0.0008	4
454.920	0.020		0.0295	0.0021	4
479.550	0.022	80.4	21.8	0.7	1
484.15	0.03		0.0172	0.0009	4
491.2	0.5				4
492.80	0.20		0.025	0.008	4
511.66	0.04	2.60	0.647	0.022	3
551.52	0.04	18.9	5.08	0.17	1
564.62	0.19		0.012	0.004	4
573.71	0.14		0.0005	0.0002	4
576.31	0.08		0.0066	0.0011	4
578.72	0.11		0.0010	0.0004	4
582.0	1.0				4
588.95	0.06	0.60	0.122	0.005	3
612.9	0.4		0.0022	0.0011	4
618.26	0.04	23.3	6.28	0.21	1
625.519	0.010	3.9	1.09	0.04	2
638.65	0.13				4
638.65	0.13		0.0033	0.0011	4
641.1	0.5		0.036	0.014	4
647.30	0.25		0.0008	0.0004	4
682.34	0.20		0.007	0.007	4
685.73	0.04	100.	27.3	0.9	1
693.06	0.22		0.0014	0.0008	4
727.22	0.20		0.038	0.011	4
730.3	1.0		0.0164	0.0004	4
745.216	0.019	1.0	0.298	0.010	2
767.4	0.8		0.0016	0.0006	4
772.89	0.05	14.9	4.12	0.13	1
794.80	0.20		0.025	0.008	4
816.560	0.020		0.0099	0.0007	4
825.95	0.25		0.0002		4
826.65	0.25		0.0002		4
835.55	0.20		0.0087	0.0027	4
844.7	0.5		0.0002	0.0001	4
864.550	0.010	1.25	0.336	0.012	2

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ¹⁸⁷WE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

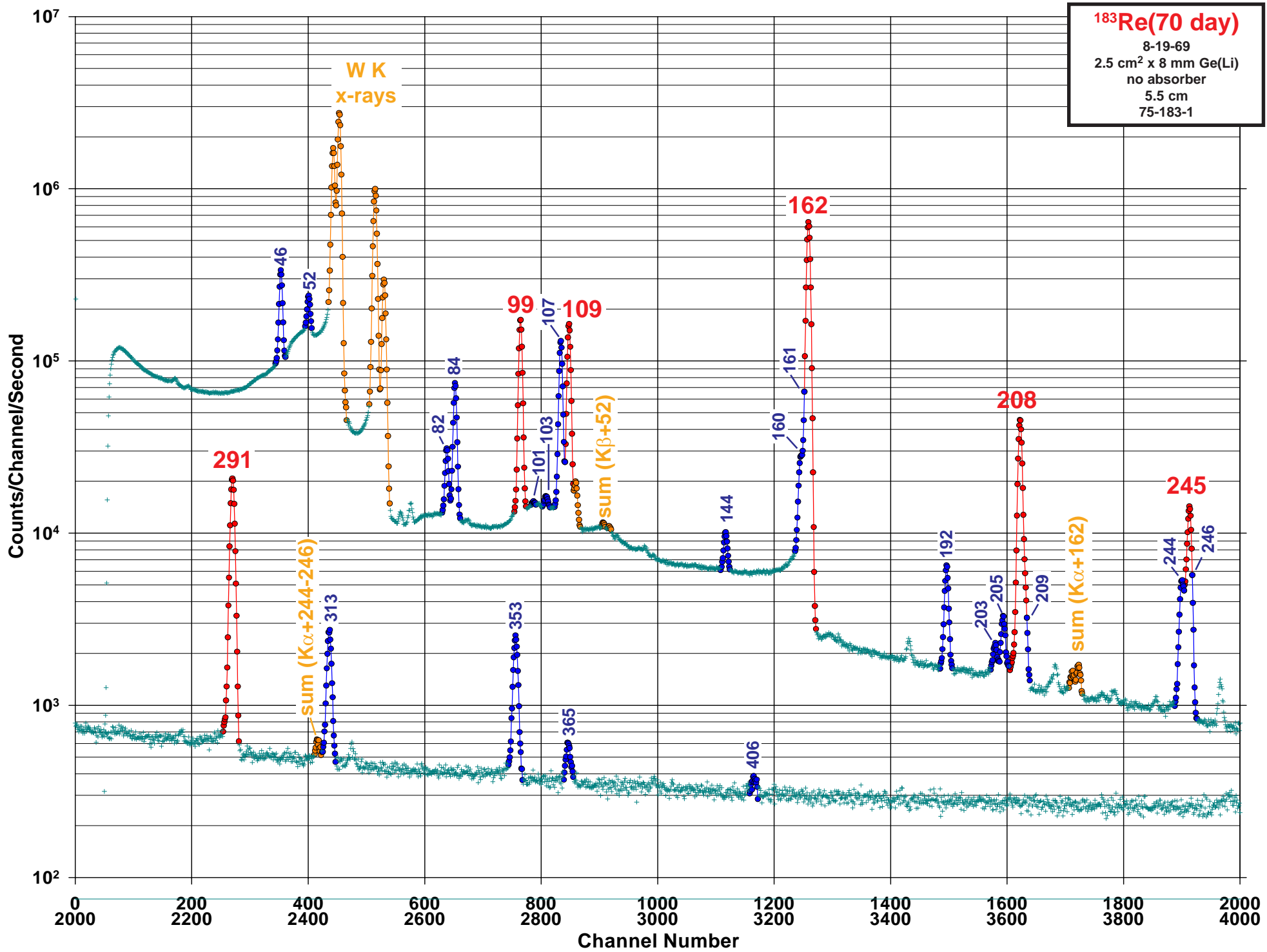
Half Life: 23.72(6) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ¹⁸⁶W(n,γ)

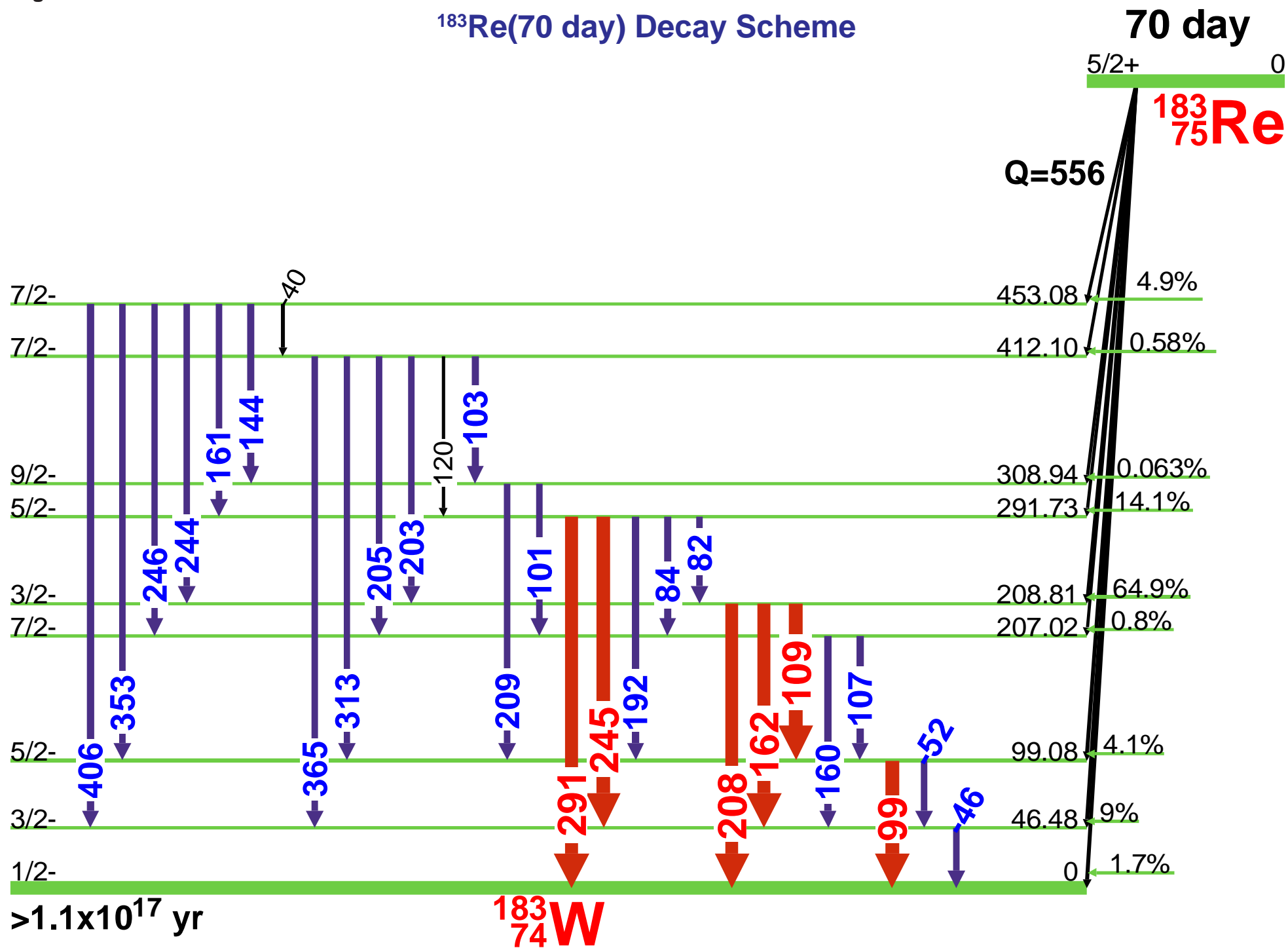
E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
879.45	0.05	0.47	0.142	0.006	3
933.80	0.20		0.014	0.006	4
960.17	0.05		0.0013	0.0001	4
968.78	0.20		0.041	0.014	4
1000.82	0.20		0.0044	0.0014	4
1056.24	0.05		0.0002	0.0001	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1086.6	1.0		0.0001		4
1095.9	1.0		0.0001		4
1190.38	0.12		0.0002		4
1220.80	0.25		0.0002	0.0001	4
1230.10	0.04		0.0013	0.0001	4





¹⁸³Re(70 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

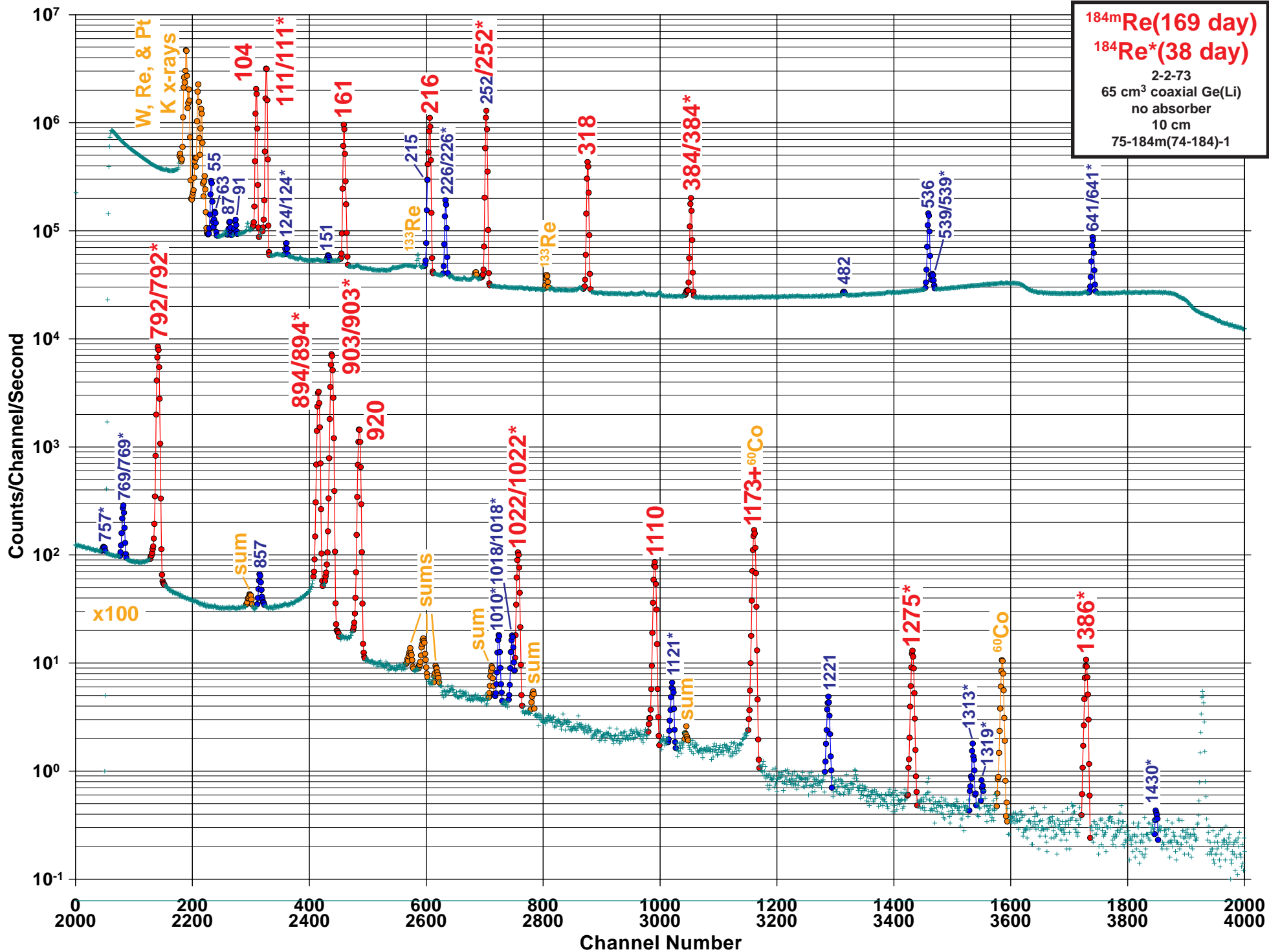
Nuclide: ^{183}Re

Half Life: 70.0(14) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{184}\text{W}(p,2n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
40.976	0.001		0.026	0.007	4
46.484	0.001	34.24	7.97	0.21	3
52.596	0.001	9.71	2.21	0.08	4
82.918	0.002	1.36	0.294	0.015	3
84.713	0.002	4.27	0.97	0.04	2
99.080	0.001	11.49	2.69	0.07	1
101.928	0.004	0.069	0.0163	0.0008	4
103.158	0.004	0.034	0.0084	0.0019	4
107.935	0.001	9.47	2.17	0.06	2
109.730	0.001	12.1	2.87	0.08	1
120.373	0.002		0.014	0.007	4
144.134	0.004	0.59	0.117	0.003	4
160.531	0.002	2.87	0.594	0.019	3
161.349	0.002	2.9	0.61	0.14	3
162.327	0.001	100.	23.3	0.7	1
192.648	0.002	1.14	0.260	0.008	4
203.290	0.002	0.15	0.0447	0.0027	3
205.086	0.002	0.42	0.110	0.004	3
208.811	0.001	12.64	2.95	0.08	1
209.862	0.004	1.0	0.261	0.009	4
244.266	0.002	1.70	0.408	0.013	2
245.244	0.002	1.03	0.245	0.019	1
246.062	0.002	5.5	1.31	0.05	4
291.728	0.002	13.1	3.05	0.18	1
313.020	0.002	1.75	0.415	0.013	2
353.996	0.002	2.30	0.536	0.015	2
365.617	0.002	0.34	0.079	0.004	4
406.593	0.002	0.10	0.028	0.004	4

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



$^{184\text{m}}\text{Re}$ (169 day)
 $^{184}\text{Re}^*$ (38 day)
2-2-73
65 cm³ coaxial Ge(Li)
no absorber
10 cm
75-184m(74-184)-1

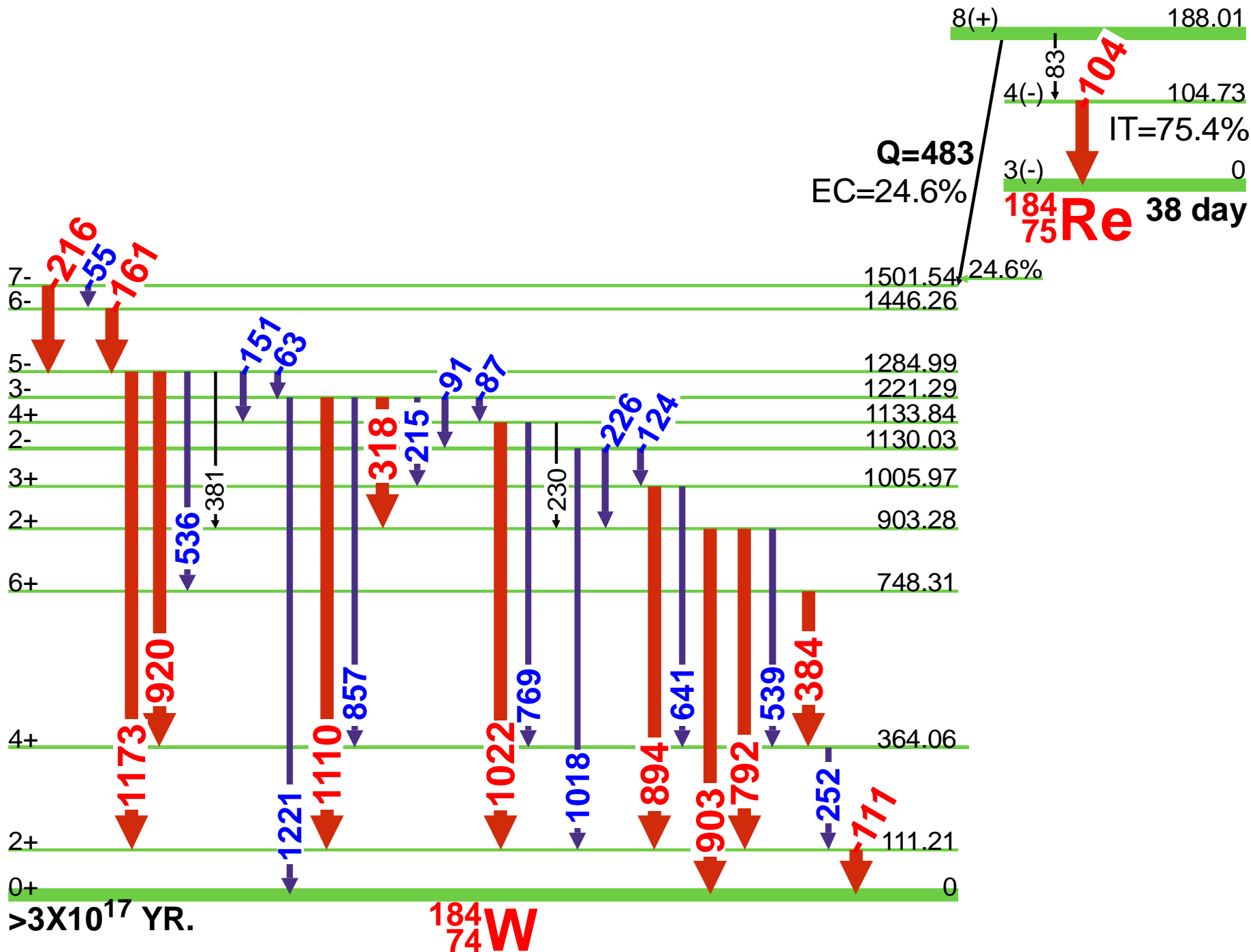


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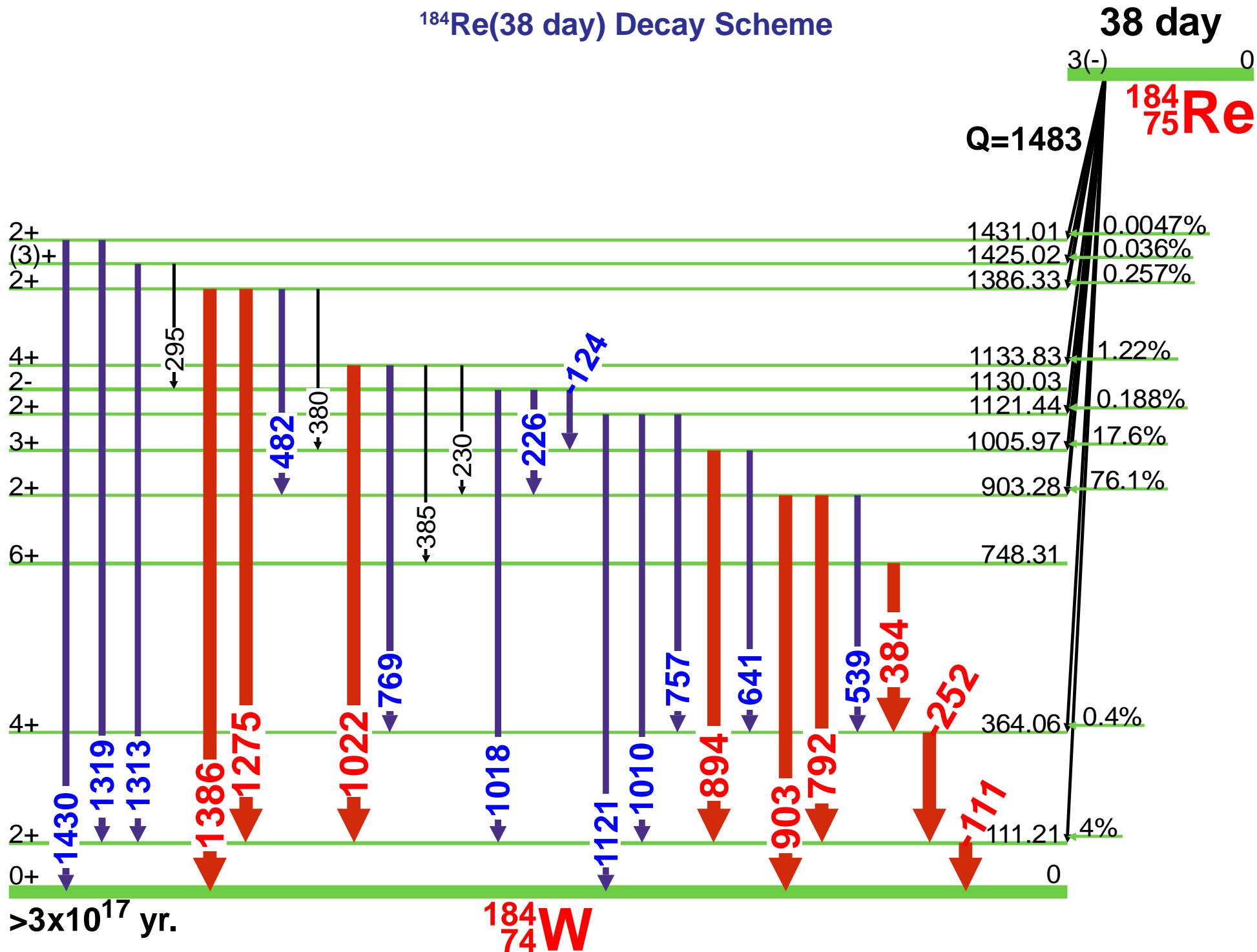


¹⁸⁴Re(169 day) Decay Scheme

169 day



¹⁸⁴Re(38 day) Decay Scheme



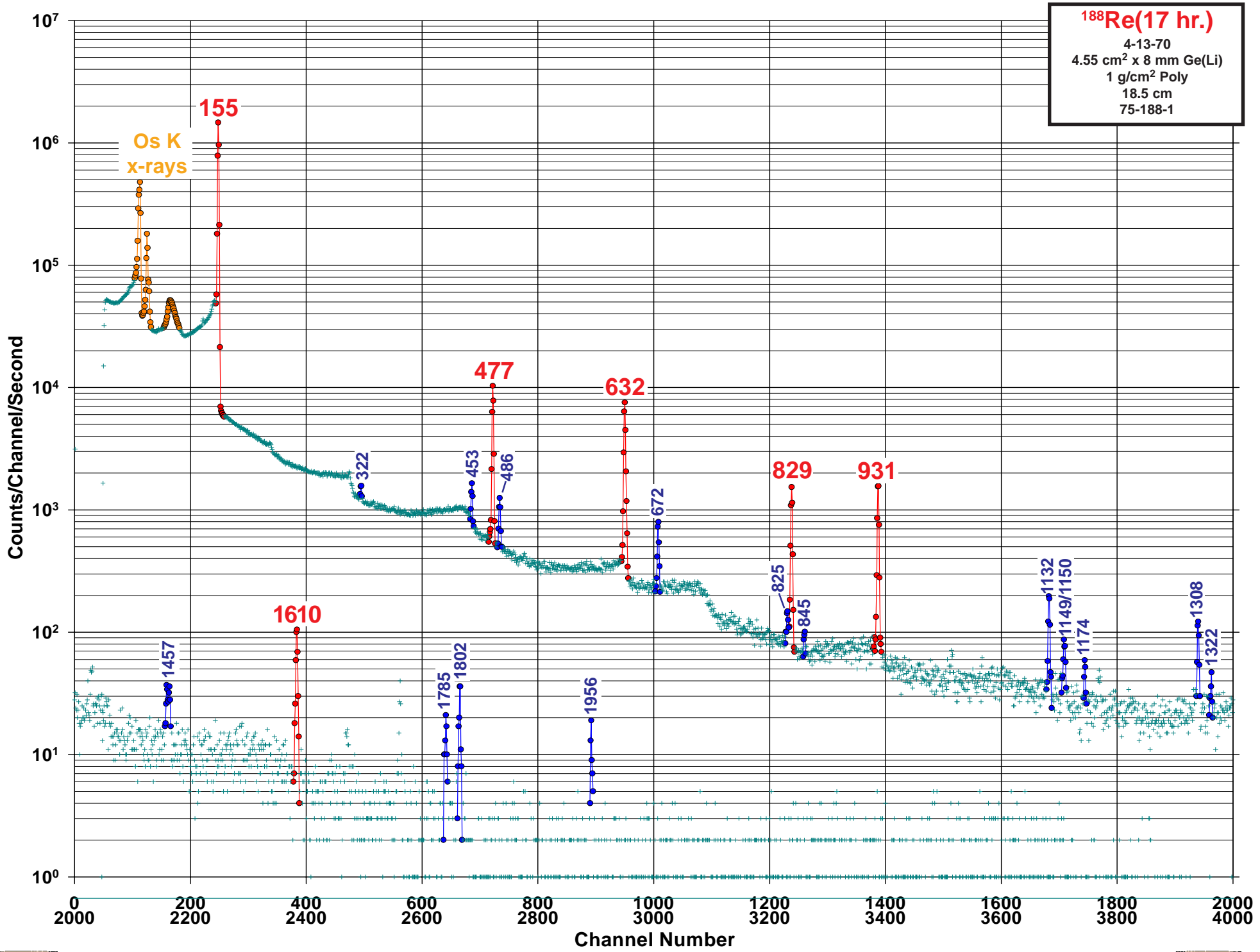
GAMMA-RAY ENERGIES AND INTENITIES

Nuclide: $^{184m}\text{Re} - ^{184}\text{Re}^*$ E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 169(8) day - 38.0(5) day*

Detector: 65 cm³ coaxial Ge (Li)Method of Production: $^{184}\text{W}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	
55.278	0.005	5.9	2.31	0.25	4	* 482.98	0.16	0.044	0.018	0.003	4
63.715	0.015	0.95	0.37	0.06	4	Ann. 511.006			0.0024		4
83.28	0.04		0.00540	0.00020	4	536.674	0.015	8.44	3.302	0.05	3
87.452	0.010	0.61	0.239	0.012	4	539.220	0.025	0.86	0.0298	0.0015	4
91.270	0.010	0.65	0.253	0.012	4	* 539.220	0.025		0.327	0.018	
104.729	0.007	34.4	13.4	0.4	1	641.915	0.020	5.50	0.344	0.012	3
111.207	0.007	55.7	5.8	0.3	1	* 641.915	0.020		1.94	0.06	
* 111.207	0.007		17.1	0.7		* 757.36	0.04	0.147	0.062	0.004	4
* 124.060	0.020	0.38	0.0018	0.0003	4	769.778	0.017	2.19	0.234	0.015	3
124.060	0.020		0.148	0.007		* 769.778	0.017		0.666	0.026	
127.67	0.10		0.00059	0.00025	4	792.067	0.022	98.8	3.69	0.07	1
* 127.67	0.10		0.0016	0.0007		* 792.067	0.022		37.5	1.1	
151.134	0.020	0.124	0.048	0.005	4	857.25	0.03	0.415	0.162	0.005	3
161.269	0.015	16.6	6.49	0.12	1	894.760	0.019	44.2	2.76	0.10	1
188.01			0.00007	0.00005	4	* 894.760	0.019		15.6	0.5	
215.326	0.012	7.1	2.78	0.07	2	903.282	0.019	100.	3.74	0.07	1
216.547	0.012	24.1	9.42	0.20	1	* 903.282	0.019		37.9	1.1	
* 226.748	0.010	3.81	0.018	0.003	1	920.933	0.021	20.8	8.14	0.12	1
226.748	0.010		1.47	0.04		* 1010.24	0.03	0.218	0.091	0.007	3
230.45	0.06	0.049	0.0052	0.0007	4	* 1018.93	0.05	0.243	0.0011	0.0002	3
* 230.45	0.06		0.0151	0.0025		1018.93	0.05	0.243	0.093	0.010	3
* 252.845	0.010	34.5	3.02	0.26	1	1022.63	0.03	1.69	0.180	0.015	1
252.845	0.010		10.7	0.3		* 1022.63	0.03		0.52	0.03	
* 256.3			0.0059	0.0001	4	* 1061.04	0.14	0.0062	0.0026	0.0005	4
* 265.0			0.0015		4	1110.08	0.03	1.49	0.58	0.03	1
279.0			0.00081		4	* 1121.44	0.04	0.084	0.0352	0.0027	3
* 295.01	0.07	0.052	0.022	0.004	4	1173.77	0.03	3.10	1.21	0.06	1
318.008	0.010	14.7	5.76	0.07	1	1221.29	0.04	0.051	0.0199	0.0015	2
* 380.34	0.04	0.16	0.0050	0.0013	4	* 1275.11	0.03	0.285	0.119	0.006	1
381.82	0.14	0.16	0.062	0.007	4	* 1313.79	0.04	0.0266	0.0111	0.0009	3
*D 384.250	0.012	8.01	3.13	0.05	1	* 1319.94	0.14	0.0054	0.0023	0.0003	4
384.254	0.010		0.0054	0.0001		* 1386.33	0.03	0.245	0.103	0.006	1
*D 385.4			0.0020		4	* 1430.96	0.08	0.0057	0.0024	0.0003	4
385.4			0.0054	0.0001							

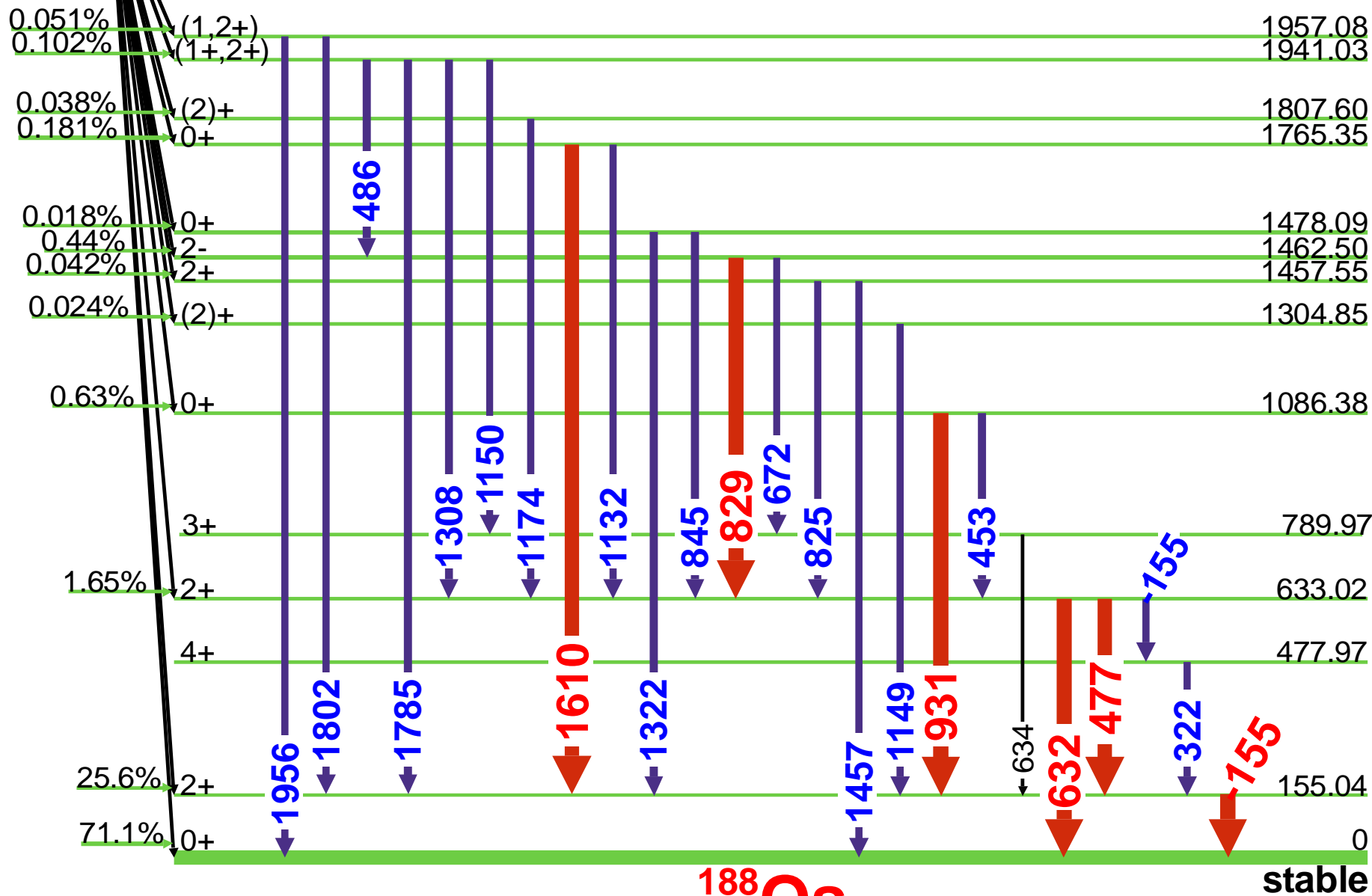


¹⁸⁸Re(17 hr.) Decay Scheme

1- 17 hr. 0

¹⁸⁸₇₅Re

Q=2120.4



¹⁸⁸₇₆Os

stable



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{188}Re E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

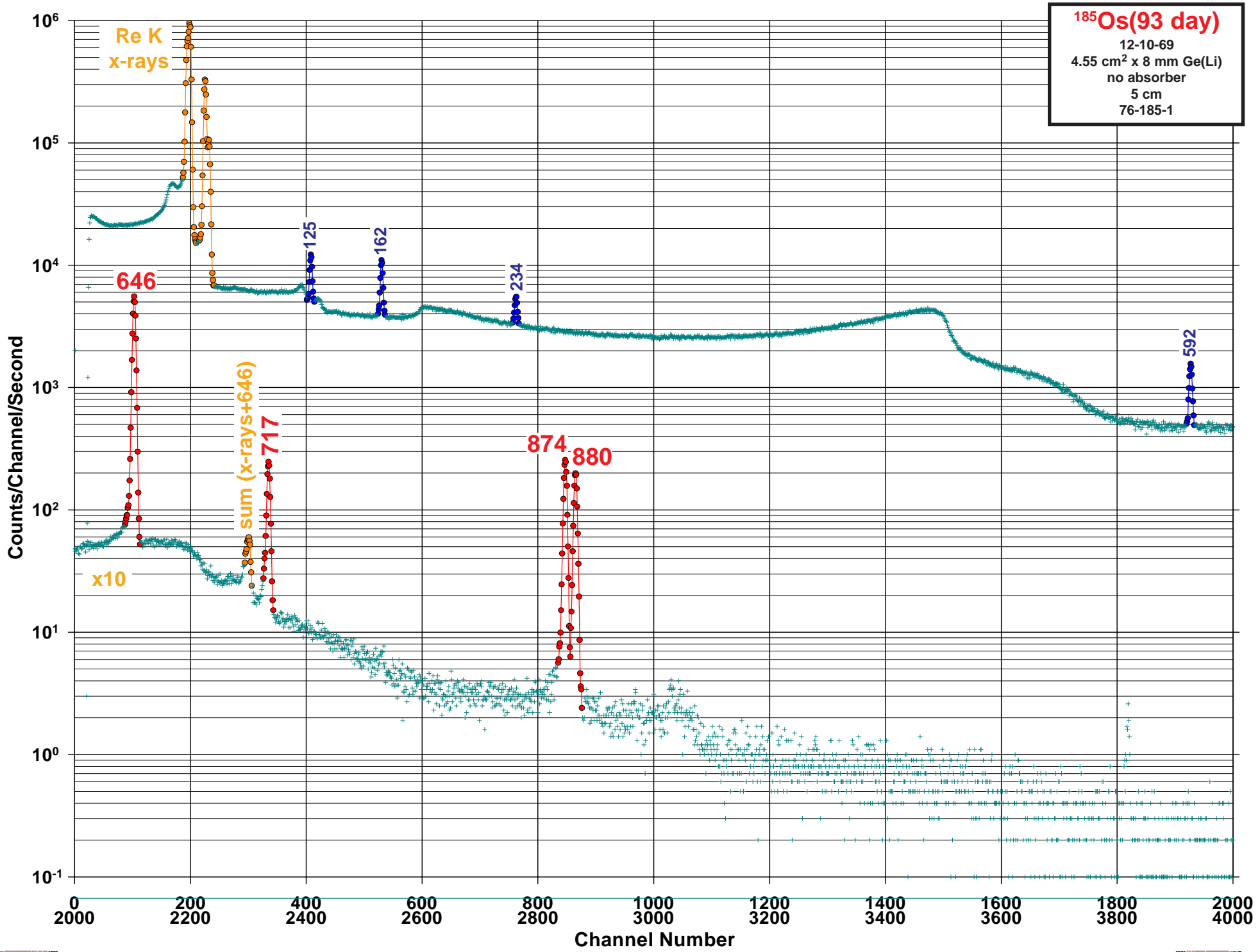
Half Life: 17.005(4) hr.

Detector: 4.55 cm² x 8 mm Ge (Li)Method of Production: $^{187}\text{Re}(n,\gamma)$

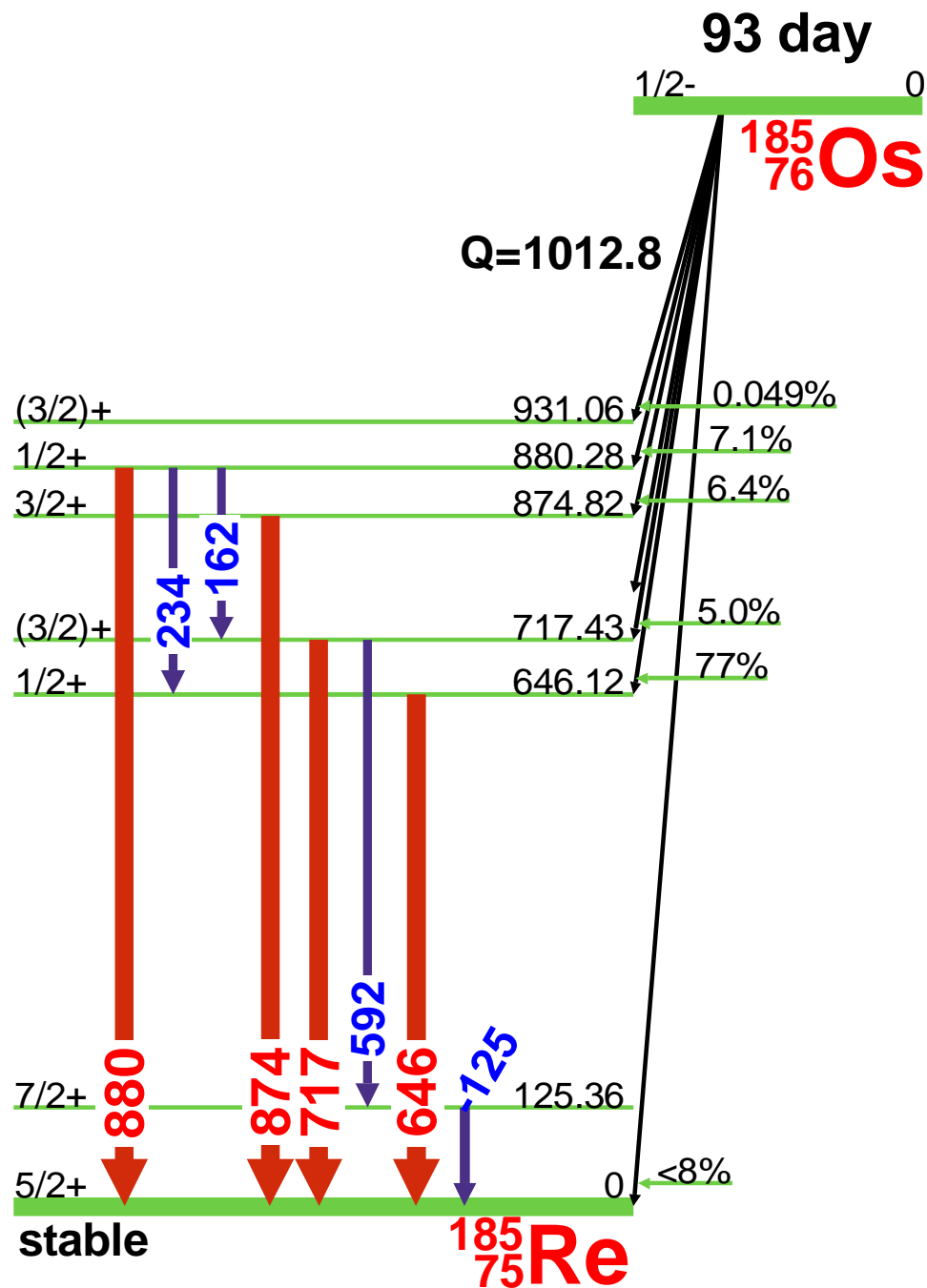
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
D	155.0		100.	0.0061	0.0006	1
	155.041	0.004		15.1	0.9	
	312.001	0.024		0.0043	0.0011	4
	322.93	0.04	0.21	0.0161	0.0011	4
	453.340	0.020	0.77	0.073	0.006	4
	477.992	0.025	7.1	1.02	0.06	1
	486.087	0.011	0.71	0.079	0.004	3
	514.88	0.06		0.0054	0.0003	4
	557.71	0.10		0.0009	0.0001	4
	623.8	0.3		0.0024	0.0005	4
D	632.983	0.021	10.0	1.27	0.06	1
	634.98	0.07		0.148	0.008	
	672.535	0.016	0.83	0.111	0.006	3
	810.49	0.04		0.0009	0.0002	4
	825.2	0.7	0.26	0.0175	0.0010	4
	829.47	0.04	3.0	0.410	0.020	1
	845.07	0.04	0.08	0.0068	0.0003	4
	931.345	0.010	3.9	0.553	0.028	1
	979.25	0.17		0.0010	0.0002	4
	984.1	0.5		0.0003	0.0002	4
D	1017.67	0.10		0.0146	0.0007	4
	1071.4	0.3		0.0007	0.0001	4
	1096.8	0.4		0.0006	0.0002	4
	1132.310	0.020	0.59	0.083	0.004	3
	1149.7	0.4	0.31	0.0158	0.0008	3
	1150.5	0.4		0.0154	0.0008	
	1174.57	0.03		0.13	0.0187	

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	1191.84	0.12		0.0133	0.0007	4
	1209.790	0.024		0.0030	0.0002	4
	1302.4	0.3		0.0057	0.0008	4
	1304.86	0.20		0.0028	0.0003	4
	1308.03	0.06	0.46	0.065	0.003	3
	1322.91	0.20	0.10	0.011	0.003	4
	1331.95	0.07		0.0017	0.0002	4
	1457.54	0.13		0.0185	0.0009	4
	1463.0	0.6		0.0008	0.0003	4
	1530.5	0.3		0.0006	0.0002	4
	1549.26	0.10		0.0016	0.0009	4
	1574.57	0.25		0.0006	0.0001	4
	1610.40	0.05	0.66	0.098	0.005	1
	1652.49	0.14		0.0035	0.0003	4
	1669.91	0.07		0.0103	0.0005	4
	1704.0					4
	1765.1					4
	1785.95	0.12	0.16	0.0194	0.0010	3
	1802.04	0.04	0.24	0.0363	0.0018	2
	1807.6	0.3		0.0009	0.0001	4
	1809.5	0.3		0.0004	0.0001	4
	1825.0					4
	1864.91	0.25		0.0050	0.0003	4
	1867.20	0.22		0.0005	0.0001	4
	1936.9	0.3		0.0002		4
	1940.91	0.23		0.0018	0.0001	4
	1956.96	0.17	0.13	0.0150	0.0008	3
	2022.53	0.16		0.0015	0.0001	4





¹⁸⁵Os(93 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁸⁵Os

Half Life: 93.6(5) day

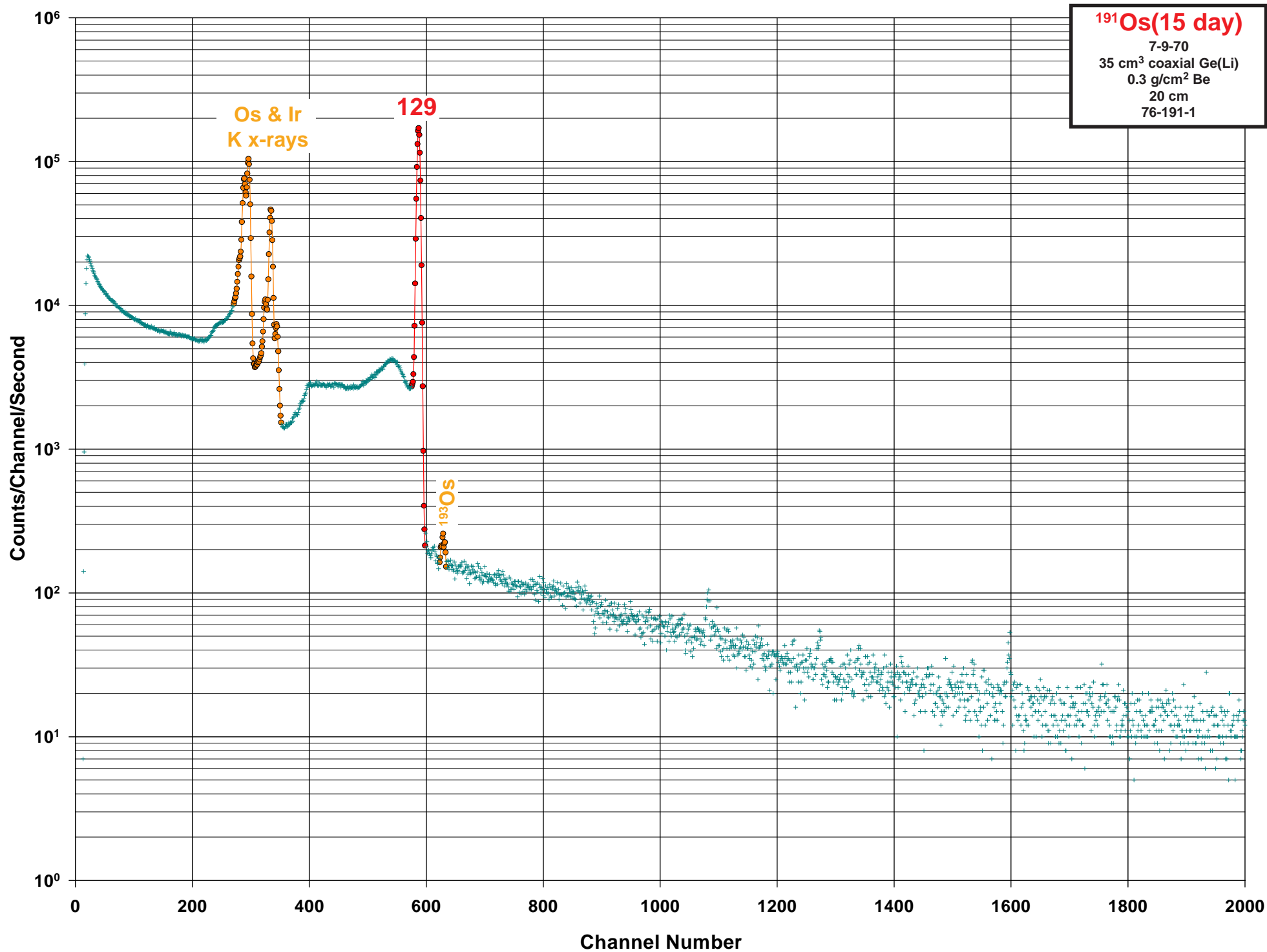
Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: ¹⁸⁴Os(n,γ)

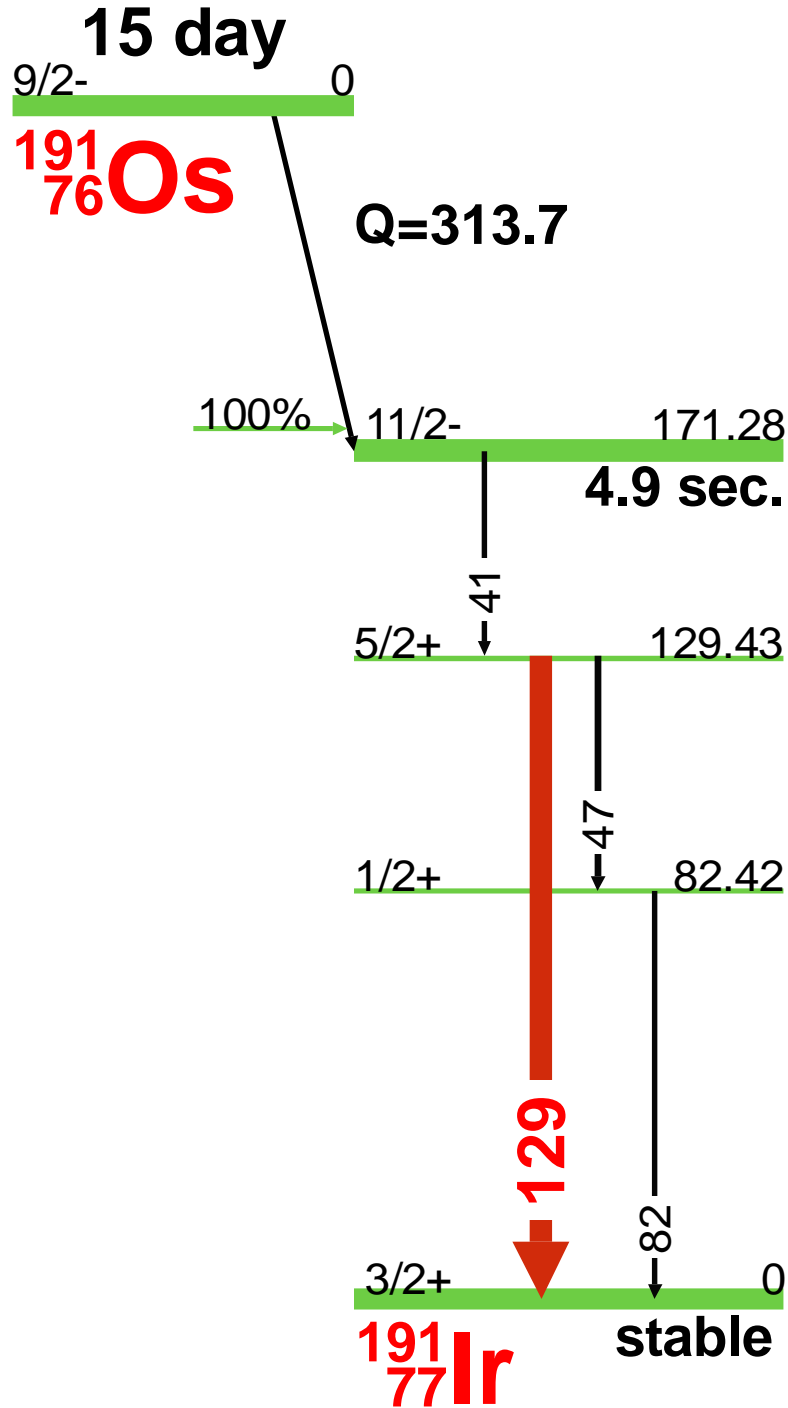
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
47.4					4
67.5					4
71.313	0.002		0.27	0.11	4
114.7					4
117.5					4
121.20	0.10		0.023	0.008	4
125.358	0.001	0.42	0.342	0.018	3
148.7					4
157.7					4
159.4					4
162.852	0.007	0.69	0.566	0.028	3
185.7					4
189.1					4
229.1					4
234.157	0.009	0.51	0.413	0.019	4
292.074	0.004	1.61	1.32	0.06	3
594.9					4
646.116	0.009	100.	78.	3.	1
710.1					4
717.424	0.012	5.32	3.94	0.16	1
749.46	0.08		0.0031	0.0004	4
755.0					4
768.93	0.06		0.0035	0.0003	4
805.7					4
836.2					4
874.813	0.013	8.24	6.29	0.25	1
880.523	0.013	6.69	5.17	0.21	1
931.057	0.015		0.0484	0.0024	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁹¹Os(15 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁹¹Os

Half Life: 15.4(1) day

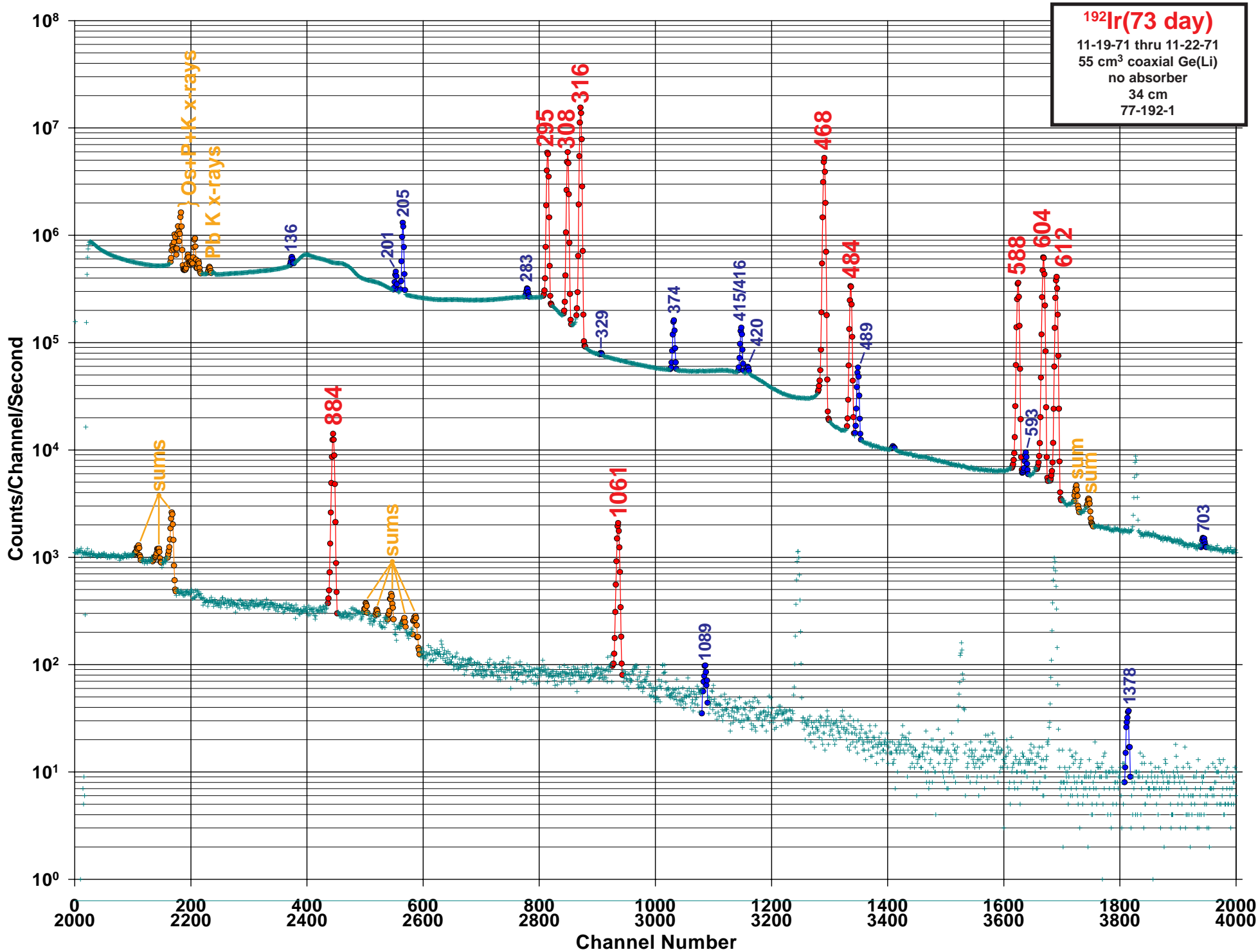
Detector: 35 cm³ coaxial Ge (Li)

Method of Production: ¹⁹⁰Os(n,γ)

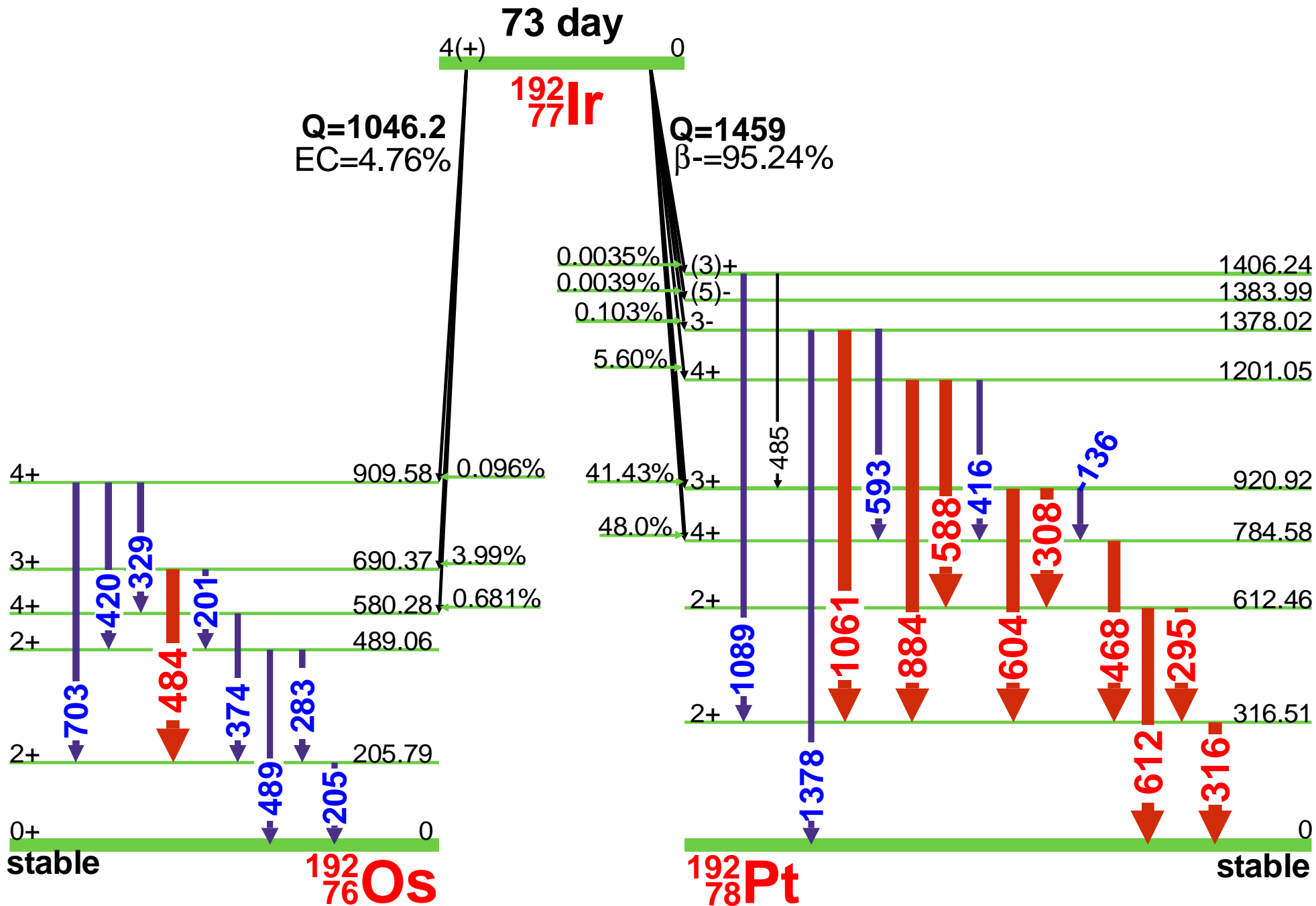
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
41.846	0.022		0.0051	0.0003	4
47.05	0.03		0.0027	0.0002	4
82.427	0.01		0.0255	0.0022	4
129.431	0.005	100	29	2	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁹²Ir(73 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{192}Ir E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

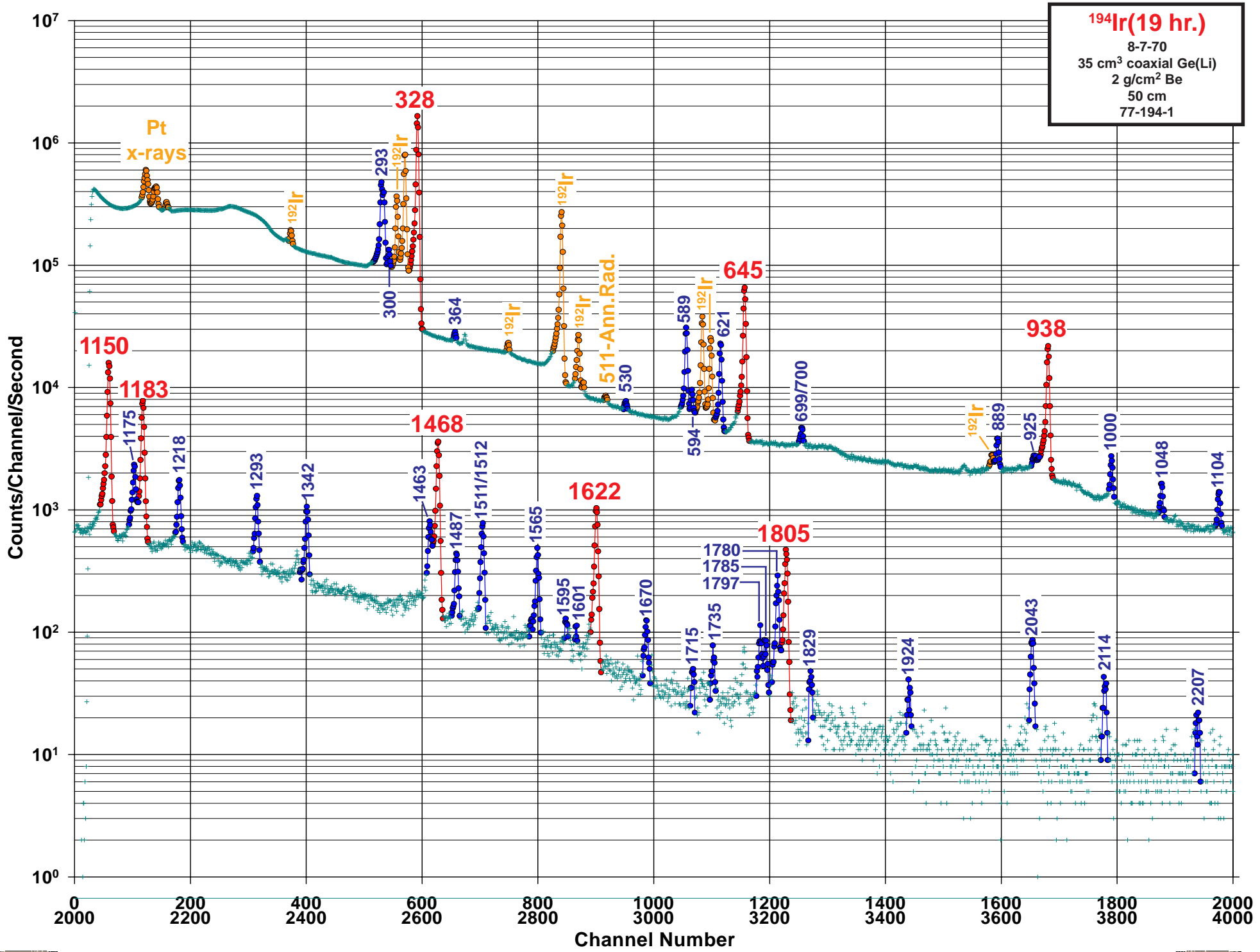
Half Life: 73.831(8) day

Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{191}\text{Ir}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
110.093	0.019		0.0126	0.0009	4
136.343		0.218	0.183	0.009	4
176.98	0.04		0.0043	0.0011	4
201.311	0.001	0.551	0.472	0.006	4
205.796		3.86	3.30	0.02	2
214.7	0.5		0.0027		4
280.04	0.05		0.023	0.010	4
283.267	0.001	0.320	0.262	0.004	4
295.958		34.64	28.67	0.10	1
308.457		35.77	30.00	0.09	1
314.8	0.3		0.075		4
316.508		100.	82.81	0.21	1
329.312	0.009	0.019	0.0186	0.0011	4
374.485	0.001	0.875	0.721	0.005	3
415.4	0.5	0.802	0.0091		3
416.471	0.001		0.664	0.007	
420.532	0.010	0.070	0.074	0.002	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
468.072		58.0	47.83	0.16	1
484.578		3.81	3.184	0.011	1
485.30	0.11		0.0022	0.0005	
489.039	0.013	0.480	0.443	0.004	3
588.584	0.001	5.52	4.514	0.014	1
593.37	0.05	0.045	0.0426	0.0015	4
599.4	0.3		0.0039	0.0016	4
604.415		10.04	8.23	0.06	1
612.466		6.55	5.309	0.017	1
703.98	0.12	0.007	0.0053	0.0009	4
739.0			0.0005		4
766.0	0.3		0.0015	0.0003	4
884.542	0.001	0.364	0.2923	0.0025	1
1061.48	0.04	0.067	0.0529	0.0008	1
1089.7	0.3	0.002	0.0010	0.0002	4
1378.3	0.3	0.0015	0.0012	0.0003	3





¹⁹⁴Ir(19 hr.)
 8-7-70
 35 cm³ coaxial Ge(Li)
 2 g/cm² Be
 50 cm
 77-194-1



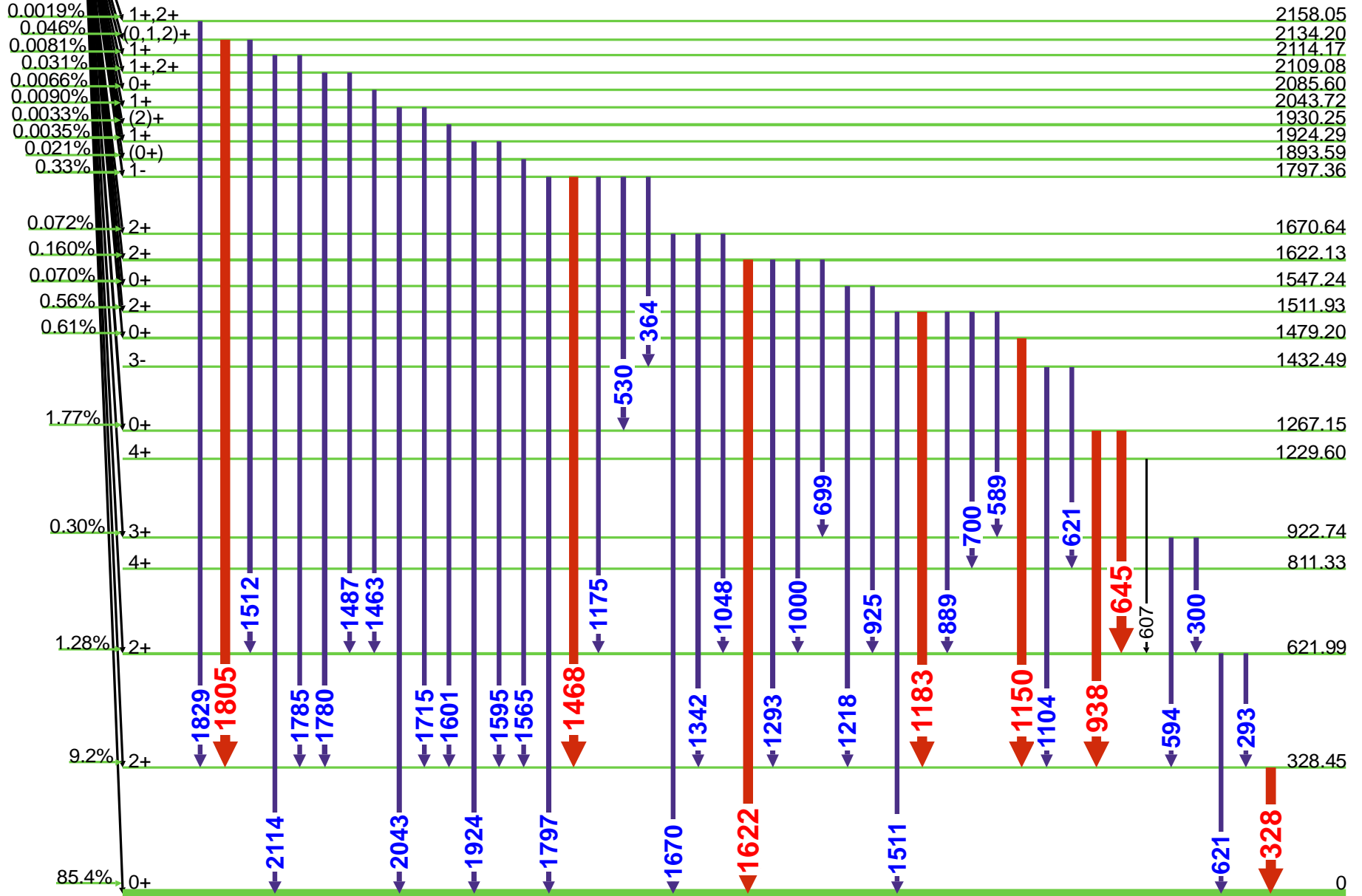
19 hr.

¹⁹⁴Ir(19 hr.) Decay Scheme

1- 0

¹⁹⁴₇₇Ir

Q=2246.9



¹⁹⁴₇₈Pt

stable



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{194}Ir E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 19.28(13) hr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{193}\text{Ir}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
111.4	0.4		0.0017	0.0006	4
202.91	0.15		0.0030	0.0008	4
244.83	0.05		0.0077	0.0011	4
293.541	0.014	18.1	2.52	0.34	3
300.741	0.014		0.35	0.05	4
328.448	0.014	100.	13.1	1.7	1
364.867	0.015	0.32	0.041	0.006	4
482.86	0.03		0.046	0.006	4
530.17	0.03	0.15	0.0159	0.0022	4
589.179	0.017		0.140	0.019	4
594.291	0.019		0.062	0.008	4
607.61	0.08		0.0039	0.0006	4
621.29	0.15	2.52	0.0096	0.0018	3
621.971	0.019		0.33	0.04	
645.146	0.020	9.14	1.18	0.16	1
699.5	0.4	0.21	0.0025	0.0013	4
700.55	0.04		0.026	0.005	
810.66	0.19		0.0025	0.0006	4
857.12	0.19		0.0071	0.0012	4
859.45	0.18		0.0017	0.0008	4
889.98	0.04	0.39	0.051	0.007	4
925.26	0.06	0.08	0.0126	0.0018	4
938.69	0.03	4.56	0.60	0.08	1
1000.12	0.04	0.38	0.046	0.006	3
1048.64	0.05	0.20	0.026	0.004	4
1104.05	0.05	0.23	0.026	0.004	4
1150.75	0.05	4.69	0.60	0.08	1
1156.6	0.3		0.0018	0.0005	4
1175.38	0.05	0.43	0.060	0.008	3
1183.49	0.05	2.42	0.31	0.04	1
1186.4	0.4		0.0084	0.0019	4
1218.78	0.05	0.45	0.056	0.008	3
1267.37					4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1293.67	0.06	0.34	0.046	0.007	3
1308.15	0.12		0.0013	0.0002	4
1342.16	0.06	0.32	0.038	0.005	3
1421.5	0.3		0.0006	0.0002	4
1431.4	0.3		0.0022	0.0007	4
1432.52	0.12		0.0011	0.0003	4
1441.78	0.14		0.0015	0.0003	4
1450.23	0.11		0.0016	0.0003	4
1463.50	0.15		0.0059	0.0014	4
1468.91	0.07	1.53	0.193	0.026	1
1479.2					4
1487.05	0.08	0.16	0.0170	0.0023	3
1492.18	0.13		0.0015	0.0003	4
1511.98	0.10	0.31	0.024	0.004	2
1512.15	0.21		0.0132	0.0025	
1518.76	0.14		0.0017	0.0003	4
1547.3					4
1565.15	0.08	0.20	0.0208	0.0029	2
1595.77	0.10		0.0016	0.0003	4
1601.90	0.12		0.0020	0.0003	4
1622.20	0.08	0.50	0.064	0.009	1
1670.72	0.10	0.05	0.0058	0.0008	4
1675.24	0.17		0.0009	0.0002	4
1715.28	0.11	0.010	0.0013	0.0002	4
1724.54	0.15		0.0008	0.0001	4
1735.37	0.12	0.02	0.0025	0.0004	3
1757.27	0.19		0.0004	0.0001	4
1780.69	0.11	0.05	0.0052	0.0008	3
1785.69	0.11	0.04	0.0040	0.0006	4
1797.48	0.09	0.14	0.0176	0.0025	2
1805.75	0.09	0.24	0.0325	0.0045	1
1812.59	0.25		0.0004	0.0001	4
1829.59	0.15	0.02	0.0019	0.0003	4



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{194}Ir E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

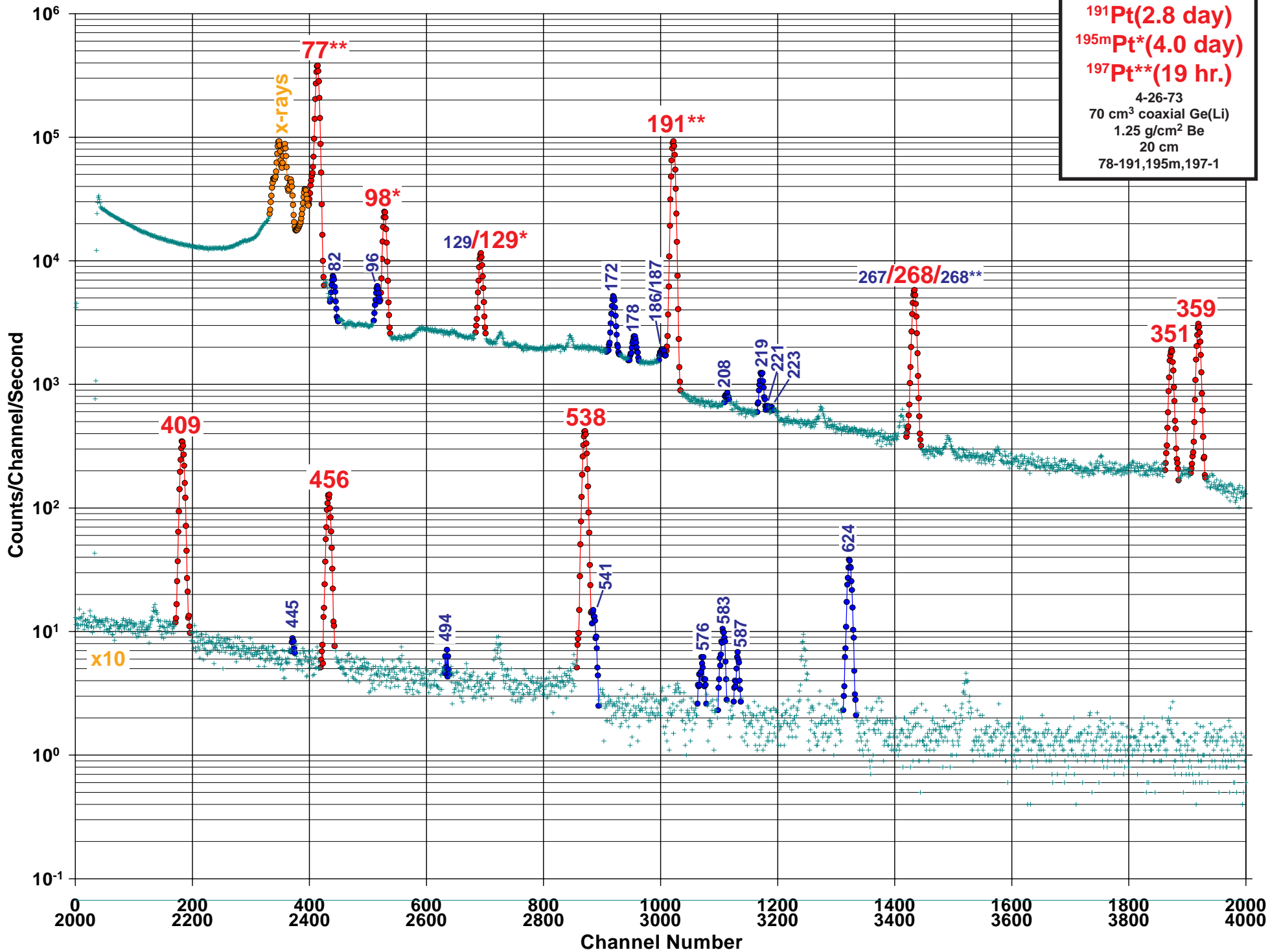
Half Life: 19.28(13) hr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: $^{193}\text{Ir}(n,\gamma)$

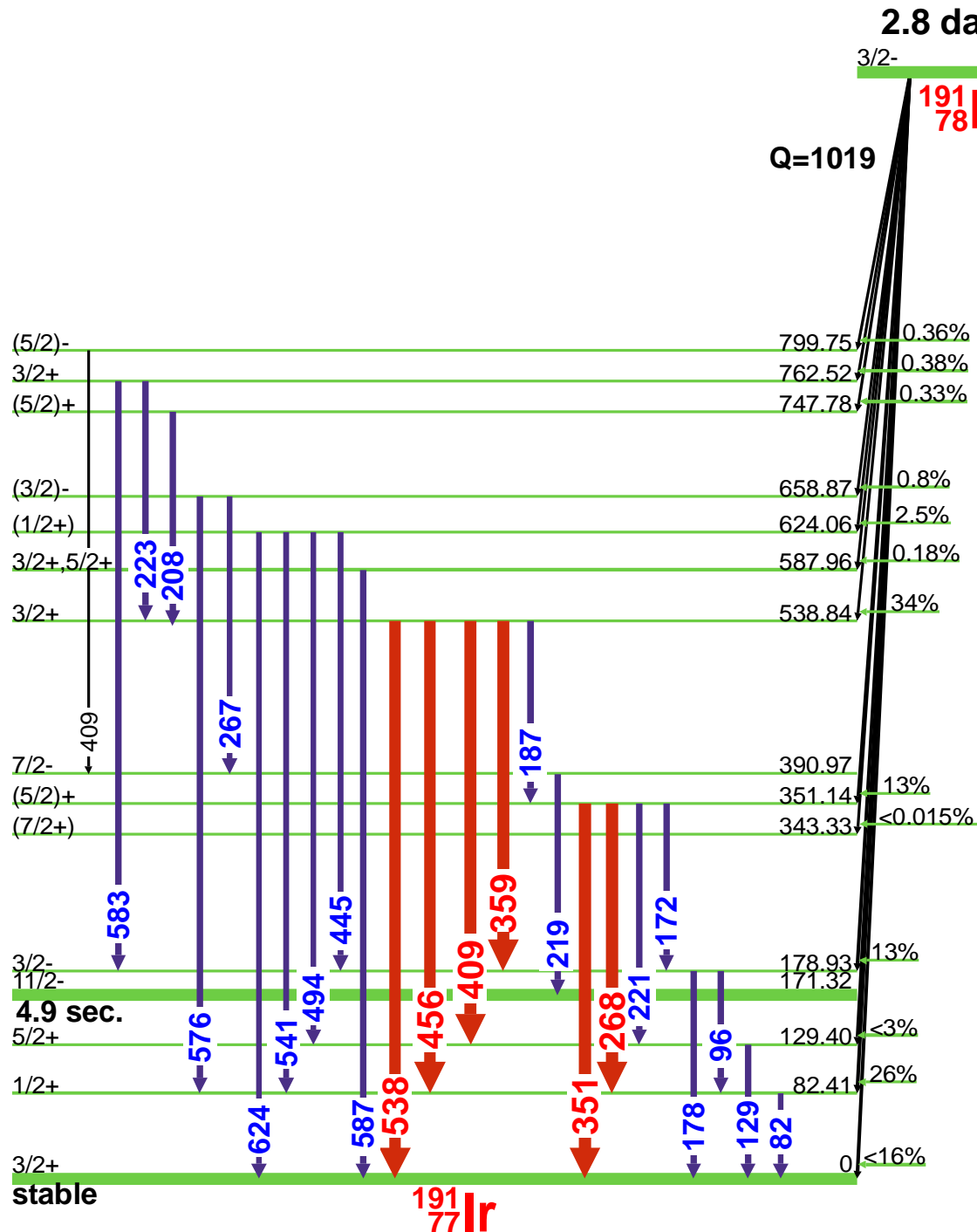
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1893.1	0.4				4
1924.42	0.14	0.02	0.0018	0.0003	4
2043.72	0.11	0.06	0.0071	0.0010	2

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2085.8	0.4				4
2114.20	0.14	0.02	0.0026	0.0004	4
2207.0	1.0	0.01	0.0013	0.0004	4

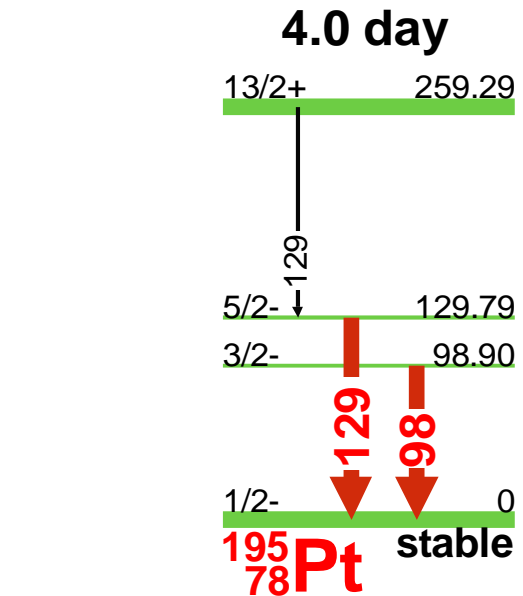




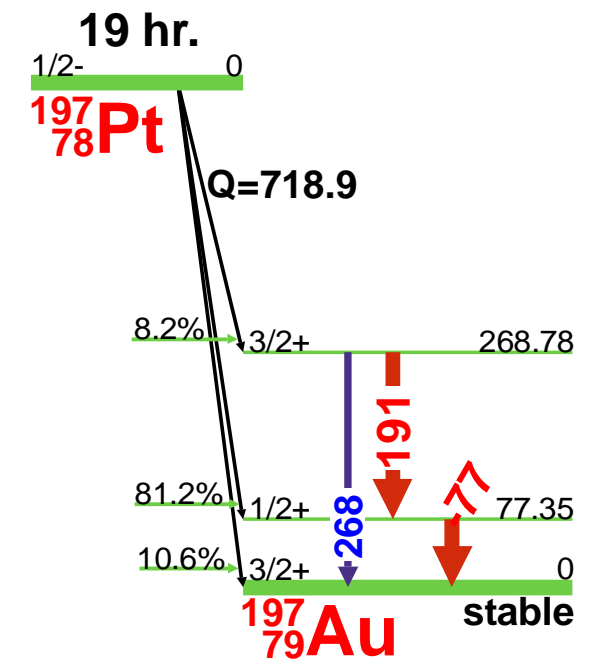
¹⁹¹Pt(2.8 day) Decay Scheme



^{195m}Pt(4.0 day) Decay Scheme



¹⁹⁷Pt(19 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{191}Pt E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 2.802(25) day

Detector: 70 cm³ coaxial Ge(Li)Method of Production: $^{194}\text{Pt}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
41.93	0.03		0.0001		4
49.59	0.03		0.040	0.009	4
82.398	0.007	35.0	4.9	0.7	3
85.15	0.08		0.060	0.009	4
96.517	0.009	22.0	3.3	0.4	3
129.400	0.007		3.2	0.5	4
138.20	0.20		0.024	0.016	4
140.884	0.015		0.075	0.014	4
160.0			0.0016	0.0002	4
172.190	0.020	21.0	3.5	0.4	3
178.96	0.03	8.4	1.02	0.11	4
186.8		2.7	0.040	0.024	4
187.69	0.04		0.42	0.05	
196.0			0.0032	0.0009	4
208.96	0.15		0.136	0.028	4
214.0			0.0088	0.0026	4
219.65	0.05	6.0	0.82	0.09	3
221.74	0.08		0.116	0.017	4
223.67	0.08		0.112	0.016	4
245.0			0.0032	0.0009	4
267.92	0.08	19.0	0.78	0.11	3
268.71	0.08		1.65	0.23	
272.0					4
308.0			0.0064	0.0006	4
343.20	0.20		0.013	0.004	4
351.17	0.03	26.5	3.4	0.4	1
359.88	0.03	39.5	6.0	0.7	1
396.70	0.20		0.010	0.003	4
404.1	0.3		0.011	0.006	4
409.0		52.0	0.096	0.019	1
409.440	0.020		8.0	0.9	

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
411.0			0.0096	0.0026	4
445.13	0.08		0.054	0.008	4
448.0			0.0064	0.0006	4
456.47	0.05	23.5	3.4	0.4	1
458.59	0.15		0.043	0.009	4
479.95	0.07		0.057	0.008	4
494.69	0.07		0.060	0.008	4
501.4			0.010	0.006	4
538.87	0.05	100.	13.7	1.5	1
541.64	0.10		0.37	0.05	4
568.81	0.08		0.053	0.007	4
576.46	0.08		0.118	0.015	4
583.61	0.08		0.076	0.009	4
587.95	0.08		0.136	0.017	4
604.6					4
618.7	0.4		0.009	0.003	4
624.06	0.06	11.0	1.41	0.16	3
633.18	0.10		0.024	0.003	4
636.0	1.0		0.0064	0.0006	4
658.75	0.15		0.0152	0.0022	4
667.0	2.0		0.0048	0.0024	4
680.00	0.20		0.0069	0.0015	4
686.6	0.5		0.0008	0.0003	4
748.00	0.20		0.0042	0.0009	4
756.6	0.5		0.0016	0.0005	4
762.60	0.15		0.0120	0.0020	4
765.0	2.0		0.010	0.005	4
806.4	0.3		0.0038	0.0008	4
853.6	0.4		0.0010	0.0001	4
935.33	0.15		0.0120	0.0020	4



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{195m}Pt

Half Life: 4.02(1) day

Detector: 70 cm³ coaxial Ge (Li)Method of Production: Pt(n, γ)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	19.8					4
	28.1			0.0013	0.0001	4
	30.89	0.09		2.28	0.19	4
	98.900	0.020	100.	11.4	0.8	1
D	129.50	0.20	38.25	0.084	0.006	1
	129.790	0.020		2.83	0.21	
	140.6			0.0300	0.0022	4
	211.35	0.25		0.0389	0.0028	4
	239.5	0.3		0.054	0.004	4

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

GAMMA-RAY ENERGIES AND INTENSITIES

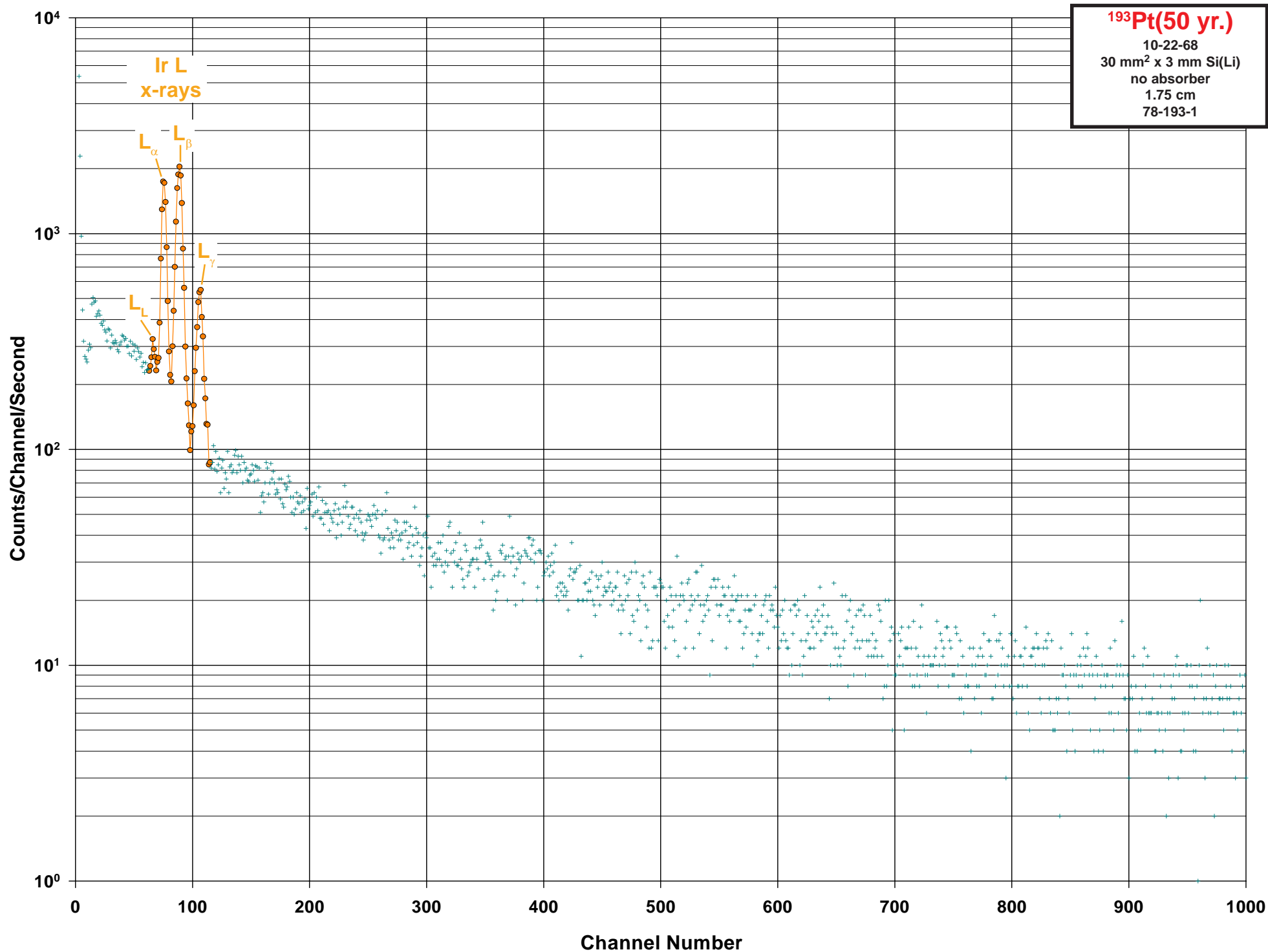
Nuclide: ^{197}Pt

Half Life: 19.8915(19) hr.

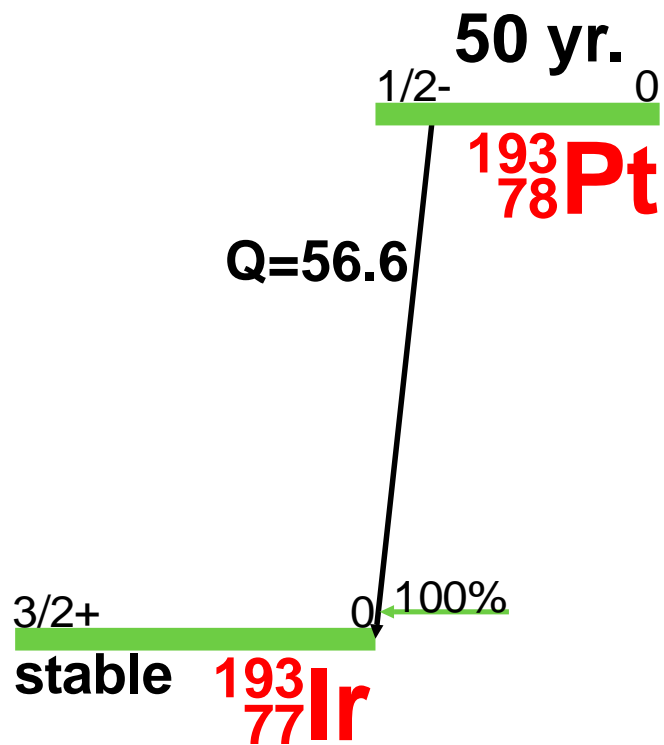
Detector: 70 cm³ coaxial Ge (Li)Method of Production: Pt(n, γ)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	77.35	0.05	100.	17.0	2.3	1
	191.437	0.010	20.5	3.7	0.4	1
	268.78	0.05	1.0	0.23	0.03	3

 E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data



¹⁹³Pt(50 yr.) Decay Scheme

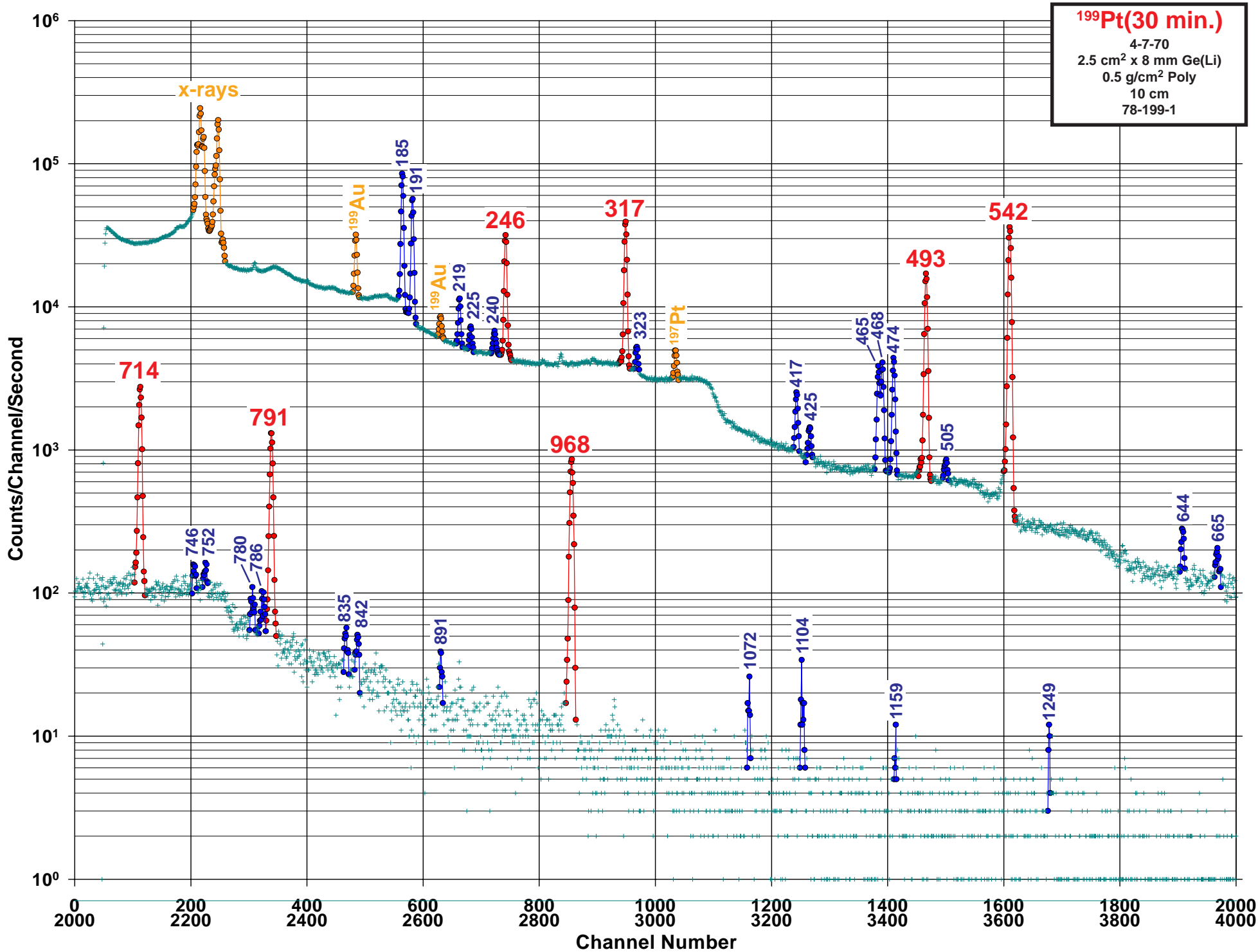


GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁹³Pt Half Life: 50(6) yr.
 Detector: 30 mm² x 3 mm Si (Li) Method of Production: ¹⁹²Pt(n,γ)

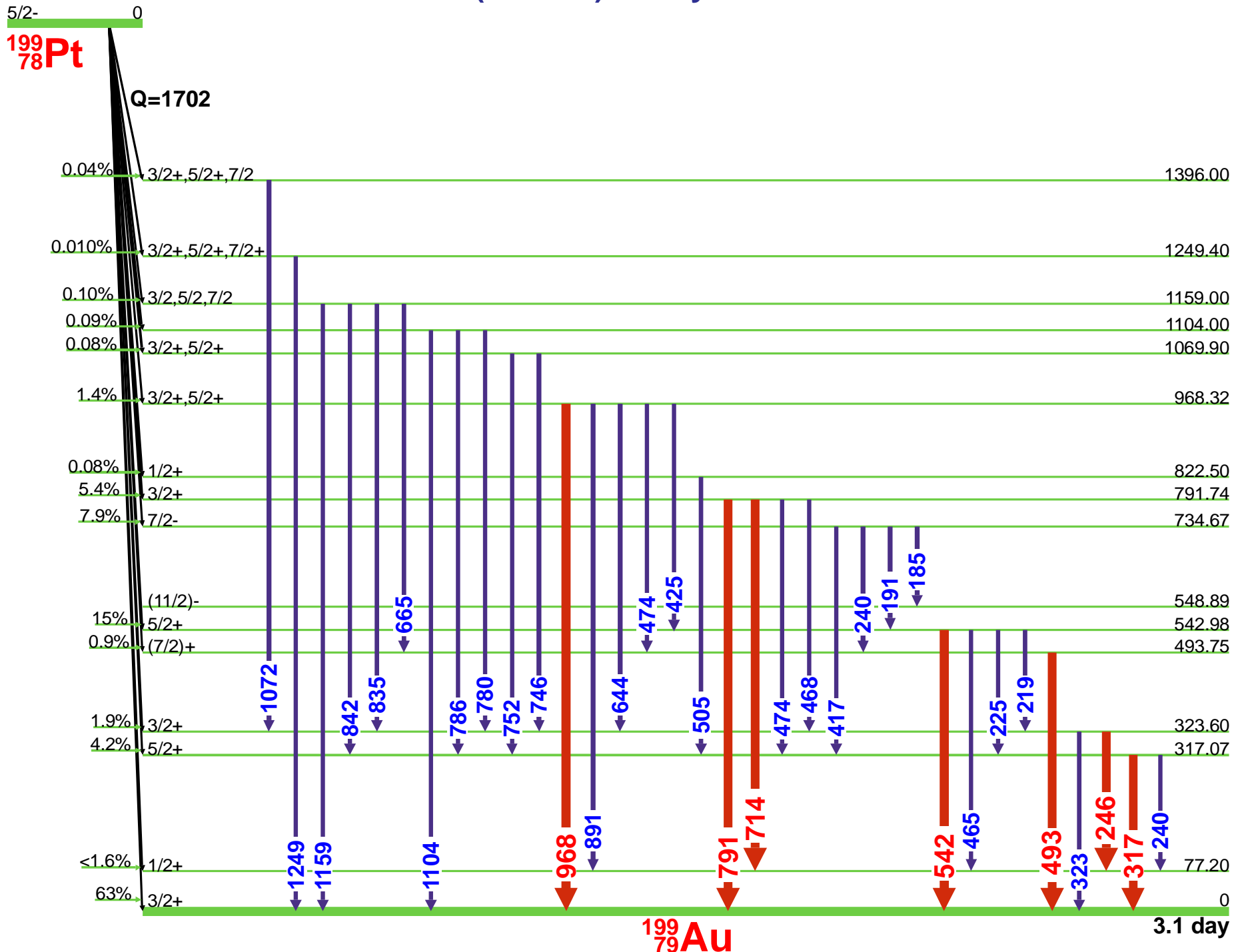
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
No Gammas					





30 min.

¹⁹⁹Pt(30 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{199}Pt E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

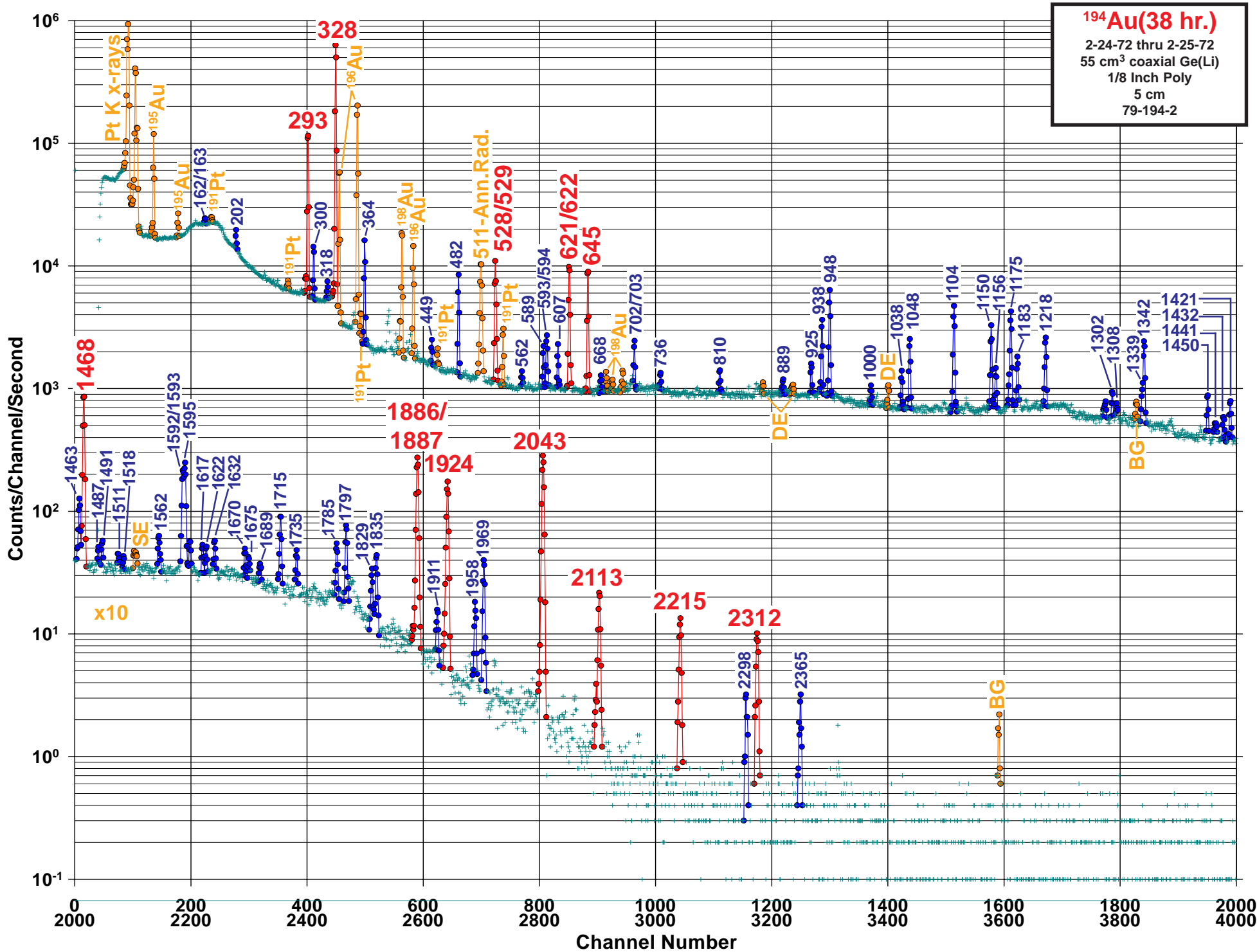
Half Life: 30.80(21) min.

Detector: 2.5cm² x 8 mm Ge (Li)Method of Production: $^{198}\text{Pt}(n,\gamma)$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	55.15	0.05				4
	77.20	0.03		1.5	0.4	4
	170.6	1.0		0.022	0.012	4
	176.2	1.0		0.028	0.015	4
	185.80	0.03	22.0	3.3	0.6	2
	191.69	0.03	16.1	2.3	0.4	2
	219.36	0.04	2.62	0.39	0.07	3
	225.36	0.04	1.04	0.156	0.028	4
D	240.01	0.06	1.22	0.18	0.03	4
	240.9	1.0		0.059	0.010	
	246.46	0.03	14.60	2.2	0.4	1
	298.2	0.3		0.048	0.020	4
	317.03	0.04	32.9	5.0	0.9	1
	323.60	0.06	1.68	0.32	0.08	4
	417.61	0.05	2.64	0.38	0.07	3
	425.34	0.07	1.18	0.143	0.027	4
	465.76	0.05	6.30	0.91	0.16	2
	468.09	0.05	6.70	1.00	0.18	2
D	474.68	0.35	7.80			2
	474.68	0.04		1.15	0.20	
	493.75	0.03	38.67	5.6	1.0	1
	505.5	0.3		0.084	0.022	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	542.98	0.04	100.	14.7	2.5	1
	609.8	0.6		0.015	0.006	4
	644.63	0.07	0.60	0.084	0.016	3
	649.8	1.5		0.010	0.005	4
	665.00	0.10	0.41	0.053	0.012	4
	714.55	0.04	12.65	1.8	0.3	1
	746.40	0.20	0.26	0.025	0.008	4
	752.90	0.20	0.30	0.043	0.009	4
	780.5	0.3	0.25	0.024	0.008	4
	786.80	0.20	0.23	0.026	0.010	4
	791.74	0.04	7.24	1.07	0.19	1
	835.50	0.10	0.14	0.021	0.005	4
	842.40	0.20	0.13	0.018	0.005	4
	891.30	0.15	0.16	0.025	0.005	4
	902.0	0.6		0.010	0.003	4
	968.32	0.05	7.36	1.07	0.19	1
	992.3	0.7		0.013	0.006	4
	1072.70	0.20	0.12	0.022	0.005	3
	1077.0	1.4		0.009	0.003	4
	1104.00	0.20	0.17	0.026	0.006	3
	1159.2	0.5	0.05	0.0088	0.0025	4
	1249.4	0.3	0.06	0.0103	0.0027	4

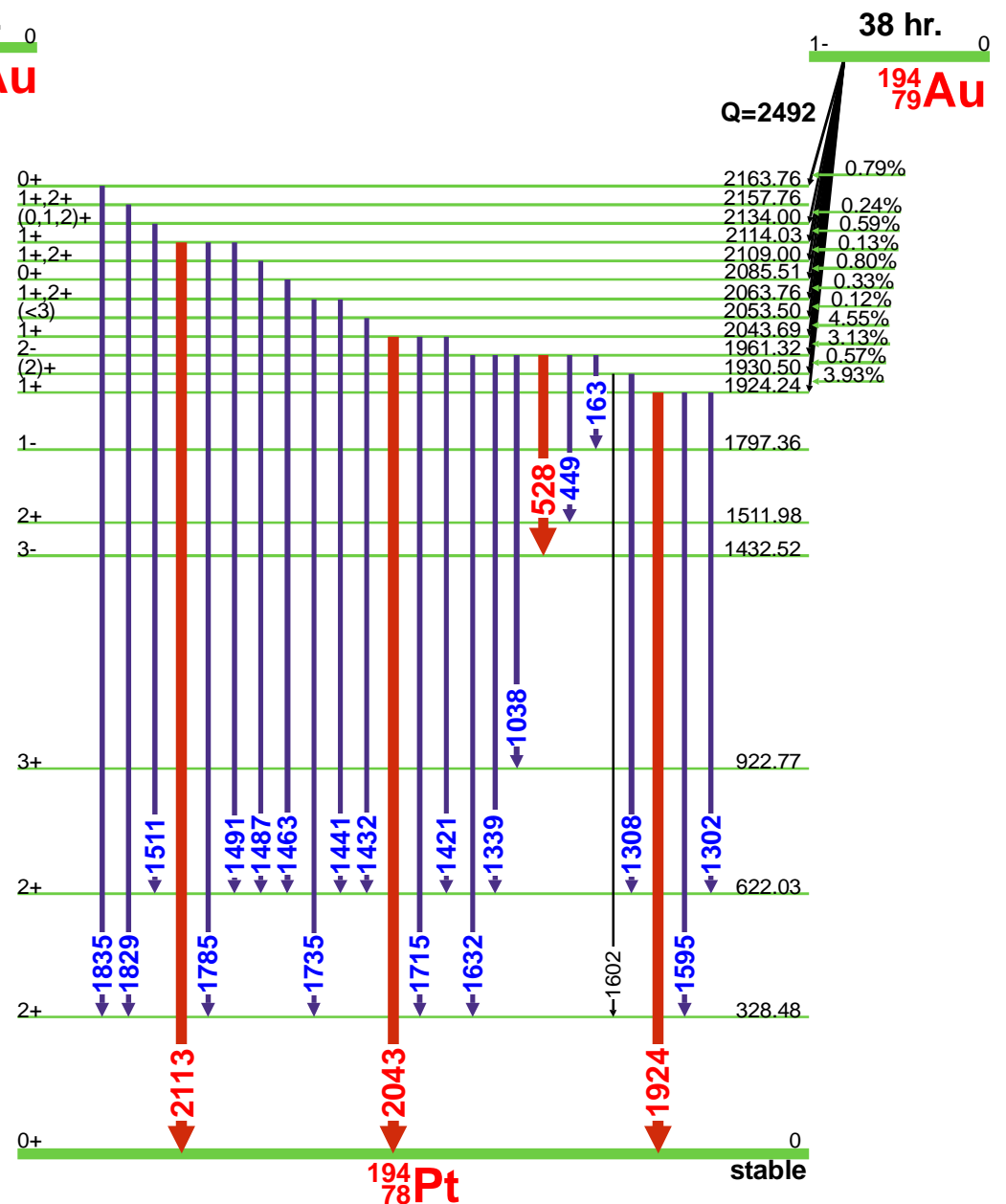
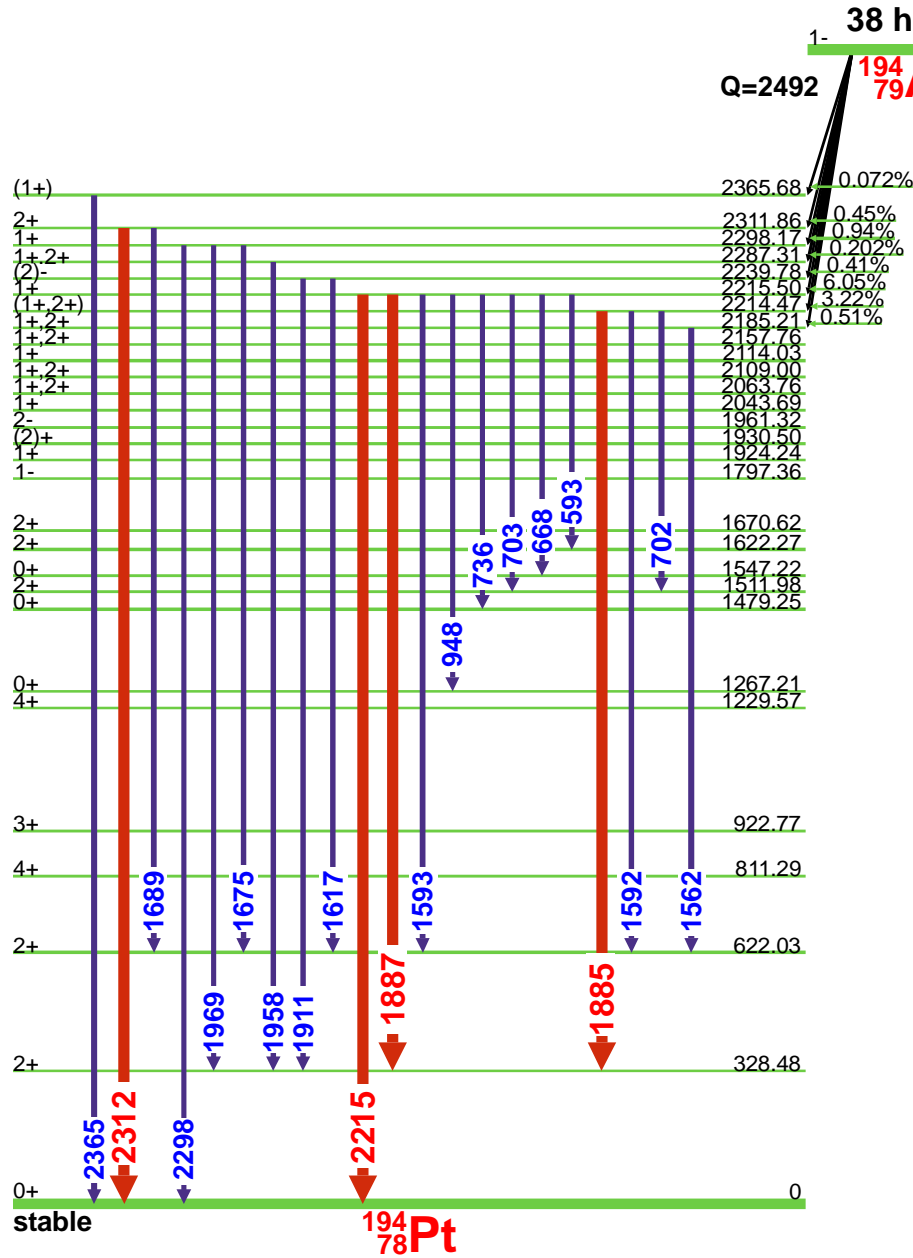




¹⁹⁴Au(38 hr.) Decay Scheme

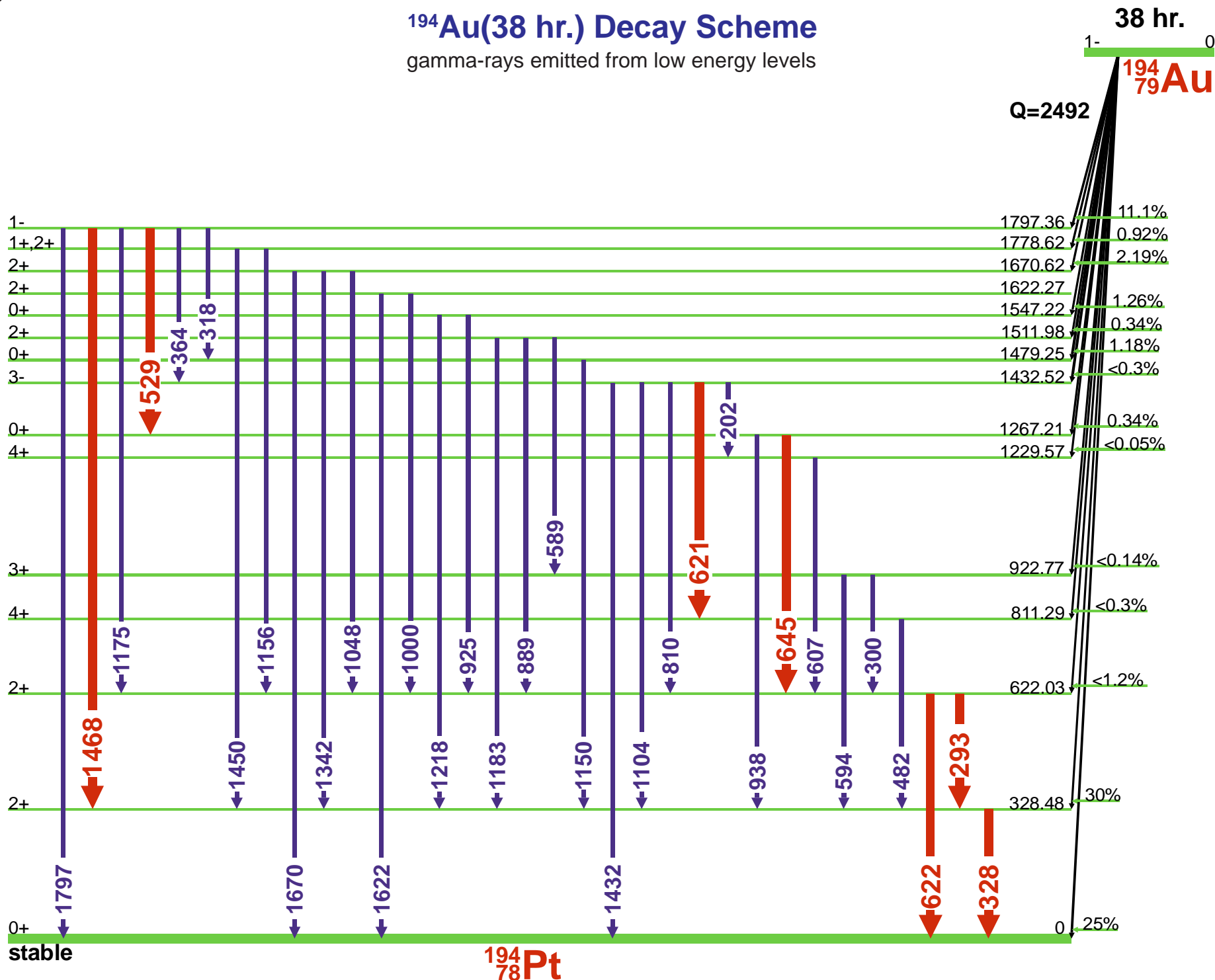
gamma-rays emitted from high energy levels

gamma-rays emitted from medium energy levels



¹⁹⁴Au(38 hr.) Decay Scheme

gamma-rays emitted from low energy levels



¹⁹⁴Pt

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ¹⁹⁴Au E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 38.02(10) hr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: ¹⁹⁴Pt(p,n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S	
	49.65	0.10		0.024	0.007	4		421.65	0.05		0.0305	0.0029	4	
	59.45	0.10		0.0049	0.0012	4		436.81	0.09		0.0134	0.0025	4	
	69.64	0.10		0.0023	0.0007	4		449.36	0.07	0.30	0.171	0.015	4	
	101.42	0.10		0.0043	0.0018	4		482.80	0.04	1.84	1.1285	0.0825	2	
	106.49	0.10		0.0073	0.0019	4		500.72	0.19		0.0067	0.0019	4	
	140.54	0.10		0.058	0.007	4	Ann.	511.006			3.4	0.3	2	
	151.83	0.10		0.056	0.008	4		528.76	0.10	3.58	1.65	0.20	1	
	162.57	0.10	0.22	0.021	0.004	4	D	529.88	0.10		0.61	0.07		
D	162.64	0.04		0.0238	0.0022				544.4	0.6		0.025	0.009	4
	163.95	0.10		0.128	0.014				562.6	0.3	0.15	0.085	0.007	4
	171.84	0.10		0.061	0.007	4		589.24	0.07	0.41	0.250	0.022	3	
	173.30	0.10		0.0049	0.0018	4		593.35	0.10	0.77	0.34	0.07	3	
	189.11	0.10		0.0038	0.0008	4	D	594.28	0.10		0.12	0.03		
	189.84	0.10		0.0037	0.0024	4		602.02	0.09		0.018	0.007	4	
	197.77	0.10		0.0067	0.0013	4		607.54	0.08	0.46	0.293	0.023	3	
	202.76	0.20	1.2	0.33	0.03	4		621.21	0.10	3.85	0.61	0.07	1	
	212.11	0.26		0.0055	0.0025	4	D	622.05	0.10		1.71	0.20		
	215.57	0.10		0.0085	0.0025	4		627.7	0.6		0.0038	0.0011	4	
	223.97	0.10		0.032	0.006	4		645.18	0.03	3.40	2.14	0.15	1	
	239.46	0.10		0.055	0.007	4		668.27	0.10	0.17	0.110	0.008	4	
	243.66	0.17		0.010	0.003	4		671.16					4	
	244.78	0.10		0.028	0.004	4		675.2	0.6		0.061	0.018	4	
	250.17	0.10		0.030	0.004	4		700.6	0.6		0.06	0.03	4	
	253.56	0.10		0.0031	0.0012	4		702.62	0.10	0.66	0.05	0.04	3	
	285.3	0.7		0.053	0.016	4	D	703.54	0.05		0.41	0.04		
	290.76	0.10		0.11	0.04	4		736.23	0.15	0.22	0.128	0.014	4	
	291.20	0.10		0.0067	0.0025	4		774.9	1.3		0.049	0.024	4	
	293.58	0.03	16.6	10.4	0.7	1		781.8	2.0		0.05	0.03	4	
	300.77	0.06	1.35	0.85	0.07	3		781.97	0.05		0.043	0.006	4	
	304.87	0.08		0.0183	0.0020	4		807.06	0.30		0.021	0.005	4	
	318.14	0.08	0.30	0.25	0.07	4		810.65	0.08	0.34	0.195	0.026	4	
	328.50	0.03	100.	61.	4.	1		814.89	0.29		0.0073	0.0013	4	
	363.10	0.18		0.0059	0.0003	4		818.9	0.5		0.030	0.006	4	
	364.87	0.04	2.52	1.51	0.11	2		843.89	0.10		0.128	0.025	4	
	366.42	0.04		0.036	0.004	4		846.9	0.6		0.055	0.018	4	
	373.33	0.14		0.0067	0.0013	4		855.5	1.3		0.10	0.04	4	
	398.95	0.12		0.014	0.004	4		859.3	1.3		0.061	0.025	4	
	412.27	0.10		0.030	0.018	4		886.0	2.0		0.012	0.006	4	
	418.06	0.20		0.043	0.006	4		889.97	0.10	0.19	0.134	0.020	4	
	418.06	0.20		0.043	0.006	4								

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ¹⁹⁴AuE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 38.02(10) hr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: ¹⁹⁴Pt(p,n)

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
894.4	0.4		0.030	0.012	4
925.15	0.07	0.48	0.293	0.028	3
932.4	1.3		0.037	0.018	4
938.71	0.03	1.76	1.10	0.08	3
948.29	0.04	3.53	2.20	0.16	2
958.0	2.0		0.06	0.03	4
1000.19	0.15	0.27	0.183	0.020	4
1007.0	0.6		0.085	0.025	4
1030.9	0.5		0.018	0.006	4
1038.56	0.08	0.52	0.32	0.03	3
1048.58	0.05	1.41	0.86	0.06	3
1080.63	0.22		0.012	0.005	4
1081.8	1.9		0.030	0.018	4
1104.06	0.05	3.27	2.01	0.16	2
1119.8	0.6		0.13	0.04	4
1121.3	0.4		0.037	0.024	4
1141.0	0.5		0.024	0.012	4
1150.78	0.05	2.26	1.39	0.10	3
1156.61	0.06	0.76	0.45	0.04	3
1175.34	0.05	3.36	2.01	0.16	2
1183.52	0.05	1.04	0.63	0.07	3
1186.3	0.5		0.055	0.024	4
1194.9	1.3		0.08	0.03	4
1208.5	0.4		0.24	0.12	4
1218.76	0.05	1.76	1.10	0.08	3
1262.43	0.10		0.029	0.003	4
1267.37	0.15				4
1291.8	1.0		0.12	0.06	4
1293.9	0.5		0.12	0.06	4
1302.29	0.08	0.43	0.268	0.028	4
1308.55	0.20	0.24	0.146	0.020	4
1317.3	1.3		0.049	0.024	4
1339.6	0.3	0.45	0.28	0.06	4
1342.15	0.10	2.03	1.22	0.11	3
1346.7	0.3		0.010	0.004	4
1388.75	0.19		0.016	0.004	4
1421.65	0.07	0.60	0.35	0.04	3
1432.0	0.6	0.30	0.06	0.04	4
1432.0	0.6		0.085	0.019	
1441.87	0.15	0.33	0.183	0.026	4

D

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
1450.06	0.15	0.55	0.323	0.029	3
1463.45	0.10	1.19	0.73	0.07	3
1468.89	0.05	10.5	6.4	0.5	1
1474.21	0.14		0.021	0.003	4
1479.27	0.10				4
1487.0	0.3	0.20	0.128	0.025	4
1491.97	0.15	0.29	0.177	0.026	4
1500.5	1.0		0.037	0.018	4
1511.9	0.3	0.19	0.049	0.012	4
1511.9	0.3		0.067	0.025	
1518.50	0.20	0.11	0.073	0.013	4
1518.63	0.06		0.065	0.010	
1535.52	0.26		0.0098	0.0025	4
1541.65	0.13		0.0207	0.0026	4
1547.9	0.4				4
1562.8	0.3	0.56	0.323	0.029	3
1592.40	0.10	2.8	1.10	0.13	2
1593.50	0.10		0.61	0.13	
1595.80	0.10	2.8	1.71	0.20	2
1602.01	0.10	0.45	0.26	0.03	4
1617.73	0.15	0.34	0.207	0.026	4
1622.23	0.15	0.26	0.177	0.026	4
1632.86	0.15	0.47	0.256	0.027	4
1665.42	0.13		0.026	0.004	4
1670.66	0.15	0.36	0.18	0.04	4
1675.1	0.5	0.27	0.05	0.05	4
1675.7	0.3		0.13	0.03	
1689.70	0.20	0.28	0.15	0.03	4
1715.23	0.06	1.14	0.69	0.06	3
1724.1	1.3		0.08	0.04	4
1735.31	0.10	0.46	0.287	0.028	3
1744.3	0.5		0.032	0.009	4
1757.2	0.6		0.061	0.018	4
1775.83	0.21		0.020	0.005	4
1778.60	0.10		0.050	0.012	4
1785.47	0.07	0.62	0.38	0.04	3
1790.2	2.0				4
1797.31	0.08	1.06	0.61	0.06	3
1803.0	0.6		0.18	0.06	4
1805.7	0.6		0.18	0.06	4

D

D

D

D



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ^{194}Au E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 38.02(10) hr.

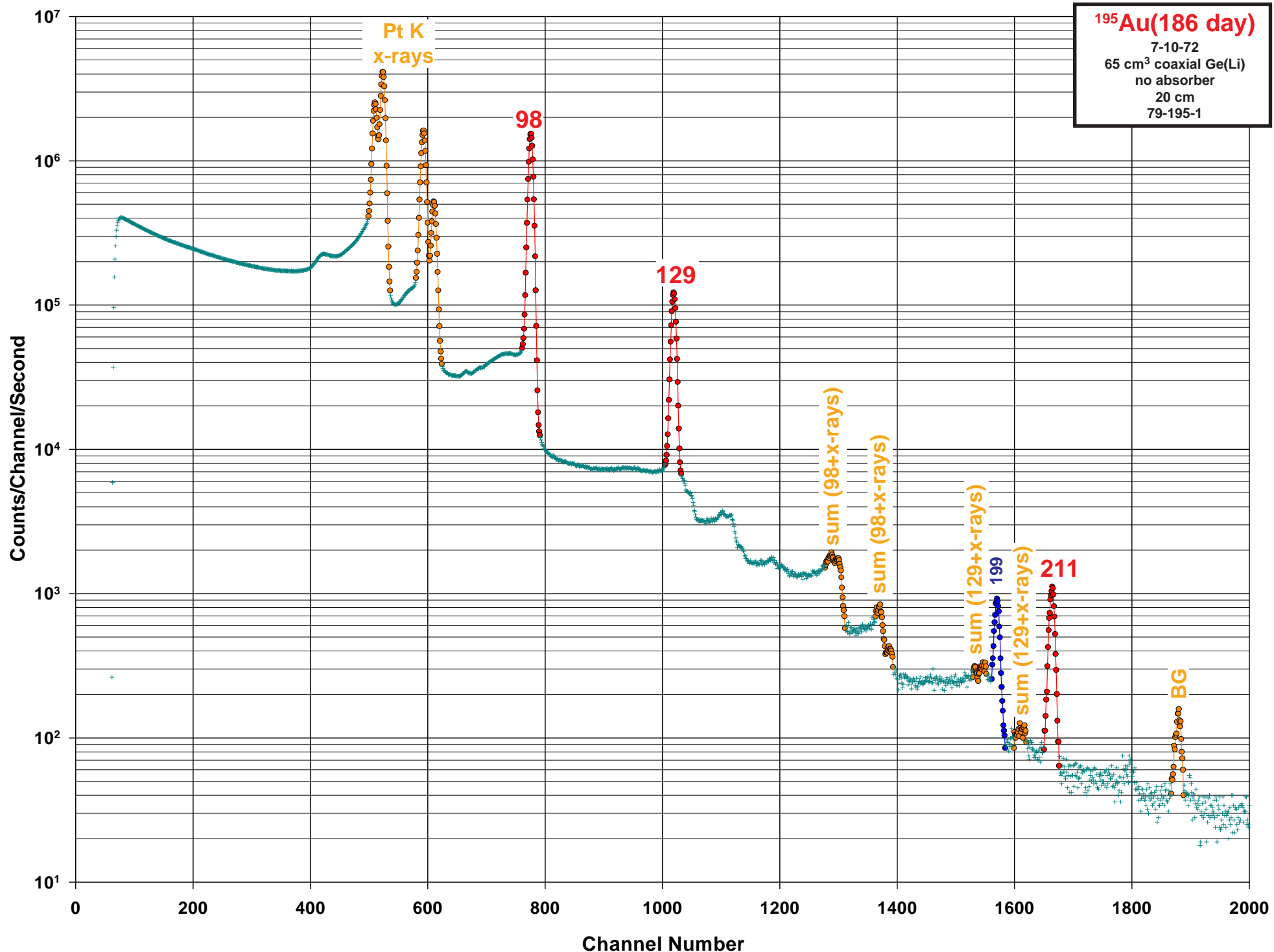
Detector: 55 cm³ coaxial Ge (Li)Method of Production: $^{194}\text{Pt}(p,n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1812.22	0.25		0.033	0.008	4
1812.8	0.6				4
1817.0	0.5		0.037	0.012	4
1829.41	0.10	0.41	0.244	0.022	3
1835.33	0.07	0.64	0.37	0.03	3
1856.3	1.3		0.043	0.024	4
1856.8	1.0		0.030	0.003	4
1885.90	0.10	5.33	1.89	0.15	1
1887.00	0.10		1.40	0.14	
1893.1	0.4				4
1911.30	0.15	0.21	0.128	0.014	3
1924.18	0.05	3.22	2.01	0.16	1
1958.74	0.20	0.26	0.165	0.020	3
1969.65	0.07	0.71	0.44	0.03	2
1984.1	0.6		0.037	0.012	4
2043.67	0.06	5.92	3.60	0.25	1
2063.7	0.5		0.0098	0.0025	4

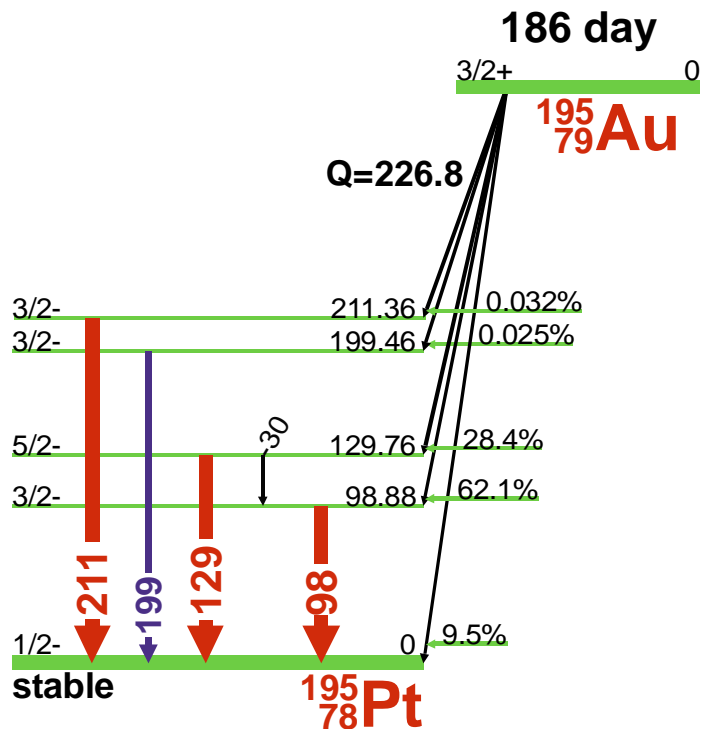
D

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2068.2	1.3		0.018	0.012	4
2068.8	1.0		0.021	0.007	4
2083.6	1.0		0.035	0.006	4
2085.8	0.4				4
2113.90	0.20	0.46	0.262	0.022	1
2164.1	0.4				4
2199.6	1.3		0.012	0.006	4
2204.0	1.3		0.012	0.006	4
2215.15	0.15	0.32	0.183	0.015	1
2298.2	0.3	0.72	0.028	0.005	2
2312.01	0.15	0.28	0.171	0.015	1
2357.0	0.8				4
2365.56	0.20	0.057	0.040	0.006	2
2371.	3.		0.0122	0.0006	4
2397.7	1.0		0.0038	0.0008	4
2412.3	0.6		0.017	0.003	4
2447.4	1.3		0.012	0.006	4





¹⁹⁵Au(186 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁹⁵Au

Half Life: 186.10(5) day

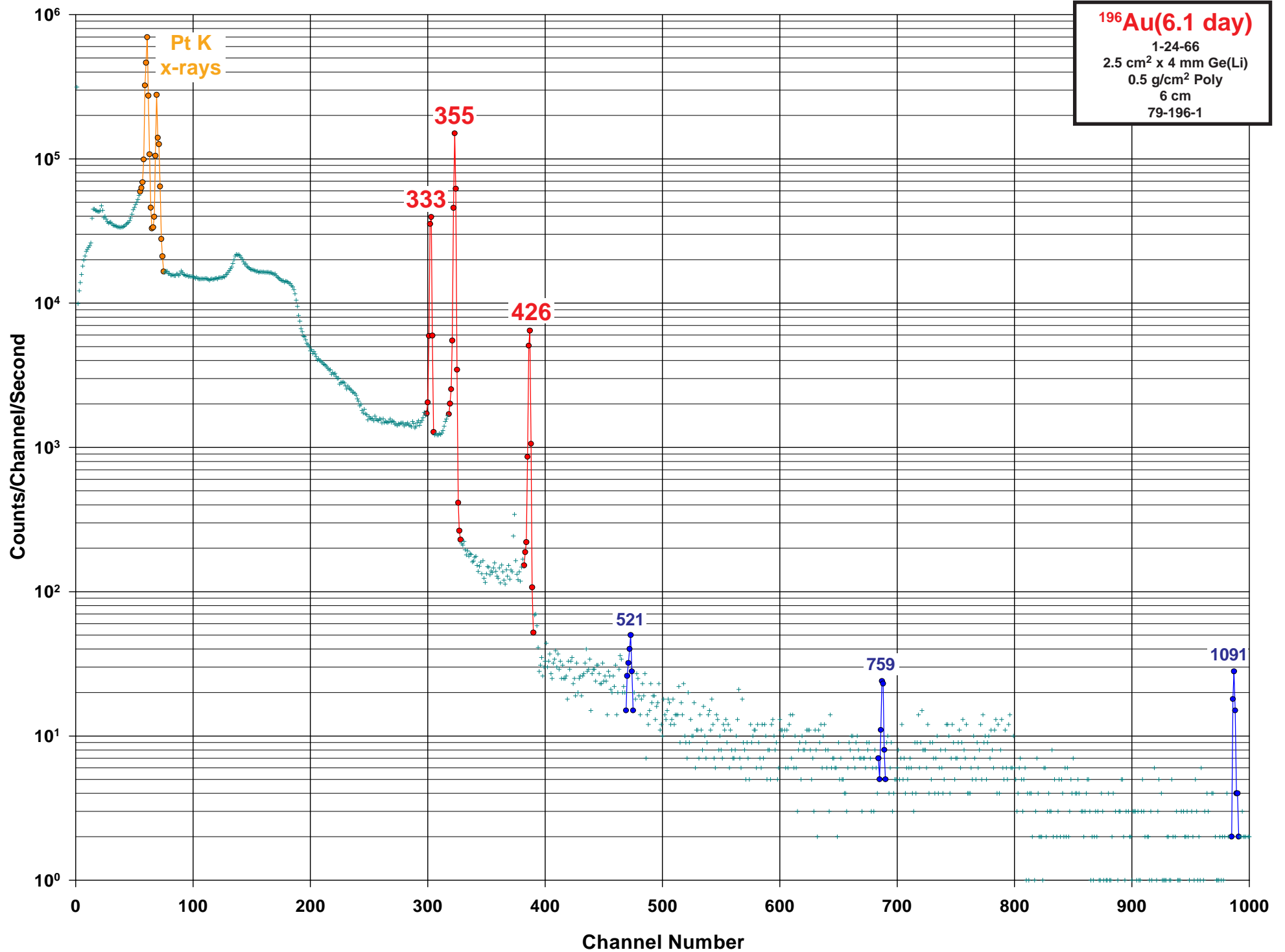
Detector: 65 cm³ coaxial Ge (Li)

Method of Production: ¹⁹⁵Pt(p,n)

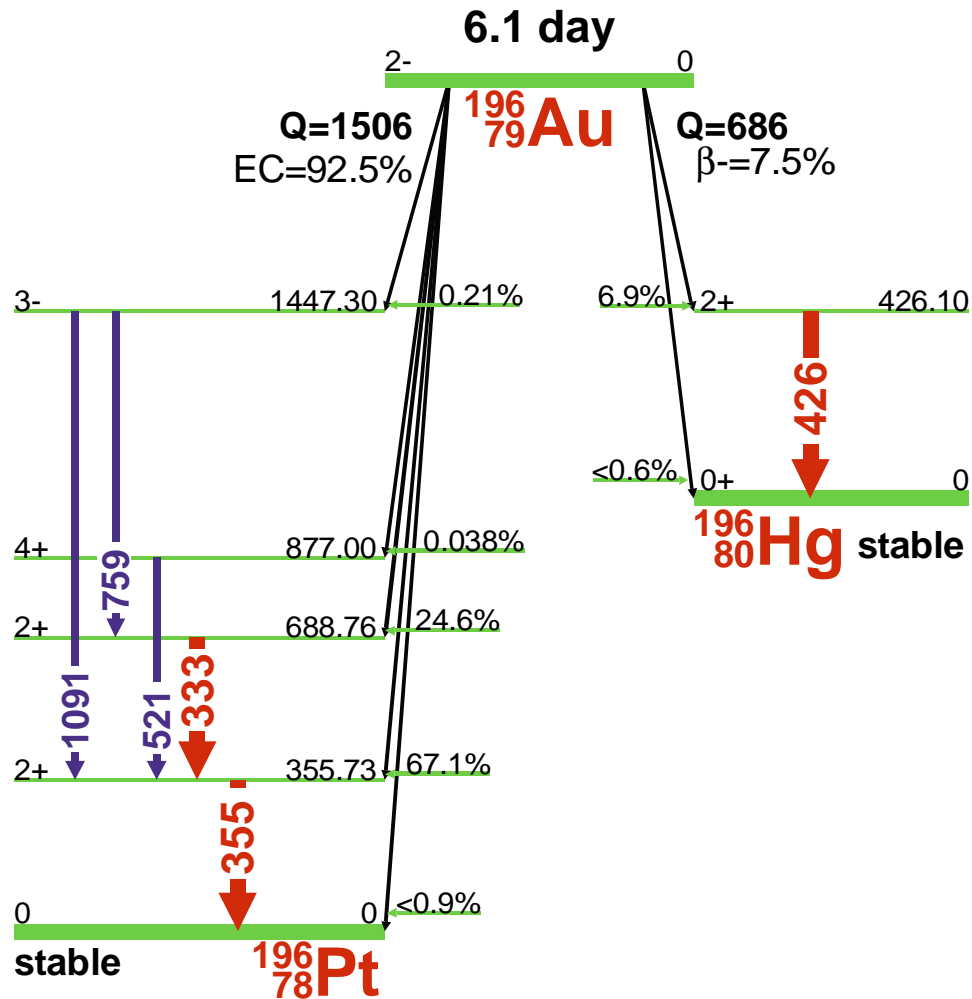
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
30.876	0.006		0.75	0.05	4
98.880	0.020	100.	10.9	0.8	1
129.757	0.020	8.0	0.82	0.05	1
199.46	0.04	0.078	0.0086	0.0008	2
211.36	0.03	0.102	0.0109	0.0012	1

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





¹⁹⁶Au(6.1 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ¹⁹⁶Au

Half Life: 6.183(10) day

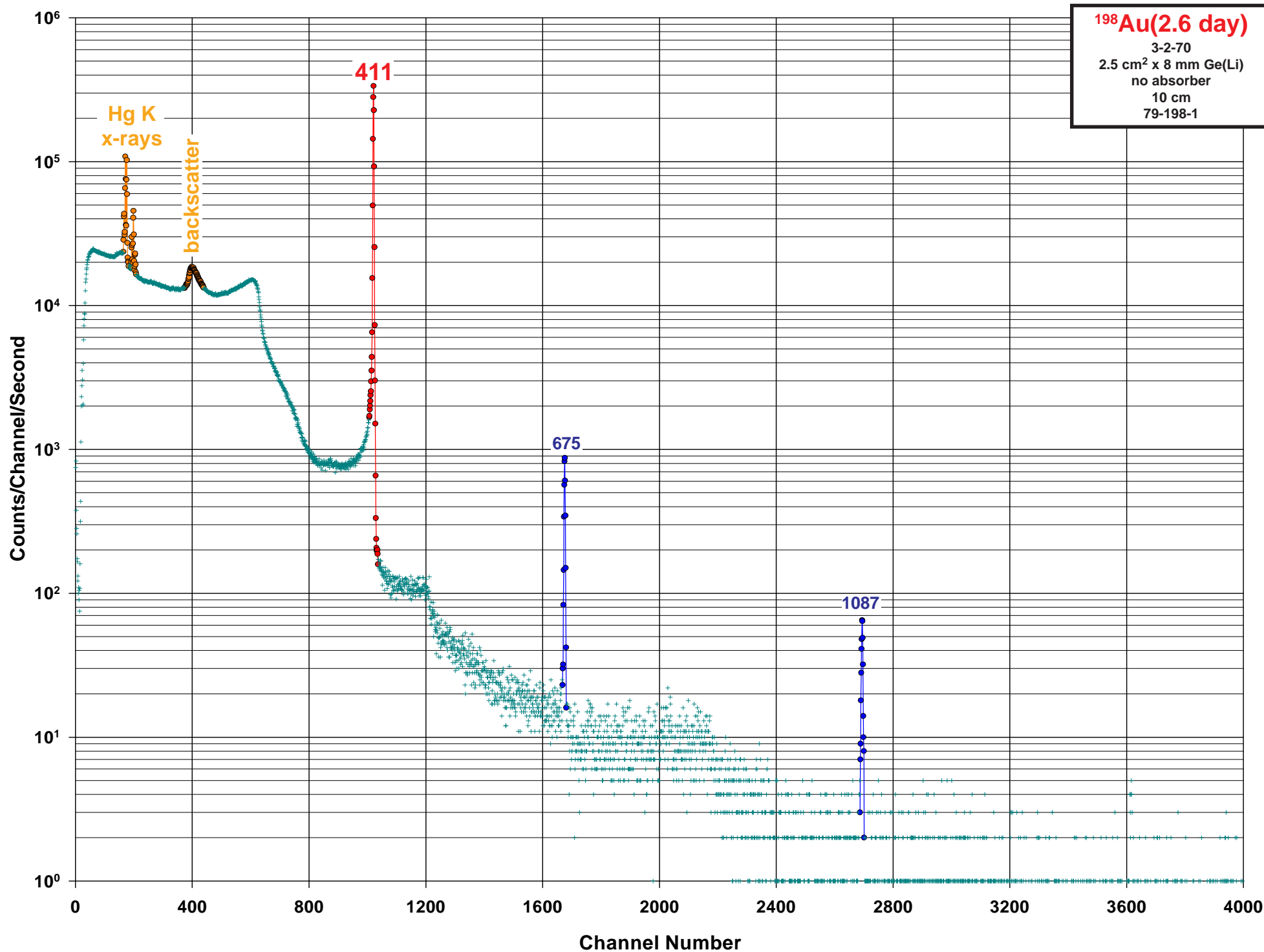
Detector: 2.5 cm² x 4 mm Ge (Li)

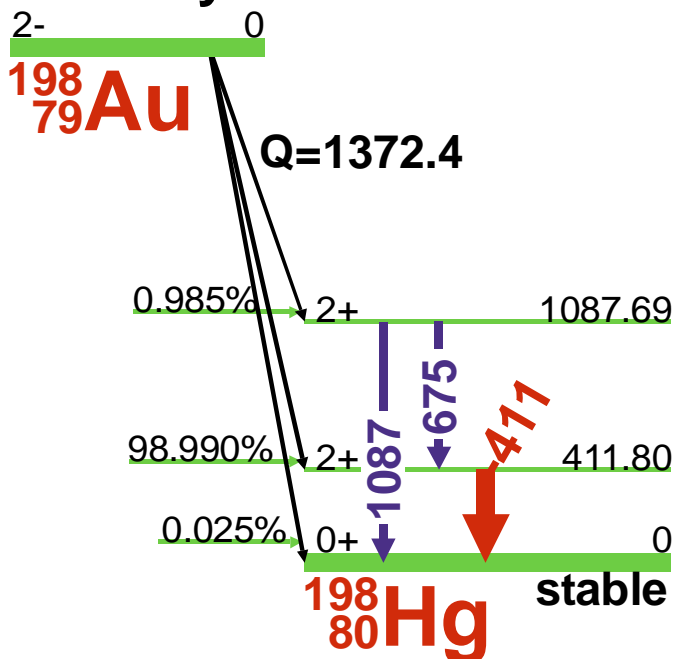
Method of Production: ¹⁹⁷Au(γ,n)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
326.2	0.4		0.050	0.011	4
333.03	0.05		22.9	0.5	1
355.73	0.05		87.0	0.8	1
393.4	0.4		0.0101	0.0005	4
426.10	0.08		6.6	0.8	1
432.0	0.3		0.0067	0.0006	4
521.40	0.20		0.389	0.008	3
570.8	0.4		0.0069	0.0005	4
659.5	0.3		0.0036	0.0003	4
673.5	0.7		0.0027	0.0003	4
688.76			0.0061	0.0018	4
759.1	0.3		0.0444	0.0018	3
1005.7	0.3		0.0027	0.0003	4
1091.40	0.20		0.148	0.006	2
1361.0	1.0		0.0005	0.0002	4
1446.3	0.7		0.0007	0.0002	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





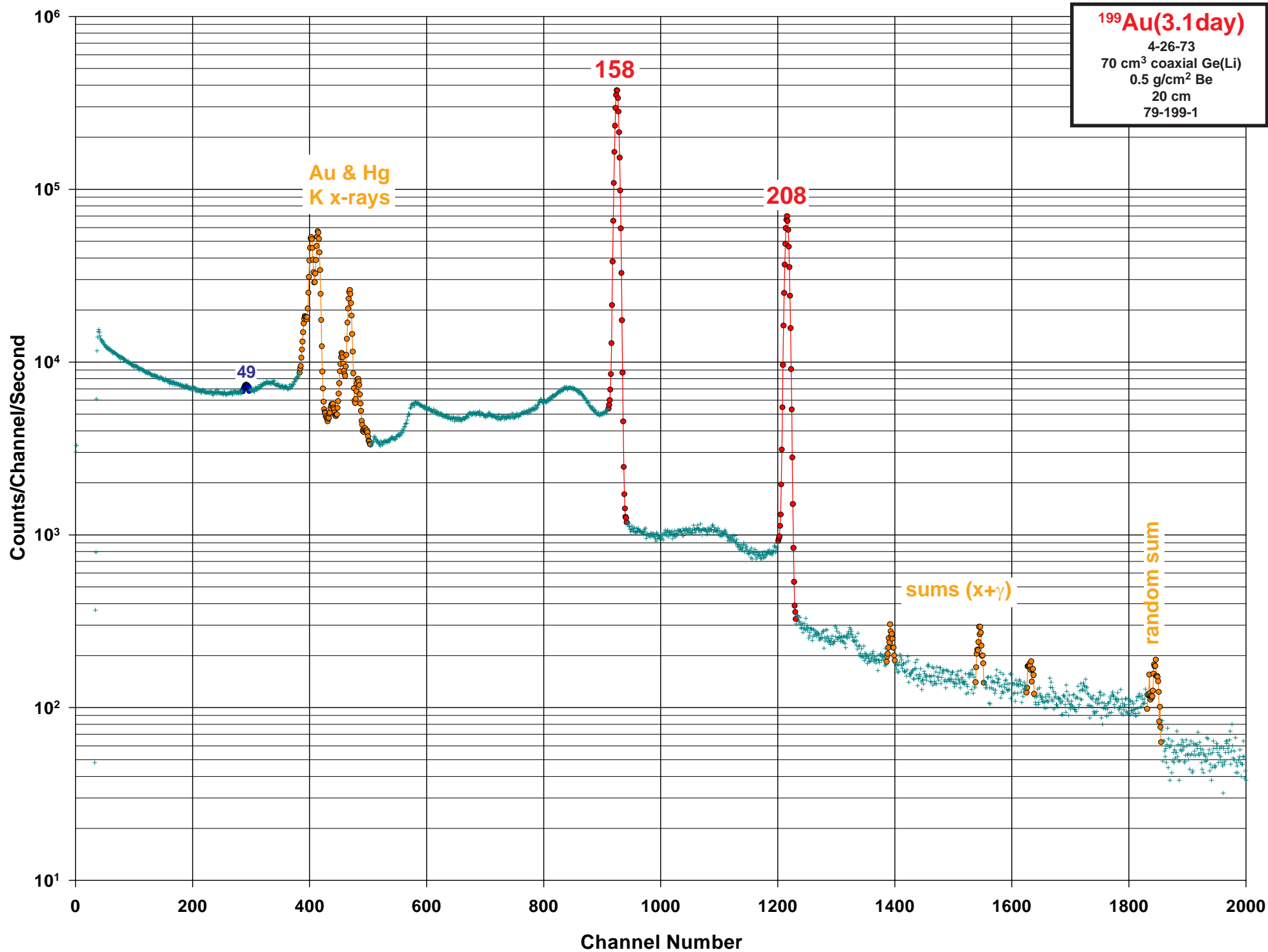
^{198}Au (2.6 day) Decay Scheme**2.6 day****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{198}Au

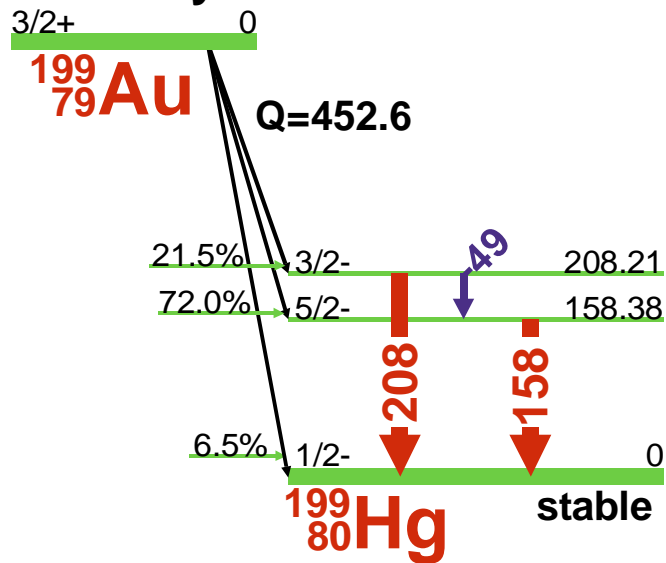
Half Life: 2.69517(2) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{197}\text{Au}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
411.802			95.58	0.12	1
675.884	0.001		0.804	0.003	2
1087.684	0.003		0.1590	0.0020	2

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



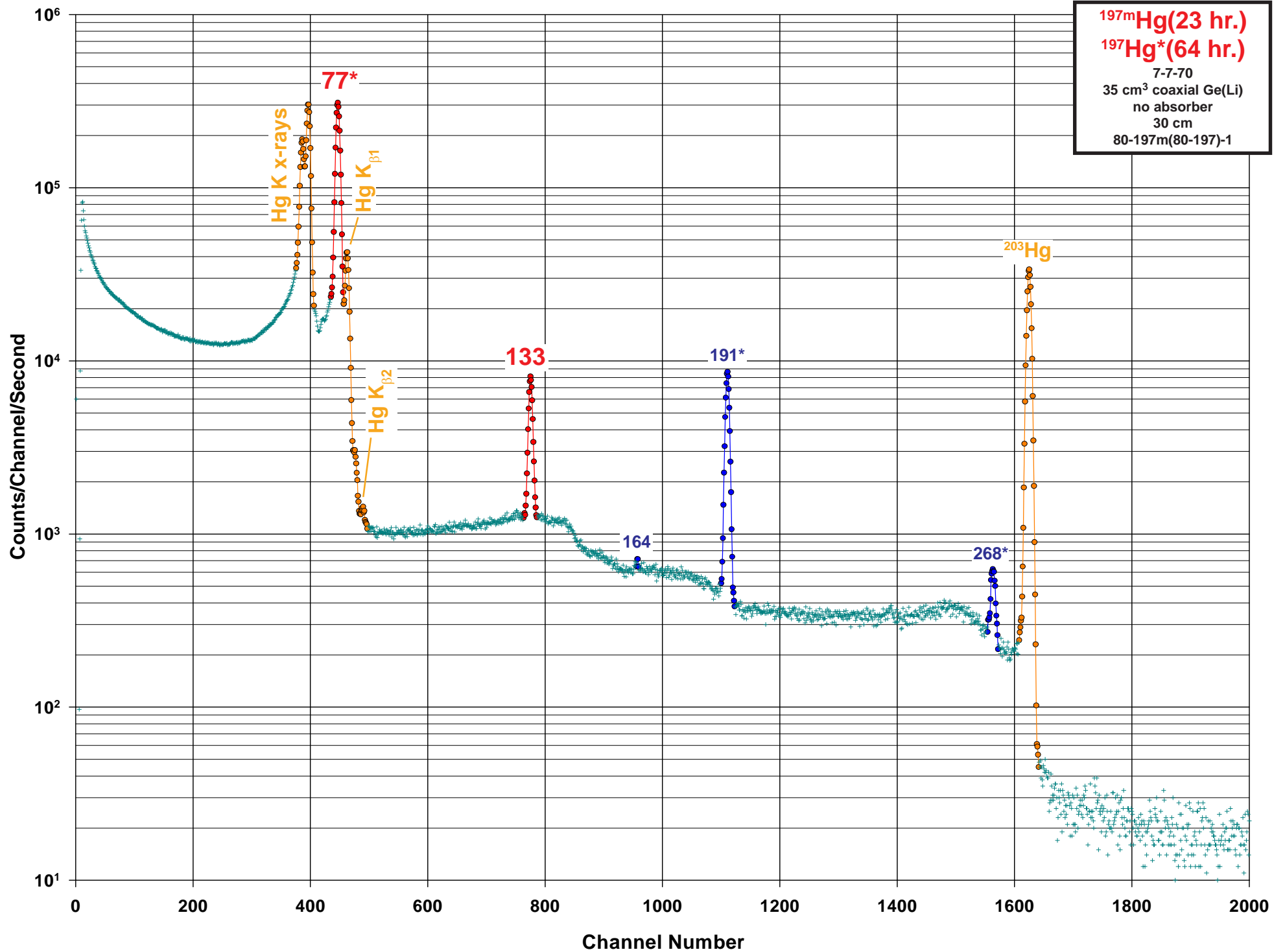
^{199}Au (3.1 day) Decay Scheme**3.1 day****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{199}Au

Half Life: 3.139(7) day

Detector: 70 cm³ coaxial Ge (Li)Method of Production: $^{198}\text{Pt}(n,\gamma)\beta$

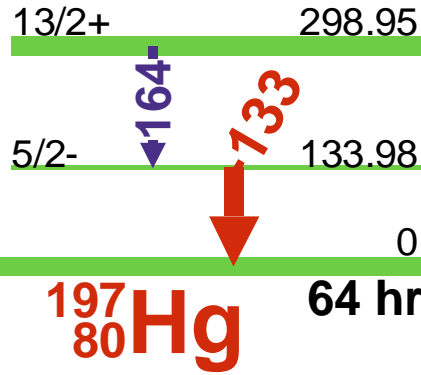
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
49.827			0.36	0.011	4
158.379	100		40	0.7	1
208.206	23.42		8.72	0.18	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data

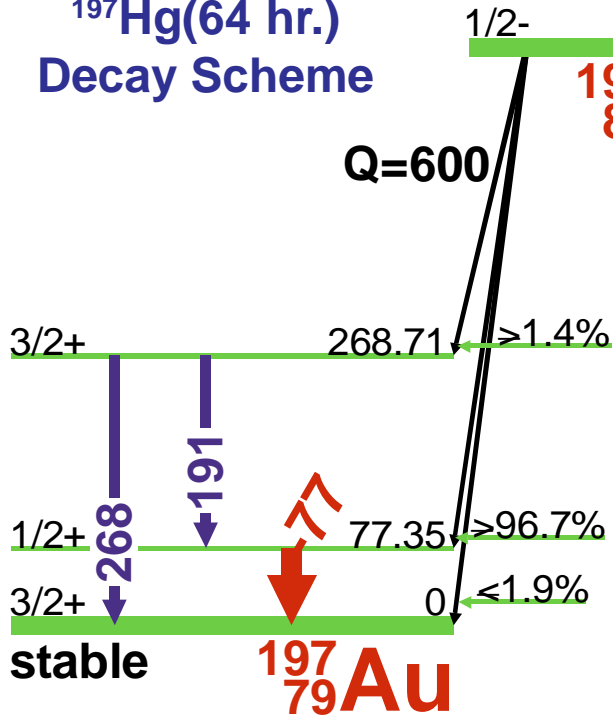


^{197m}Hg(23 hr.)
Decay Scheme

23 hr.



¹⁹⁷Hg(64 hr.)
Decay Scheme



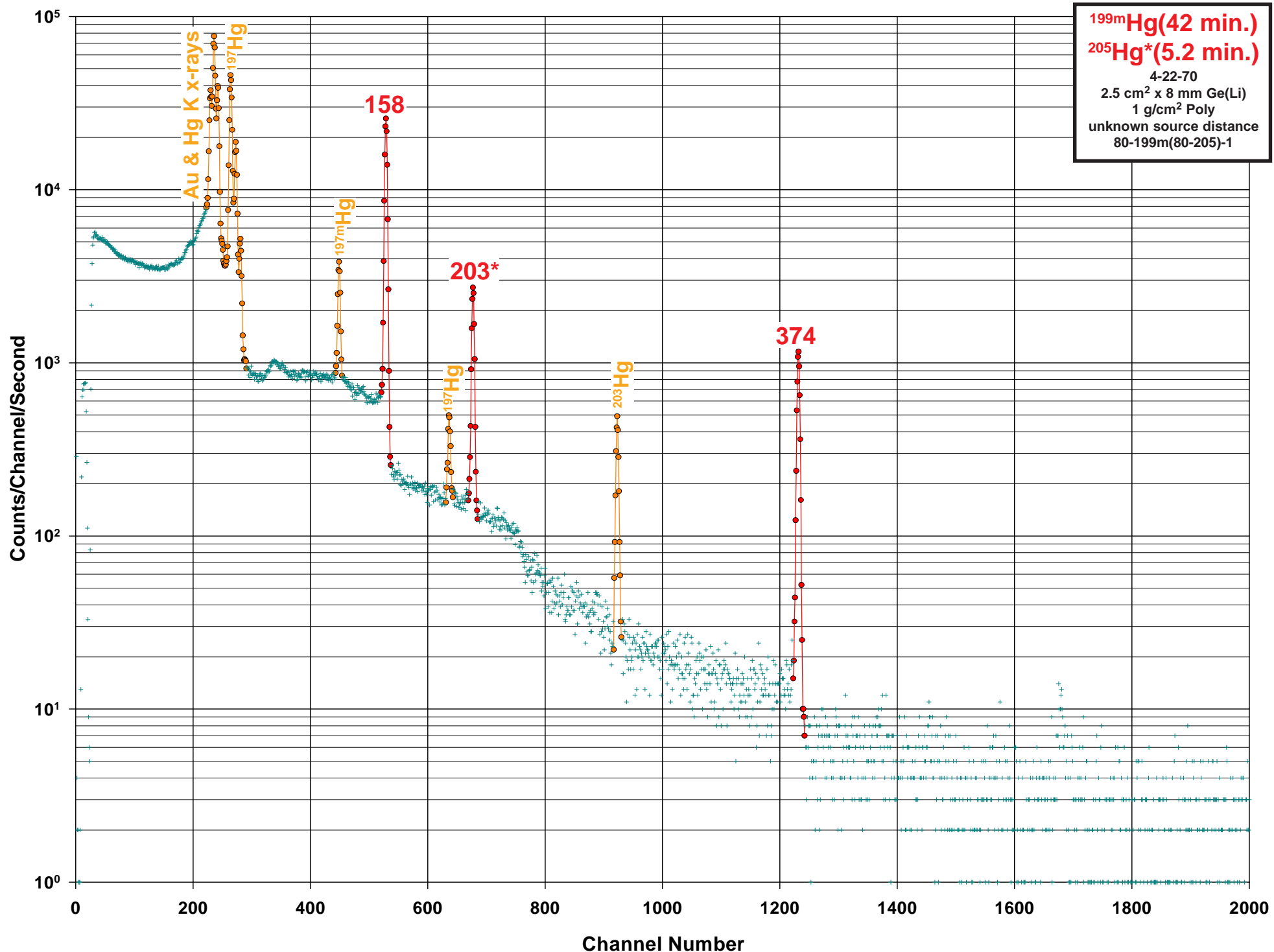
GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{197m}Hg - ¹⁹⁷Hg* Half Life: 23.8(1) hr. - 64.14(5) hr.*
Detector: 35 cm³ coaxial Ge (Li) Method of Production: ¹⁹⁶Hg (n, γ)

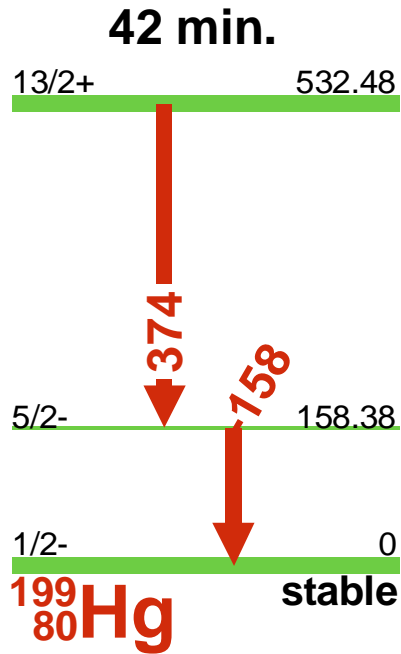
	E _{γ} (keV)	σ E _{γ}	I _{γ} (rel)	I _{γ} (%)	σ I _{γ}	S
*	77.351	0.002	100.	18.7	0.4	1
	133.98	0.05	100.	36.63	0.27	1
	164.97	0.07	1.6	0.2864	0.0021	4
*	191.364	0.015	2.69	0.632	0.022	3
*	268.71	0.03	0.21	0.0393	0.0019	3

E _{γ} , σ E _{γ} , I _{γ} , σ I _{γ} - 1998 ENSDF Data

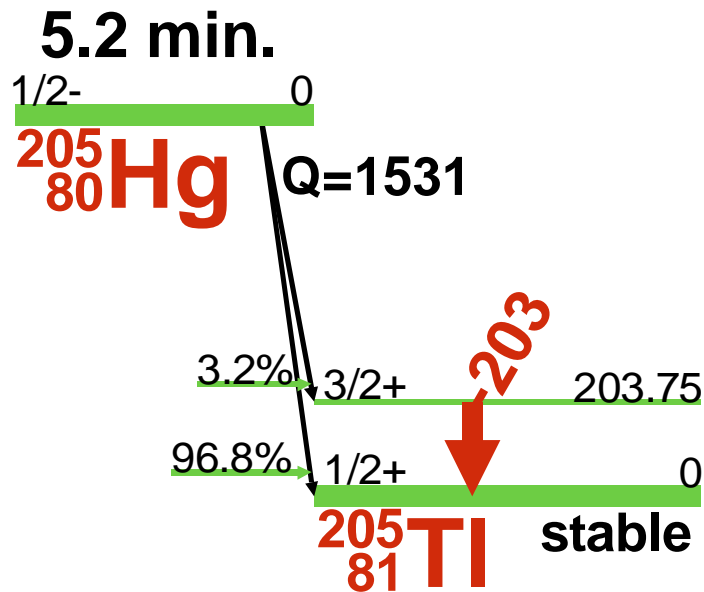




^{199m}Hg(42 min.) Decay Scheme



²⁰⁵Hg(5.2 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{199m}Hg - ²⁰⁵Hg*

Half Life: 42.6(2) min.- 5.2(1) min.*

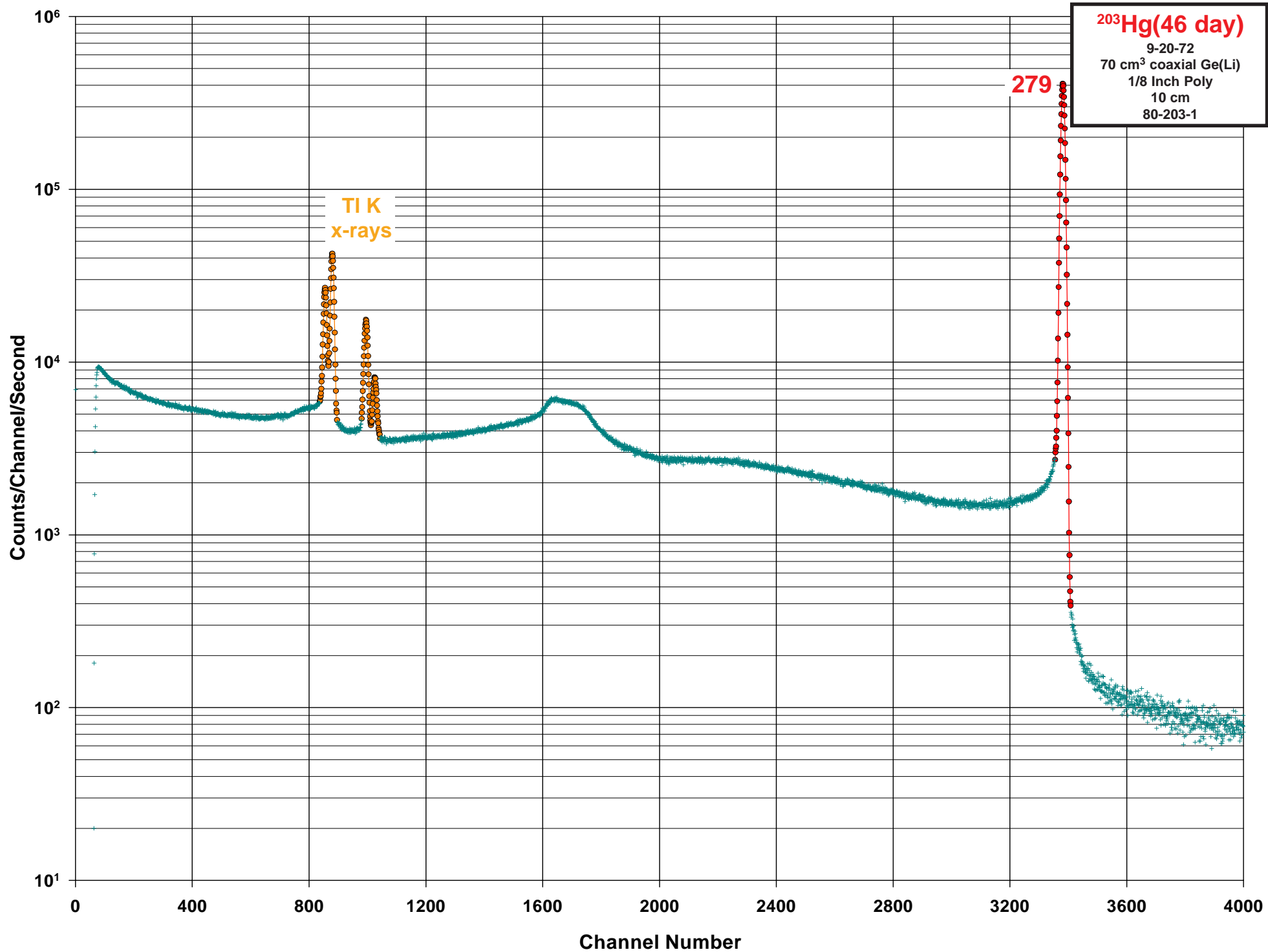
Detector: 2.5 cm² x 8 mm Ge (Li)

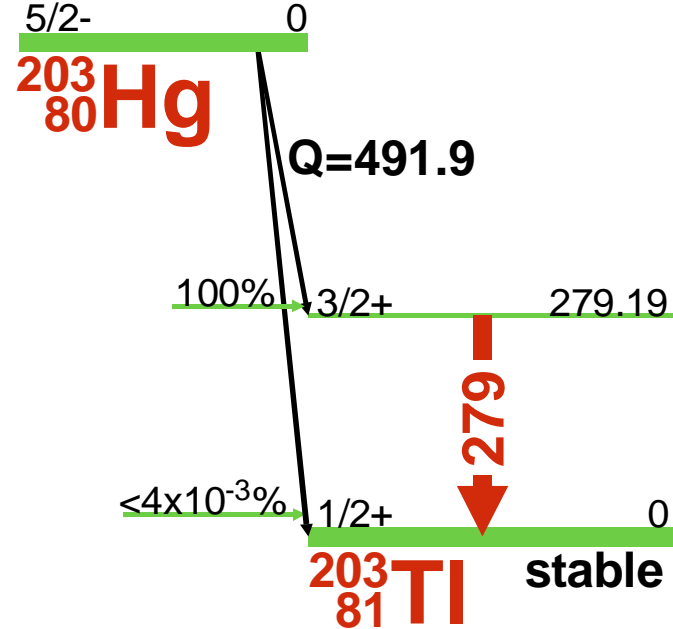
Method of Production: Hg(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
118.6					4
158.30	0.10	100.	52.3	1.0	1
* 203.750	0.009	100.	2.2	1.0	1
255.0					4
374.10	0.10	35.2	13.8	1.1	1
413.40	0.20		0.0272	0.0022	4
* 415.6	0.3		0.013	0.006	4
* 521.3			0.0007	0.0004	4
* 618.6	0.7		0.0020	0.0010	4
* 720.8	0.8		0.0011	0.0006	4
* 937.2	0.6		0.0020	0.0010	4
* 1014.7	0.8		0.0007	0.0004	4
* 1136.8	0.6		0.0046	0.0024	4
* 1141.1	1.5		0.0010	0.0006	4
* 1218.7	0.4		0.006	0.003	4
* 1230.8	1.0		0.0005	0.0003	4
* 1340.3	0.8		0.0003	0.0002	4
* 1433.9	0.5		0.0044	0.0023	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





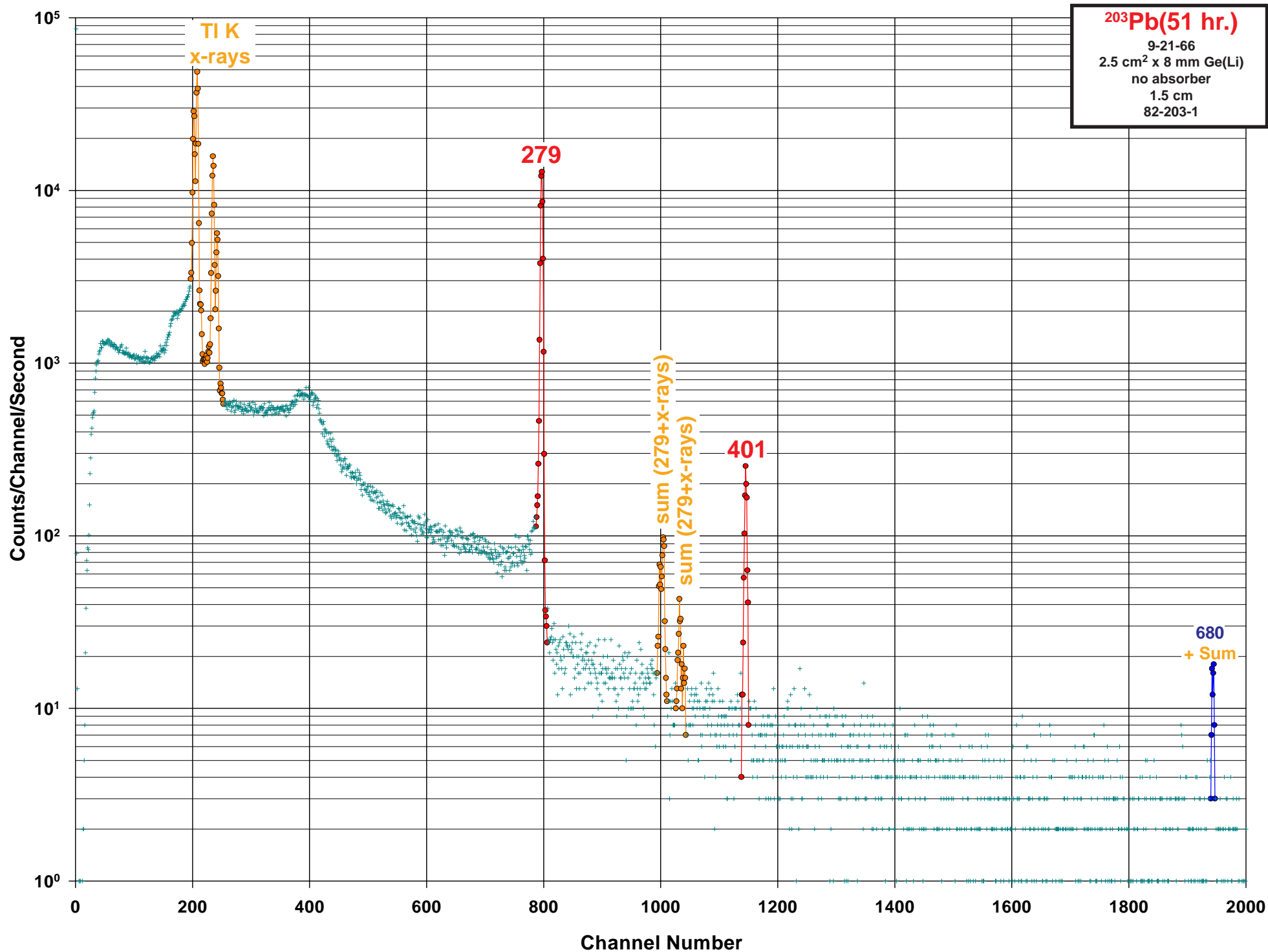
^{203}Hg (46 day) Decay Scheme**46 day****GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{203}Hg

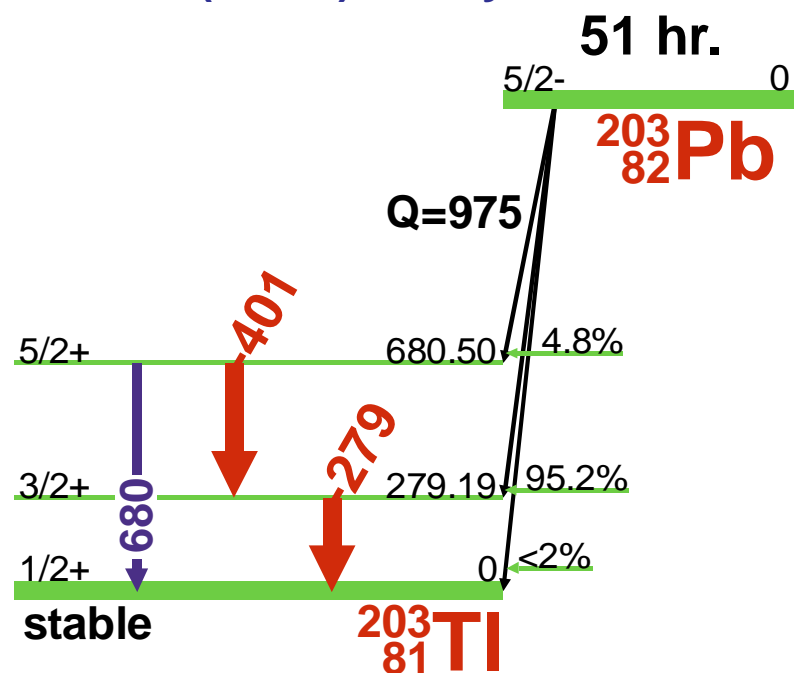
Half Life: 46.612(18) day

Detector: 70 cm³ coaxial Ge (Li)Method of Production: $^{202}\text{Hg}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
279.197	0.001	100.	81.46	0.13	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



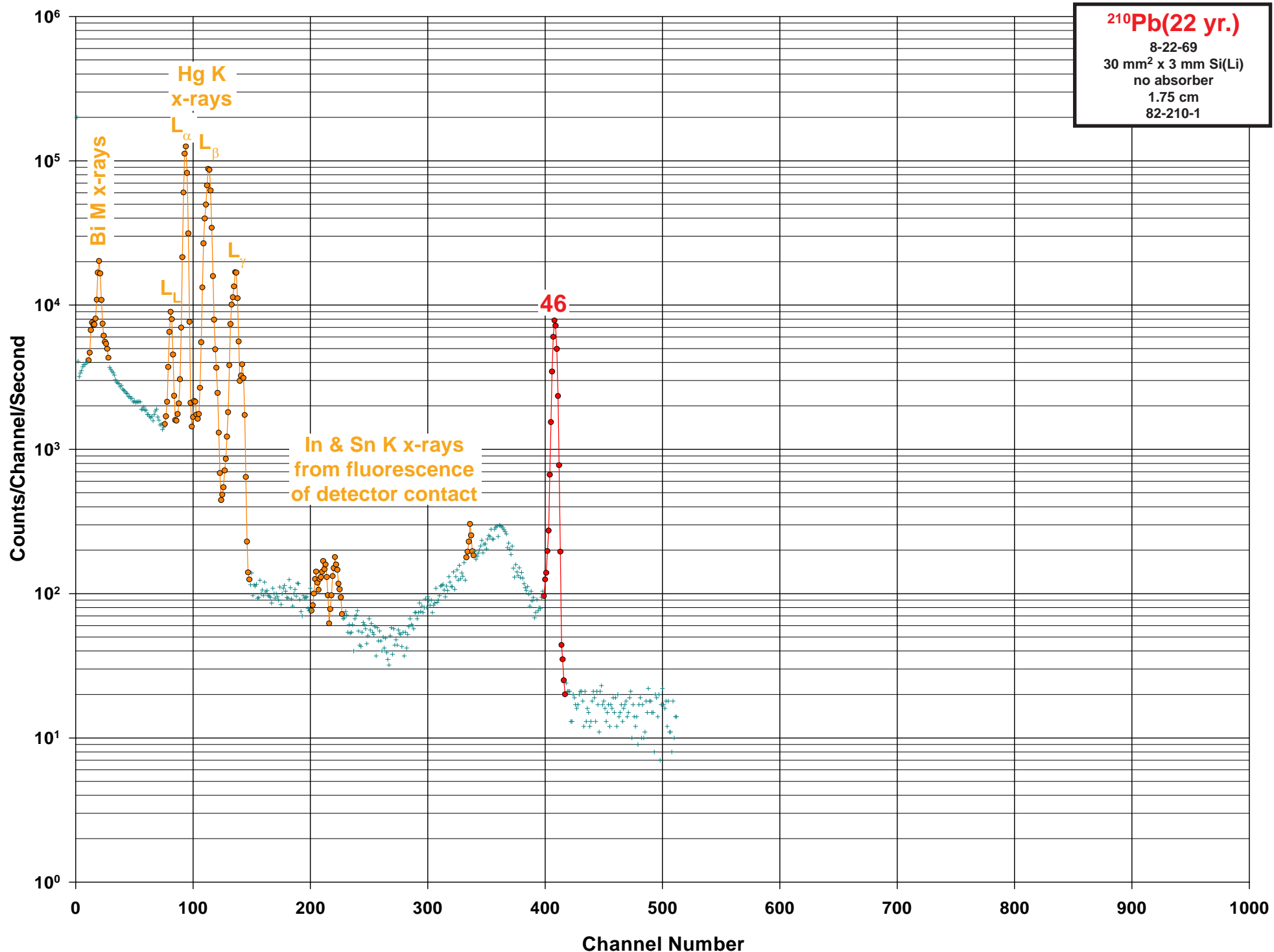
^{203}Pb (51 hr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{203}Pb

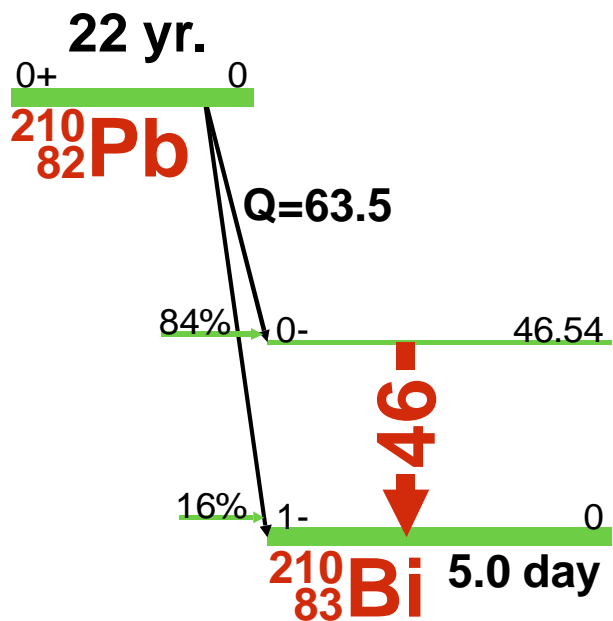
Half Life: 51.873(9) hr.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{204}\text{Pb}(\gamma, n)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
279.197	0.001	100.	80.8	0.2	1
401.325	0.010	4.36	3.35	0.07	1
680.514	0.010	0.92	0.753	0.018	3

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



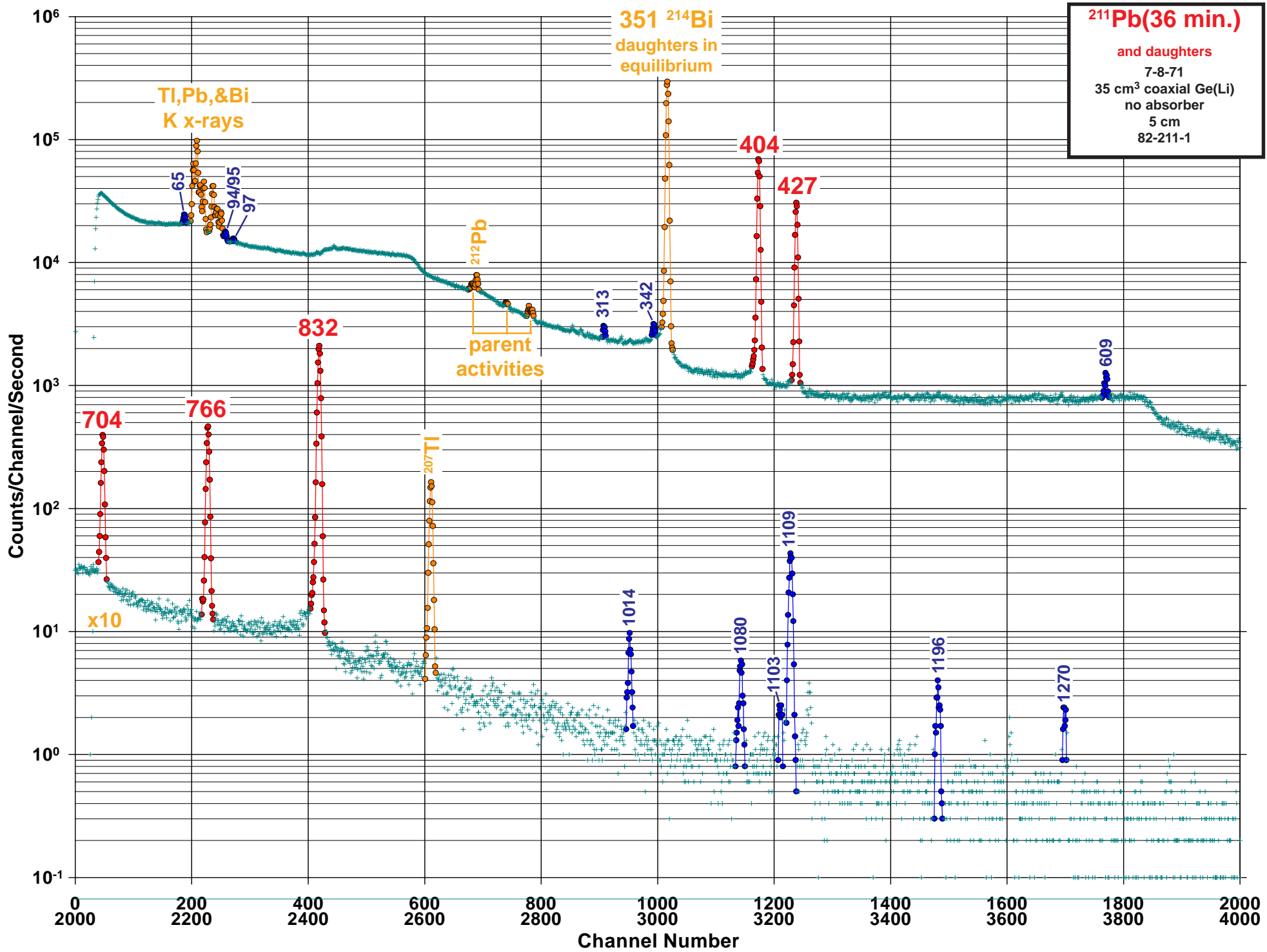
^{210}Pb (22 yr.) Decay Scheme**GAMMA-RAY ENERGIES AND INTENSITIES**Nuclide: ^{210}Pb

Half Life: 22.3(3) yr.

Detector: 30 mm² x 3 mm Si (Li)Method of Production: ^{226}Ra chem.

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
46.539	0.001		4.25	0.04	1

 $E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



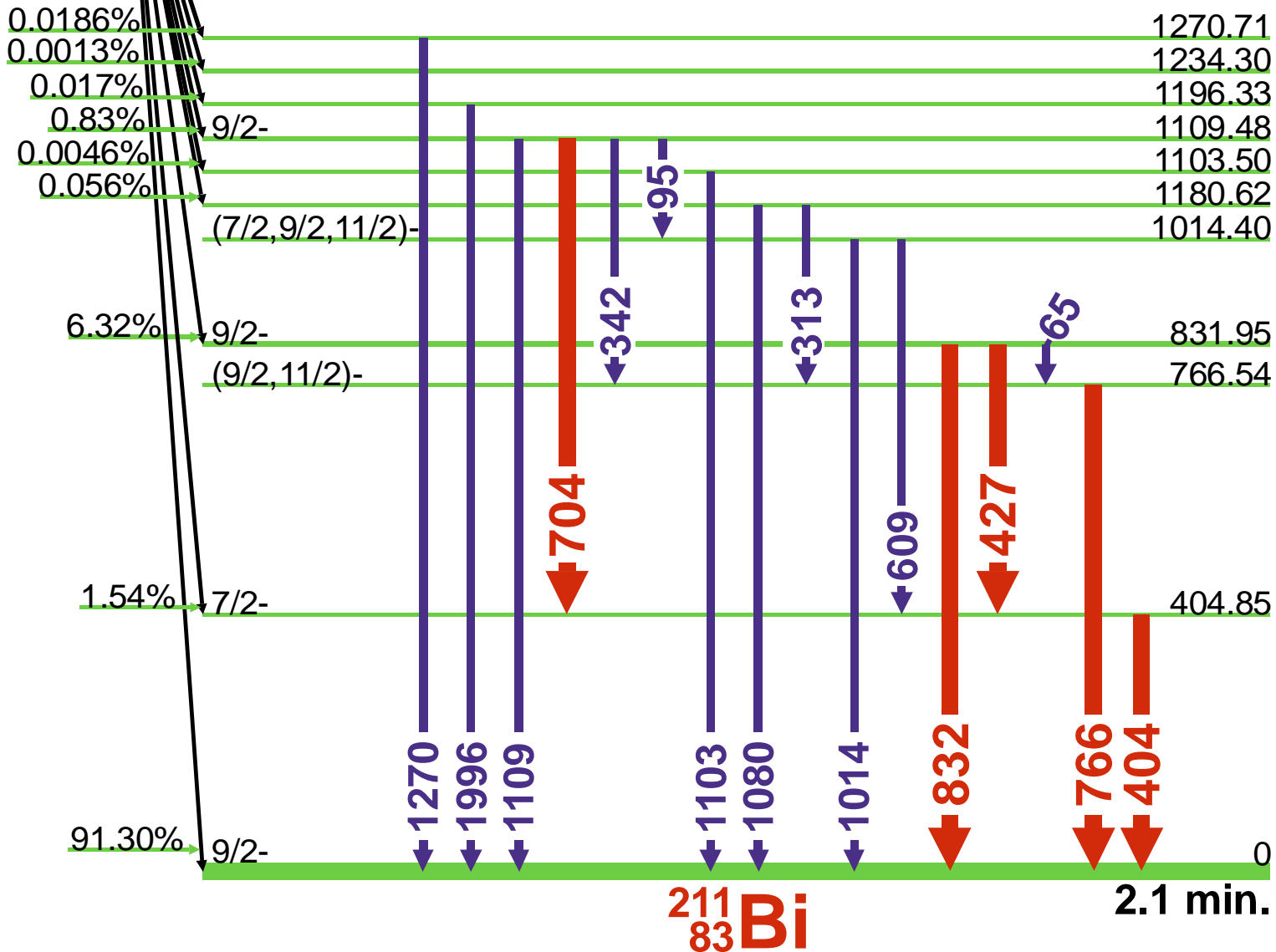
36 min.

²¹¹Pb(36 min.) Decay Scheme

9/2+ 0

²¹¹₈₂Pb

Q=1373



²¹¹₈₃Bi

2.1 min.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{211}Pb E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

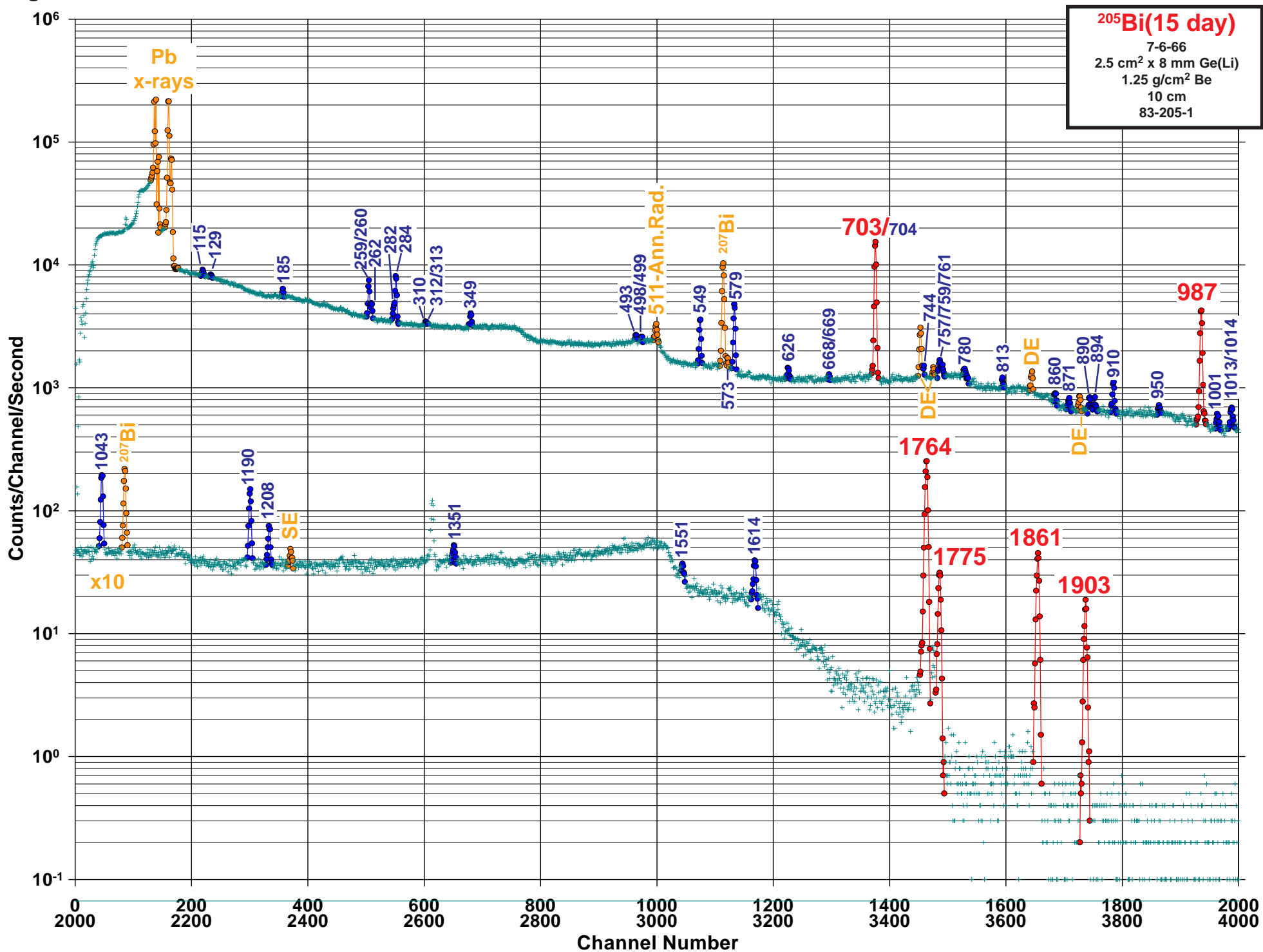
Half Life: 36.1(2) min.

Detector: 35 cm³ coaxial Ge (Li)NOTE: $I_\gamma(\text{rel})$ values are relative to 100 for the 351-keV line from the ^{211}Bi daughterMethod of Production: ^{235}U chem.

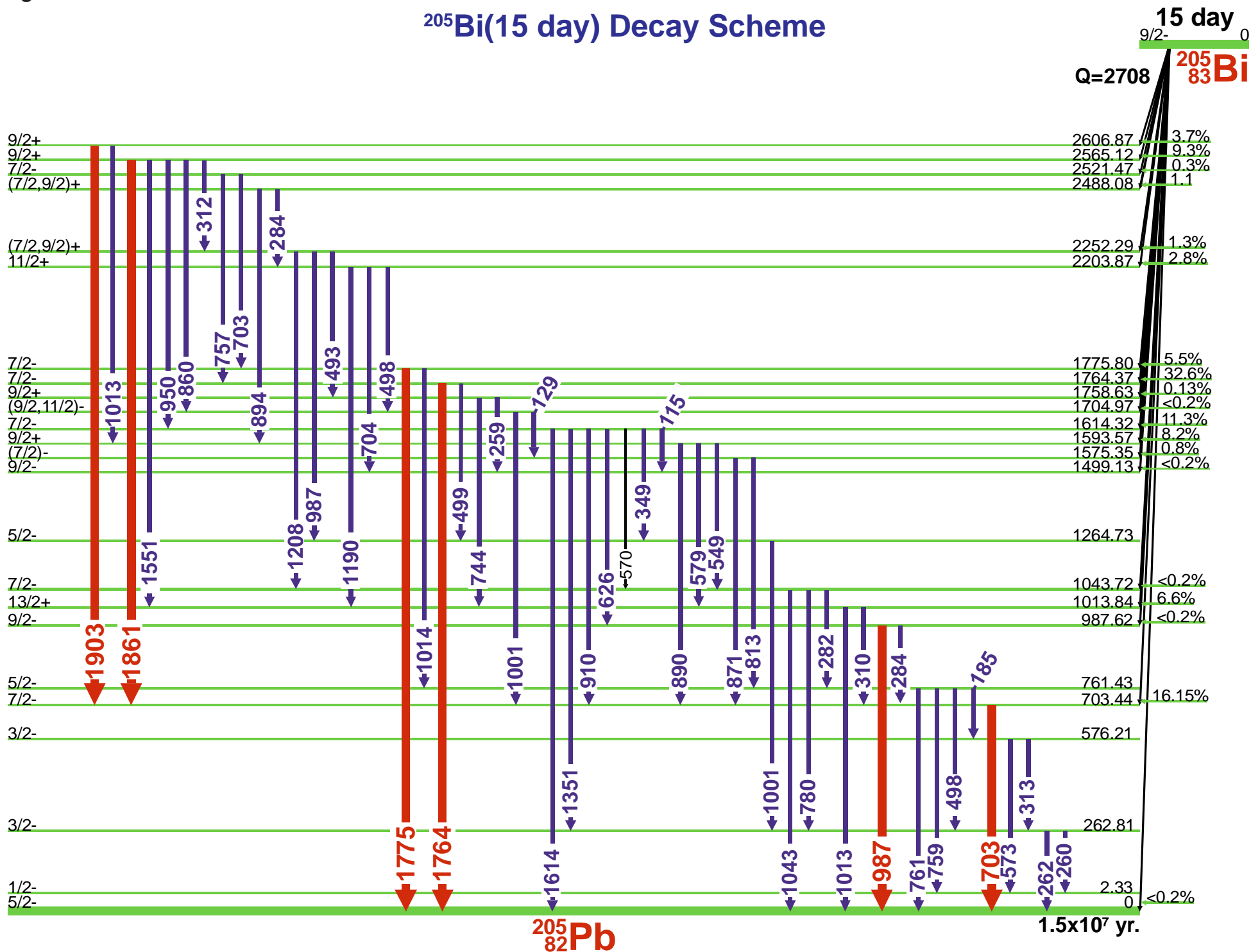
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
65.420	0.014		0.078	0.005	4
81.00	0.20		0.045	0.012	4
83.80	0.10		0.058	0.009	4
88.20	0.20		0.017	0.004	4
94.3	0.3		0.0116	0.0026	4
95.00	0.20		0.0181	0.0026	4
97.30	0.20		0.0116	0.0013	4
244.0			0.039	0.013	4
313.59	0.09	0.25	0.031	0.004	4
342.91	0.04	0.20	0.035	0.005	4
362.072	0.017		0.0426	0.0026	4
404.853	0.010	28.2	3.78	0.06	1
427.088	0.010	13.1	1.76	0.04	1
430.0	1.0		0.0065	0.0026	4
478.0	0.4		0.0129	0.0026	4
479.60	0.20		0.0052	0.0013	4
481.1	0.4		0.026	0.005	4
481.92	0.12		0.0103	0.0013	4
491.82	0.12		0.0041	0.0008	4
494.2	0.3		0.0017	0.0006	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
500.4	0.5		0.0116	0.0026	4
502.00	0.20		0.0036	0.0008	4
504.12	0.12		0.0058	0.0008	4
546.0					4
609.38	0.04	0.24	0.043	0.006	3
676.69	0.07		0.013	0.004	4
704.64	0.03	3.3	0.462	0.011	1
766.51	0.03	4.7	0.617	0.016	1
832.01	0.03	24.1	3.52	0.06	1
865.93	0.14	0.06	0.0059	0.0004	4
951.0			0.022	0.013	4
1014.64	0.05	0.12	0.0173	0.0005	4
1080.16	0.06	0.10	0.0123	0.0007	4
1090.5	0.5		0.0026	0.0006	4
1103.52	0.20	0.02	0.0046	0.0006	4
1109.48	0.05	0.79	0.115	0.004	3
1196.33	0.05	0.07	0.0102	0.0004	3
1234.3	0.4		0.0013	0.0003	4
1270.71	0.08	0.05	0.0068	0.0005	4





²⁰⁵Bi(15 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ²⁰⁵Bi E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 15.31(4) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ²⁰⁶Pb (p,2n)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
2.328	0.007				4
26.220	0.010		0.0014	0.0001	4
90.04	0.04		0.109	0.022	4
112.70	0.10		0.0087	0.0006	4
115.10	0.10	0.23	0.075	0.003	4
122.6	1.0		0.0068	0.0006	4
127.00	0.20		0.0031	0.0006	4
129.62	0.10	0.03	0.0062	0.0006	4
148.80	0.20		0.0053	0.0016	4
164.95	0.10		0.0156	0.0009	4
170.80	0.20		0.0040	0.0009	4
185.22	0.10	0.28	0.095	0.006	4
205.74	0.07		0.025	0.003	4
221.07	0.07		0.0311	0.0019	4
235.97	0.06		0.057	0.003	4
248.40	0.20		0.0019	0.0012	4
D 259.46	0.20	3.10	0.050	0.025	3
260.50	0.05		1.09	0.03	
262.80	0.05	1.19	0.364	0.012	4
277.2	0.5		0.016	0.003	4
282.38	0.07	1.14	0.426	0.006	4
D 284.15	0.10	4.80	1.692	0.022	3
284.26	0.10		0.031	0.009	
310.35	0.05	0.27	0.104	0.003	4
D 312.84	0.20	0.18	0.025	0.009	4
313.43	0.20		0.034	0.009	
339.25	0.20		0.0109	0.0016	4
349.55	0.05	1.48	0.563	0.010	4
354.45	0.10		0.0171	0.0019	4
361.20	0.20		0.031	0.009	4
361.85	0.20		0.030	0.009	4
444.8	0.7		0.014	0.006	4
476.30	0.15		0.023	0.003	4
488.05	0.15		0.039	0.005	4
493.65	0.05	0.97	0.373	0.008	4
498.40	0.15	0.55	0.093	0.016	4
D 498.87	0.20		0.040	0.025	
499.54	0.20		0.062	0.016	
503.4	0.5		0.008	0.005	4
Ann. 511.006			0.297	0.014	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
511.50	0.05		0.855	0.016	4
549.84	0.04	8.88	2.95	0.03	3
561.27	0.05		0.053	0.005	4
570.60	0.05	13.22	4.34	0.06	2
573.85	0.05		0.622	0.013	4
576.30	0.10		0.188	0.006	4
579.80	0.10		5.44	0.06	3
606.25	0.15		0.025	0.004	4
626.71	0.10	1.78	0.585	0.006	4
646.00	0.10		0.065	0.003	4
661.40	0.15		0.028	0.005	4
D 668.6	0.6		0.019	0.012	
669.8	1.2		0.009	0.012	
683.5	0.3		0.026	0.003	4
688.50	0.05		0.227	0.009	4
701.16	0.20		0.16	0.06	4
703.4		100.			1
D 703.45	0.05		31.10	0.10	
704.86	0.20		0.38	0.09	
717.37	0.05		0.311	0.006	4
720.65	0.10		0.143	0.009	4
723.09	0.20		0.028	0.012	4
723.57	0.05		0.152	0.012	4
729.40	0.05		0.065	0.004	4
744.70	0.10	2.33	0.697	0.016	4
757.09	0.20		0.12	0.05	4
759.10	0.10	3.73	1.04	0.05	4
761.35	0.10	2.16	0.68	0.03	4
764.99	0.20		0.009	0.004	4
771.40	0.15		0.047	0.004	4
777.85	0.15		0.073	0.009	4
780.92	0.05	1.56	0.572	0.010	4
788.13	0.15		0.100	0.016	4
789.30	0.20		0.019	0.009	4
795.67	0.05		0.140	0.006	4
800.80	0.05		0.190	0.006	4
806.55	0.10		0.159	0.012	4
813.75	0.10	1.49	0.470	0.012	4
828.22	0.05		0.289	0.012	4
831.0	0.3		0.040	0.009	4

Ann.

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

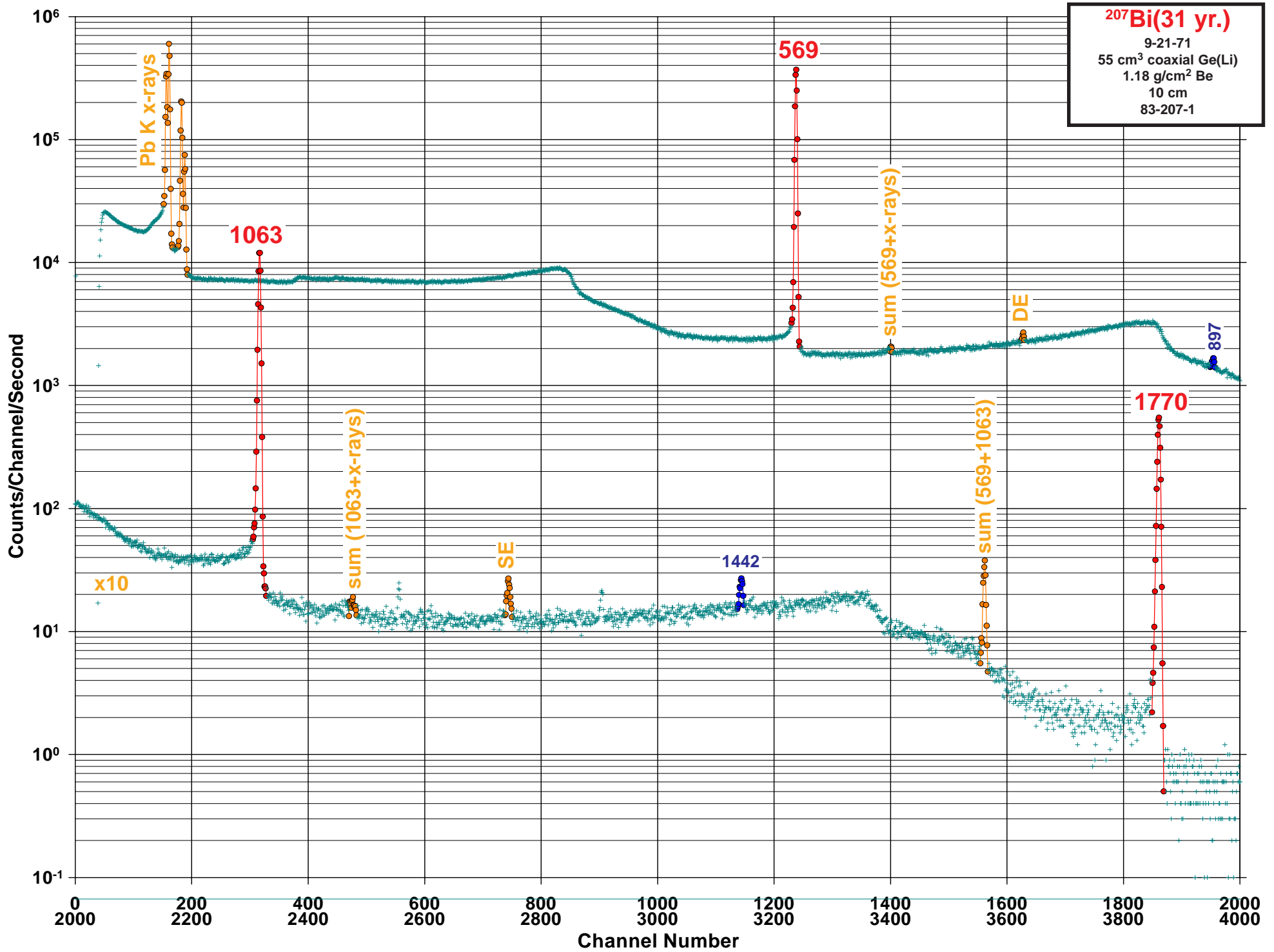
Nuclide: ²⁰⁵BiE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 15.31(4) day

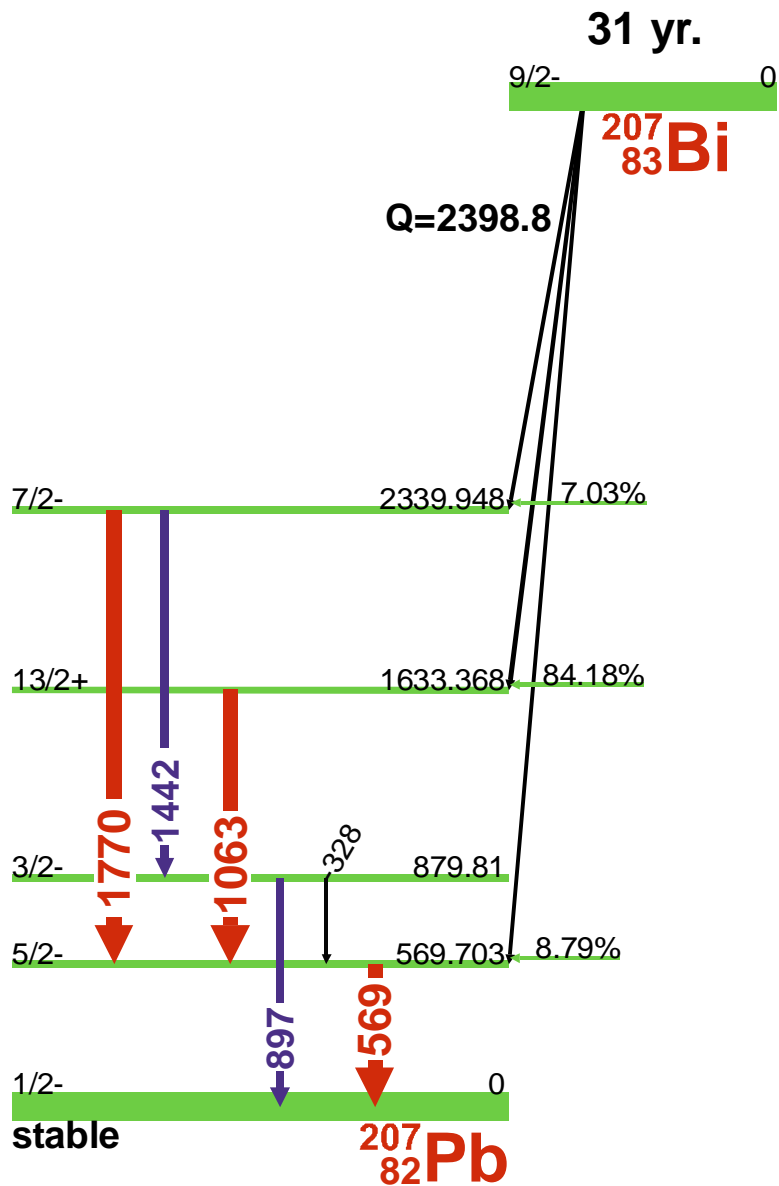
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ²⁰⁶Pb (p,2n)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	842.8	0.3		0.022	0.006	4		1208.70	0.05	1.65	0.512	0.010	4
	848.2	0.3		0.026	0.004	4		1216.25	0.10		0.101	0.005	4
	852.90	0.05		0.072	0.005	4		1256.9	0.5		0.022	0.011	4
	860.13	0.05	1.40	0.435	0.008	4		1261.65	0.20		0.062	0.006	4
	871.95	0.05	1.32	0.417	0.009	4		1264.60	0.20		0.050	0.022	4
	890.15	0.05	2.05	0.678	0.010	4		1264.80	0.20		0.124	0.022	4
	894.56	0.05	2.69	0.622	0.010	4		1265.9	0.3		0.047	0.012	4
	901.90	0.05		0.129	0.005	4		1277.20	0.20		0.038	0.004	4
	910.90	0.05	5.25	1.64	0.03	3		1351.52	0.05	3.51	1.06	0.03	4
	922.15	0.10		0.053	0.003	4		1438.70	0.20		0.117	0.006	4
	931.50	0.15		0.039	0.005	4		1499.00	0.15		0.171	0.014	4
	950.84	0.05	1.27	0.389	0.009	4		1501.40	0.10		0.227	0.014	4
	971.56	0.05		0.280	0.006	4		1513.40	0.20		0.070	0.012	4
	978.50	0.10		0.040	0.006	4		1521.20	0.10		0.199	0.012	4
D	987.49	0.20		0.09	0.03			1548.65	0.15		0.280	0.016	4
	987.66	0.05	53.46	16.13	0.16	1		1551.00	0.10	2.54	0.970	0.025	4
	989.12	0.20		0.0311	0.0001	4		1563.15	0.10		0.165	0.009	4
	989.84	0.20		0.075	0.025	4		1577.50	0.15		0.166	0.009	4
	992.65	0.20		0.09	0.03	4		1593.00	0.15		0.115	0.008	4
D	1001.59	0.20		0.26	0.04	4		1614.30	0.15	6.36	2.28	0.04	3
	1001.95	0.20	1.78	0.27	0.04			1619.10	0.15		0.367	0.016	4
	1003.0	0.3		0.07	0.03	4		1676.4	0.3		0.033	0.006	4
	1013.40	0.15		0.082	0.019			1756.4	0.3		0.218	0.012	4
D	1013.80	0.10		0.058	0.012	4		1760.04	0.40		0.12	0.03	4
	1014.30	0.05	3.29	0.914	0.019			1764.30	0.10	93.05	32.5	0.6	1
	1031.5	0.3		0.034	0.011	4		1775.80	0.10	11.10	3.99	0.08	1
	1038.86	0.24		0.114	0.009	4		1815.6	0.4		0.014	0.005	4
	1043.75	0.05	23.87	7.51	0.10	2		1818.00	0.20				4
	1060.75	0.15		0.044	0.005	4		1818.00	0.20		0.047	0.004	4
	1063.90	0.15		0.025	0.005	4		1861.70	0.10	17.44	6.17	0.10	1
	1066.03	0.15		0.110	0.005	4		1903.45	0.10	6.71	2.47	0.04	1
	1072.40	0.10		0.302	0.006	4		1965.8	0.5		0.0081	0.0016	4
	1075.10	0.10		0.011	0.005	4		2003.3	0.5		0.0037	0.0016	4
	1107.72	0.10		0.099	0.009	4		2565.10	0.15		0.0423	0.0022	4
	1190.03	0.05	7.34	2.26	0.06	3		2607.10	0.20		0.0187	0.0019	4
	1199.62	0.10		0.190	0.012	4							





²⁰⁷Bi(31 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁰⁷Bi

Half Life: 31.55(5) yr.

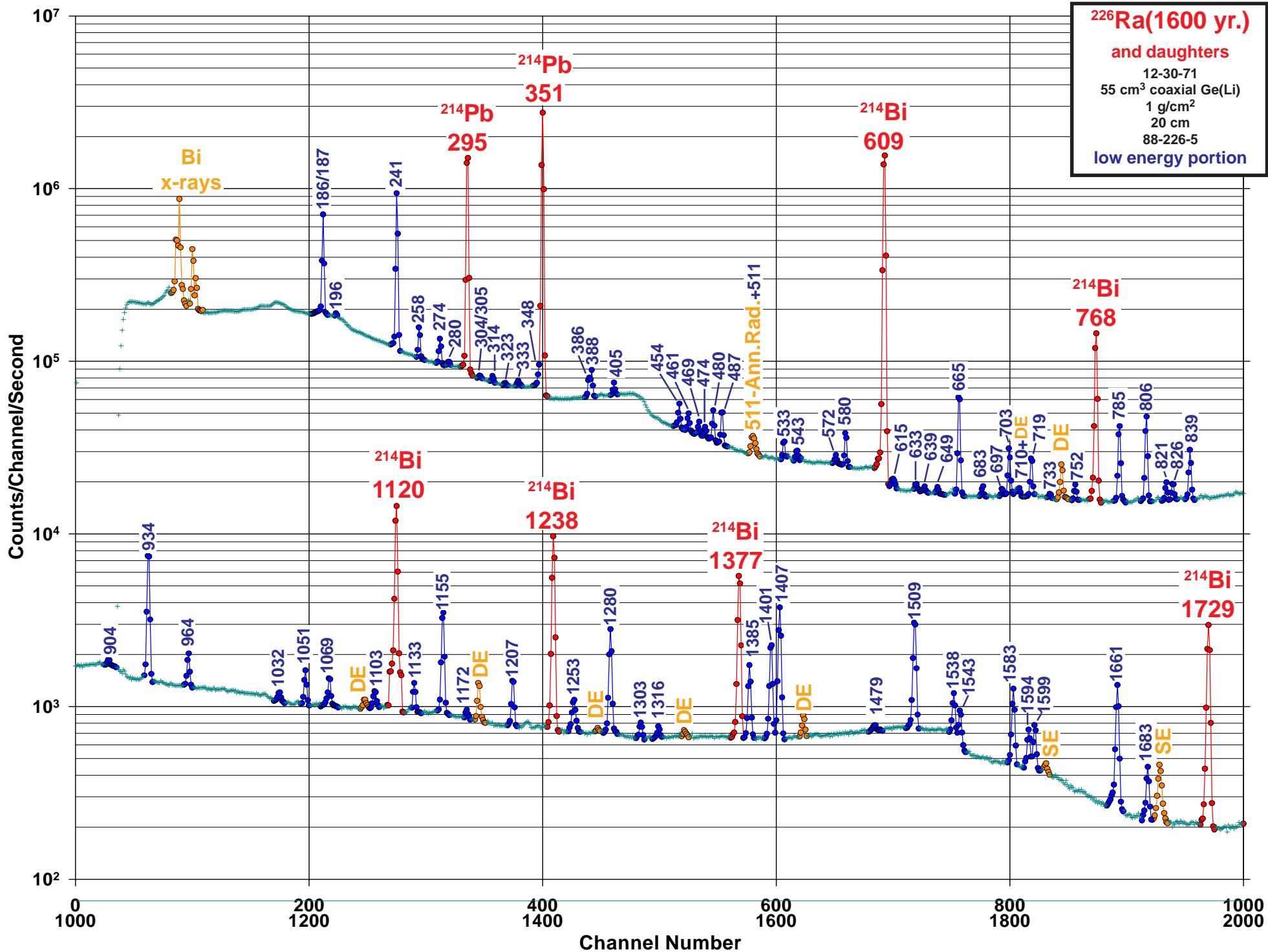
Detector: 55 cm³ coaxial Ge (Li)

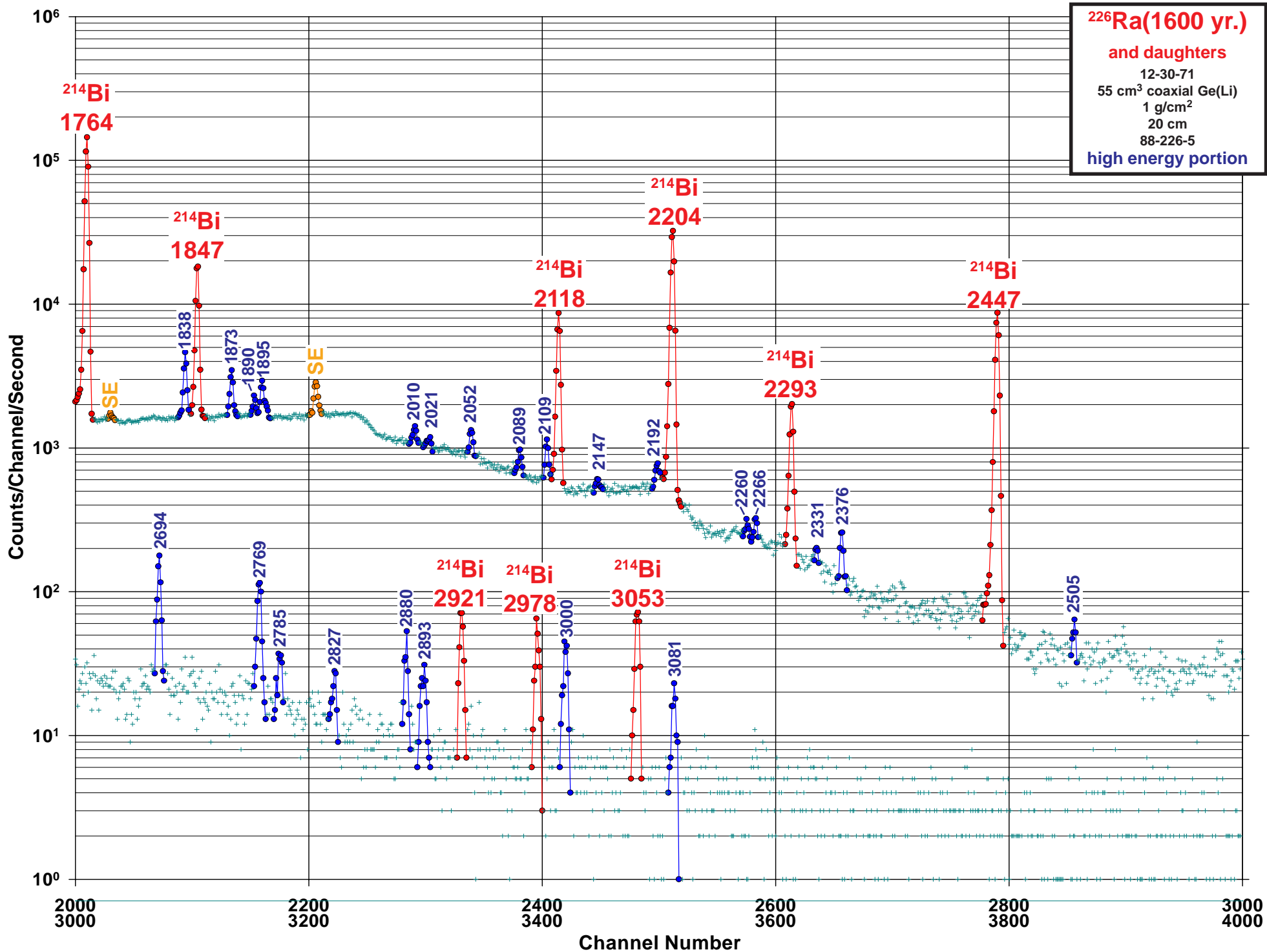
Method of Production: ²⁰⁷Pb(p,n)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	328.12	0.10		0.0007	0.0001	4
Ann.	511.006			0.024		4
	569.702	0.002	100.	97.74	0.03	1
	897.80	0.10	0.25	0.121	0.008	4
	1063.662	0.004	77.0	74.50	0.20	1
	1442.20	0.20	0.13	0.130	0.003	4
	1770.237	0.010	7.39	6.87	0.04	1

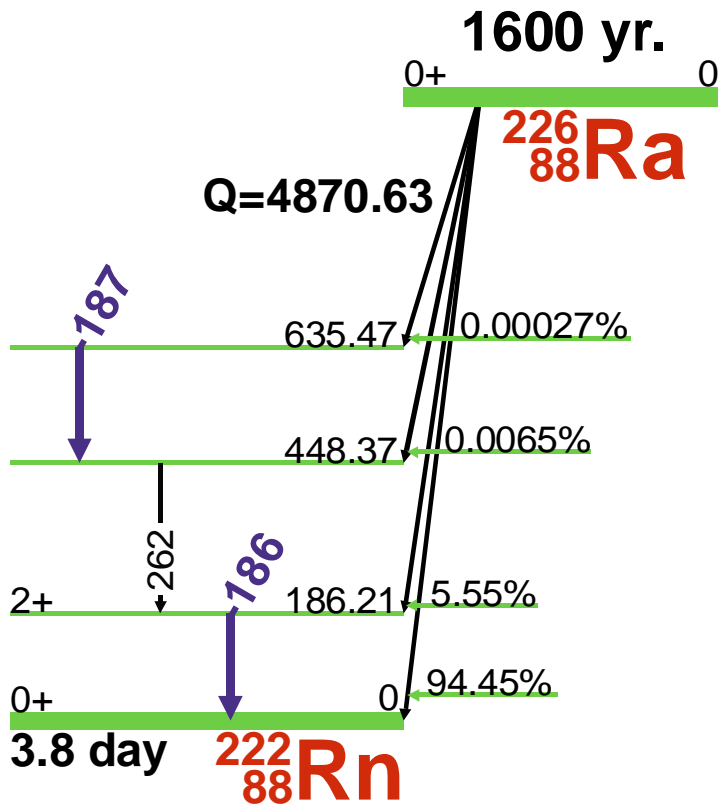
$E_\gamma, \sigma E_\gamma, I_\gamma, \sigma I_\gamma$ - 1998 ENSDF Data



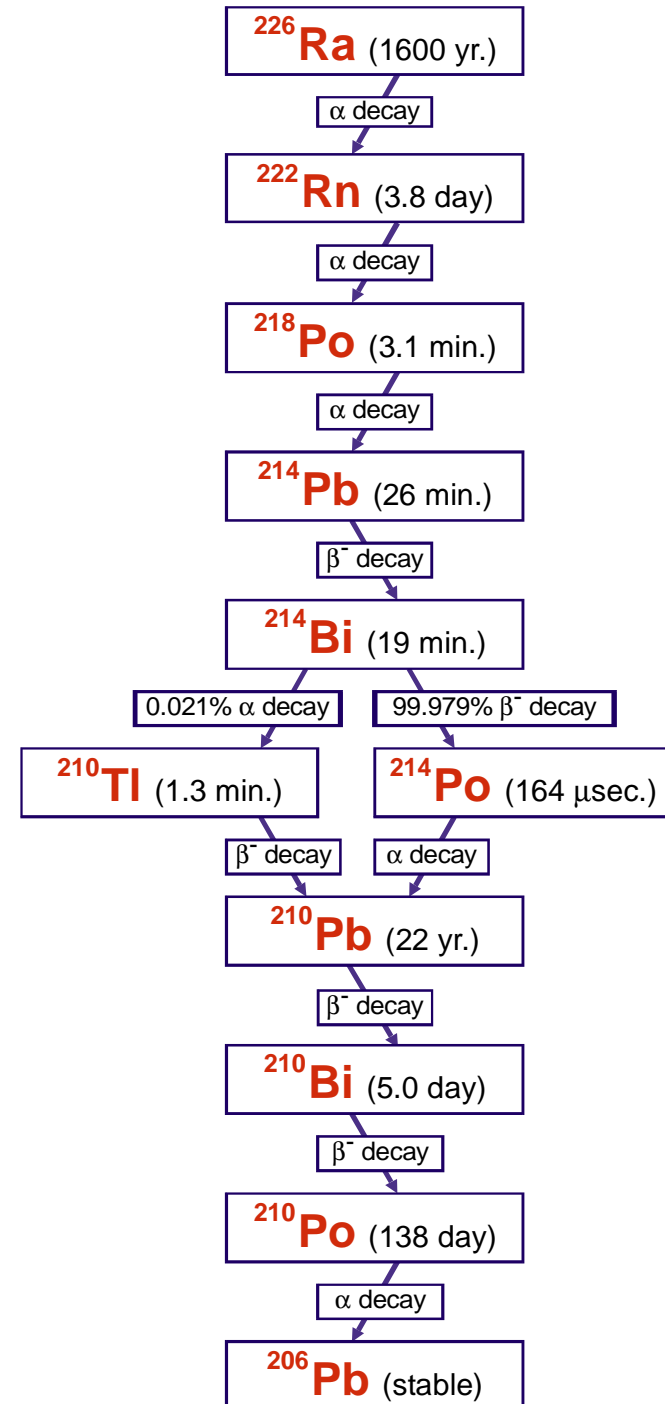




²²⁶Ra(1600 yr.) Decay Scheme



²²⁶Ra Decay Chain



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ²²⁶RaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 1600(7) yr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: ²³⁸U decay

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²²⁶ Ra	34.8	1.6				4	²¹⁴ Pb	533.660	0.020	0.173	0.186	0.009	4
²²⁶ Ra D	186.211	0.013	4.3	3.59	0.06	3	²¹⁴ Bi	543.00	0.20	0.083	0.084	0.009	4
	187.10	0.20					²¹⁴ Pb	543.81	0.07		0.069	0.010	4
²¹⁴ Pb	196.20	0.05		0.069	0.010	4	²¹⁴ Bi	572.76	0.07	0.091	0.074	0.010	4
²¹⁴ Pb	241.997	0.003	9	7.43	0.11	2	²¹⁴ Pb	580.13	0.03	0.39	0.352	0.014	3
²¹⁴ Pb	258.87	0.04	0.47	0.524	0.011	4	²²⁶ Ra	600.66	0.05		0.0005		4
²²⁶ Ra	262.27	0.05		0.0050	0.0005	4	²¹⁴ Bi	609.312	0.007	46.1	46.1	0.5	1
²¹⁴ Bi	273.80	0.05		0.15	0.03	4	²¹⁴ Bi	615.73	0.10	0.1	0.060	0.020	4
²¹⁴ Pb	274.80	0.05	0.55	0.474	0.011	4	²¹⁴ Bi	633.14	0.1		0.055	0.005	
²¹⁴ Bi	280.95	0.05	0.099	0.060	0.010	4	²¹⁴ Bi	639.67	0.10	0.032	0.030	0.005	4
²¹⁴ Pb	295.224	0.002	21.3	19.30	0.20	1	²¹⁴ Bi	649.18	0.07	0.061	0.060	0.007	4
²¹⁴ Bi D	304.2	0.20	0.14	0.0420		4	²¹⁴ Bi	665.453	0.022	1.54	1.46	0.03	3
	304.2	0.20					²¹⁴ Bi	683.22	0.06	0.073	0.081	0.009	4
²¹⁴ Pb	305.26	0.03		0.031	0.003	4	²¹⁴ Bi	697.90	0.25	0.035	0.051	0.014	4
²¹⁴ Pb	314.32	0.07		0.078	0.001	4	²¹⁴ Bi	703.11	0.04	0.45	0.472	0.012	3
²¹⁴ Bi	314.9	0.8					²¹⁴ Bi	710.3	0.3	0.077			4
²¹⁴ Pb	323.83	0.04	0.055	0.028	0.004	4	²¹⁴ Bi	710.67	0.10	0.077	0.0750	0.0020	4
²¹⁴ Bi	333.31	0.06	0.106	0.080	0.020	4	²¹⁴ Bi	719.86	0.03		0.379	0.011	4
²¹⁴ Bi	334.78	0.08		0.034		4	²¹⁴ Bi	733.80	0.15	0.05	0.043	0.006	4
²¹⁴ Bi	348.92	0.06	0.061	0.12	0.04	4	²¹⁴ Bi	752.84	0.03	0.135	0.130	0.010	4
²¹⁴ Pb	351.932	0.002	40	37.6	0.4	1	²¹⁴ Bi	768.356	0.010	4.9	4.94	0.06	1
²¹⁴ Bi	386.77	0.05	0.56	0.31	0.03	4	²¹⁴ Bi	785.37	0.08		1.72	0.02	4
²¹⁴ Bi	388.88	0.05	0.61	0.37	0.04	4	²¹⁴ Pb	785.96	0.9		1.07	0.08	4
²¹⁴ Bi	405.74	0.03	0.18	0.170	0.010	4	²¹⁴ Bi	806.174	0.018	1.26	1.220	0.020	3
²²⁶ Ra	414.60	0.05		0.0003		4	²¹⁴ Bi	821.18	0.03	0.141	0.158	0.015	4
²²⁶ Ra	449.37	0.10		0.0002		4	²¹⁴ Bi	826.30	0.20	0.01	0.110	0.020	4
²¹⁴ Bi	454.770	0.120	0.35	0.300	0.020	4	²¹⁴ Pb	839.04	0.09	0.59	0.587	0.010	3
²¹⁴ Bi	461.000	0.200	0.281	0.053	0.009	4	²¹⁴ Bi	904.29	0.10	0.124	0.085	0.020	4
²¹⁴ Pb	462.00	0.07		0.221	0.009	4	²¹⁴ Bi	934.061	0.012	3.13	3.03	0.04	2
²¹⁴ Bi	469.760	0.070	0.14	0.129	0.010	4	²¹⁴ Bi	964.08	0.03	0.38	0.362	0.017	3
²¹⁴ Bi	474.410	0.050	0.131	0.110	0.009	4	²¹⁴ Bi	1032.37	0.08	0.1	0.078	0.020	4
²¹⁴ Pb	480.430	0.020	0.4	0.320	0.011	4	²¹⁴ Bi	1051.96	0.03	0.33	0.315	0.011	4
²¹⁴ Pb	487.09	0.07	0.46	0.422	0.016	4	²¹⁴ Bi	1069.96	0.08	0.29	0.275	0.015	4
²¹⁴ Pb	511.0	0.4		0.032	0.010	4	²¹⁴ Bi	1103.64	0.19	0.183	0.10	0.04	4
²²² Rn	511.5	0.2	0.37	0.08	0.08	4	²¹⁴ Bi	1120.287	0.010	15.3	15.10	0.20	1

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ²²⁶RaE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

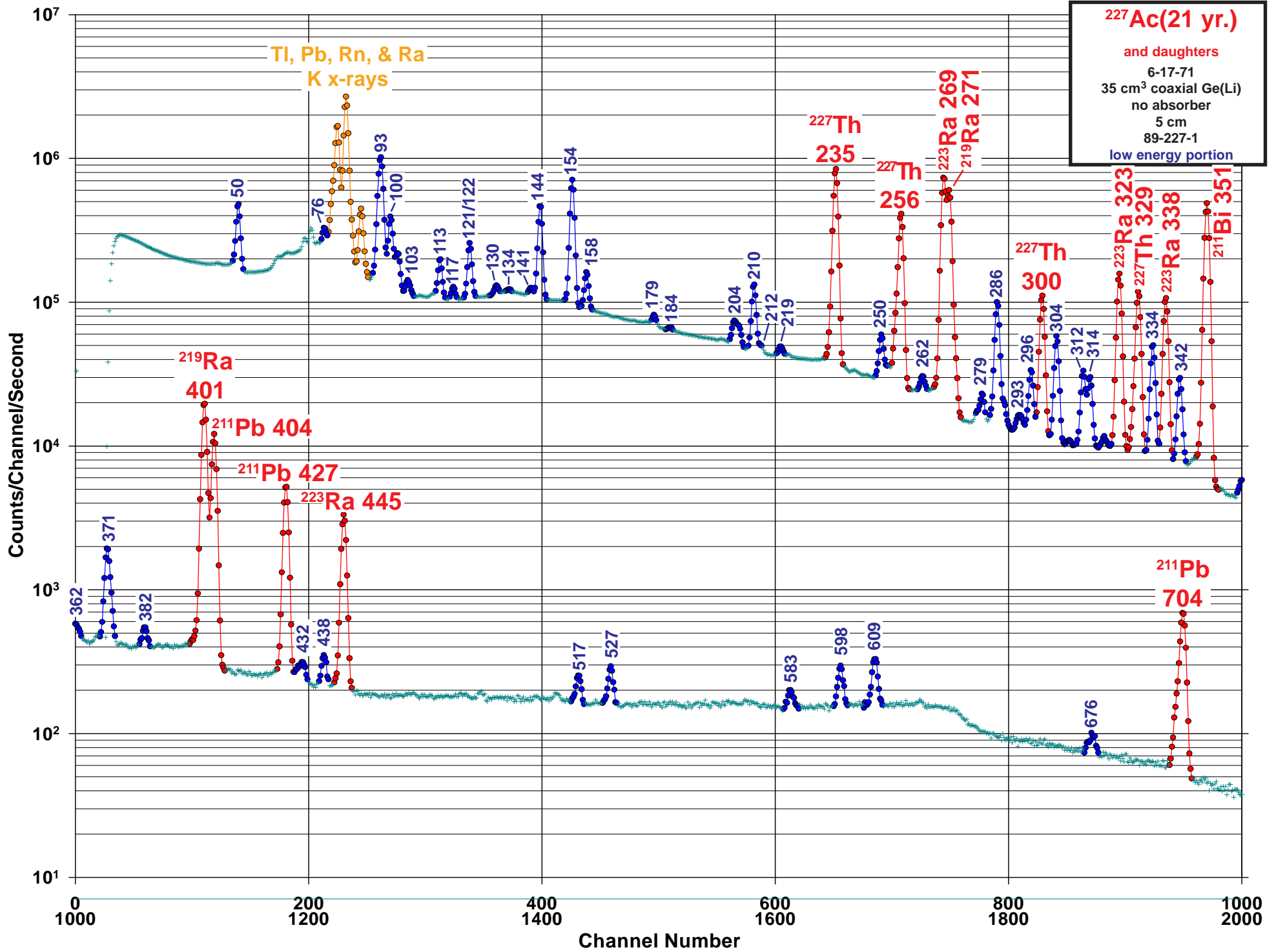
Half Life: 1600(7) yr.

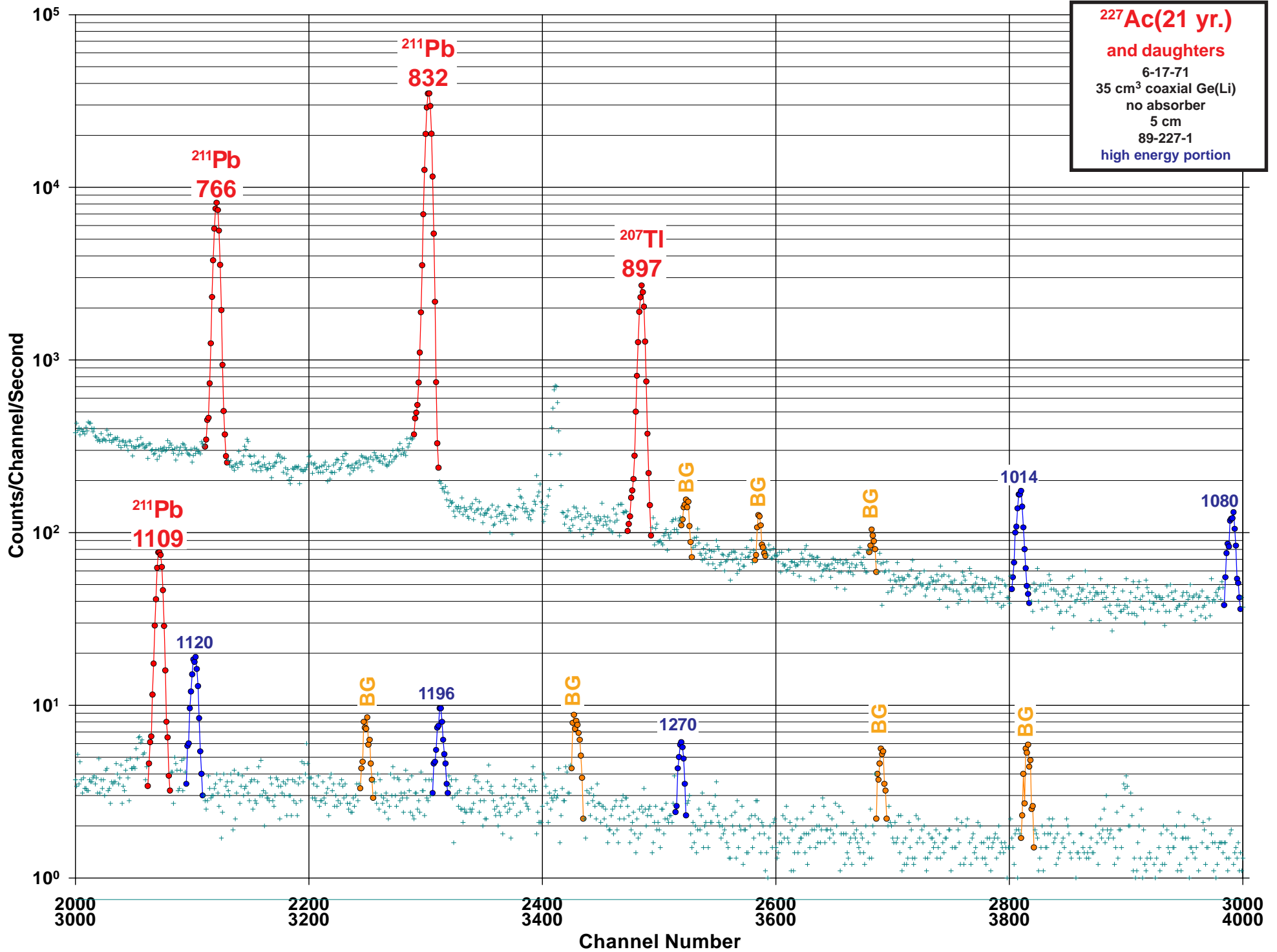
Detector: 55 cm³ coaxial Ge (Li)Method of Production: ²³⁸U decay

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²¹⁴ Bi	1133.66	0.03		0.248	0.013	4
²¹⁴ Bi	1155.19	0.020	1.69	1.630	0.020	3
²¹⁴ Bi	1172.98	0.10	0.07	0.051	0.006	4
²¹⁴ Bi	1207.68	0.03	0.47	0.451	0.016	3
²¹⁴ Bi	1238.110	0.012	6	5.79	0.08	1
²¹⁴ Bi	1253.14	0.12				
²¹⁴ Bi	1280.960	0.020	1.45	1.430	0.020	3
²¹⁴ Bi	1303.76	0.08	0.118	0.112	0.007	4
²¹⁴ Bi	1316.96	0.15	0.087	0.080	0.010	4
²¹⁴ Bi	1377.669	0.012	4	4.00	0.06	1
²¹⁴ Bi	1385.31	0.03	0.82	0.757	0.018	3
²¹⁴ Bi	1401.50	0.04	1.32	1.270	0.020	3
²¹⁴ Bi	1407.98	0.04	2.3	2.15	0.05	2
²¹⁴ Bi	1479.15	0.14	0.06	0.051	0.005	4
²¹⁴ Bi	1509.228	0.015	2.15	2.11	0.04	3
²¹⁴ Bi	1538.50	0.06	0.39	0.376	0.014	4
²¹⁴ Bi	1543.32	0.06	0.3	0.20	0.05	4
²¹⁴ Bi	1583.22	0.04	0.75	0.690	0.015	3
²¹⁴ Bi	1594.73	0.08	0.28	0.25	0.04	3
²¹⁴ Bi	1599.31	0.06	0.36	0.23	0.06	3
²¹⁴ Bi	1661.28	0.06	1.14	1.15	0.03	2
²¹⁴ Bi	1683.99	0.04	0.225	0.216	0.006	3
²¹⁴ Bi	1729.595	0.015	2.95	2.92	0.04	1
²¹⁴ Bi	1764.494	0.014	15.9	15.40	0.20	1
²¹⁴ Bi	1838.36	0.05	0.37	0.360	0.020	3
²¹⁴ Bi	1847.42	0.025	2.16	2.11	0.03	1
²¹⁴ Bi	1873.16	0.06	0.23	0.219	0.007	3
²¹⁴ Bi	1890.30	0.15	0.084	0.08	0.03	4

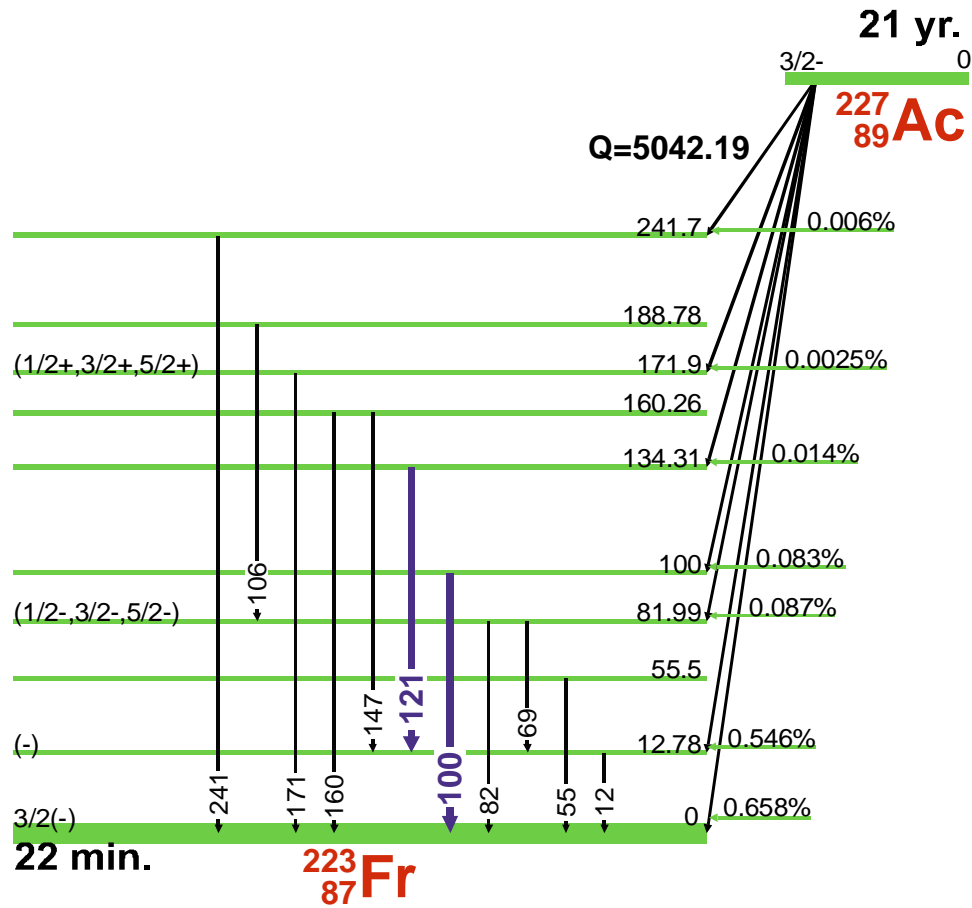
	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²¹⁴ Bi	1895.92	0.14	0.18	0.160	0.020	3
²¹⁴ Bi	2010.78	0.12	0.059	0.047	0.003	4
²¹⁴ Bi	2021.60	0.20	0.02	0.020	0.003	4
²¹⁴ Bi	2052.94	0.12	0.066	0.069	0.005	4
²¹⁴ Bi	2089.70	0.20	0.056	0.050	0.006	4
²¹⁴ Bi	2109.92	0.12	0.084	0.088	0.004	3
²¹⁴ Bi	2118.55	0.03	1.23	1.14	0.03	1
²¹⁴ Bi	2147.90	0.20	0.021	0.014	0.002	4
²¹⁴ Bi	2192.58	0.16	0.052	0.034	0.003	4
²¹⁴ Bi	2204.21	0.04	5.2	5.08	0.04	1
²¹⁴ Bi	2260.30	0.20	0.013	0.0087	0.0005	4
²¹⁴ Bi	2266.51	0.13	0.019	0.0180	0.0010	4
²¹⁴ Bi	2293.40	0.12	0.34	0.305	0.009	1
²¹⁴ Bi	2331.30	0.20	0.026	0.0221	0.0014	4
²¹⁴ Bi	2376.90	0.20	0.01	0.0088	0.0012	3
²¹⁴ Bi	2447.86	0.10	1.6	1.570	0.020	1
²¹⁴ Bi	2505.40	0.20	0.005	0.0057	0.0005	4
²¹⁴ Bi	2694.70	0.20	0.033	0.0310	0.0020	2
²¹⁴ Bi	2769.90	0.20	0.026	0.0250	0.0020	2
²¹⁴ Bi	2785.90	0.20	0.006	0.0055	0.0009	4
²¹⁴ Bi	2827.00	0.20	0.004	0.0023	0.0002	4
²¹⁴ Bi	2880.30	0.20	0.01	0.0092	0.0003	3
²¹⁴ Bi	2893.50	0.20	0.0056	0.0060	0.0005	3
²¹⁴ Bi	2921.90	0.20	0.016	0.0140	0.0020	1
²¹⁴ Bi	2978.90	0.20	0.015	0.0138	0.0005	1
²¹⁴ Bi	3000.00	0.20	0.009	0.0088	0.0012	3
²¹⁴ Bi	3053.90	0.20	0.022	0.0210	0.0020	1
²¹⁴ Bi	3081.7	0.3	0.004	0.0048	0.0005	3



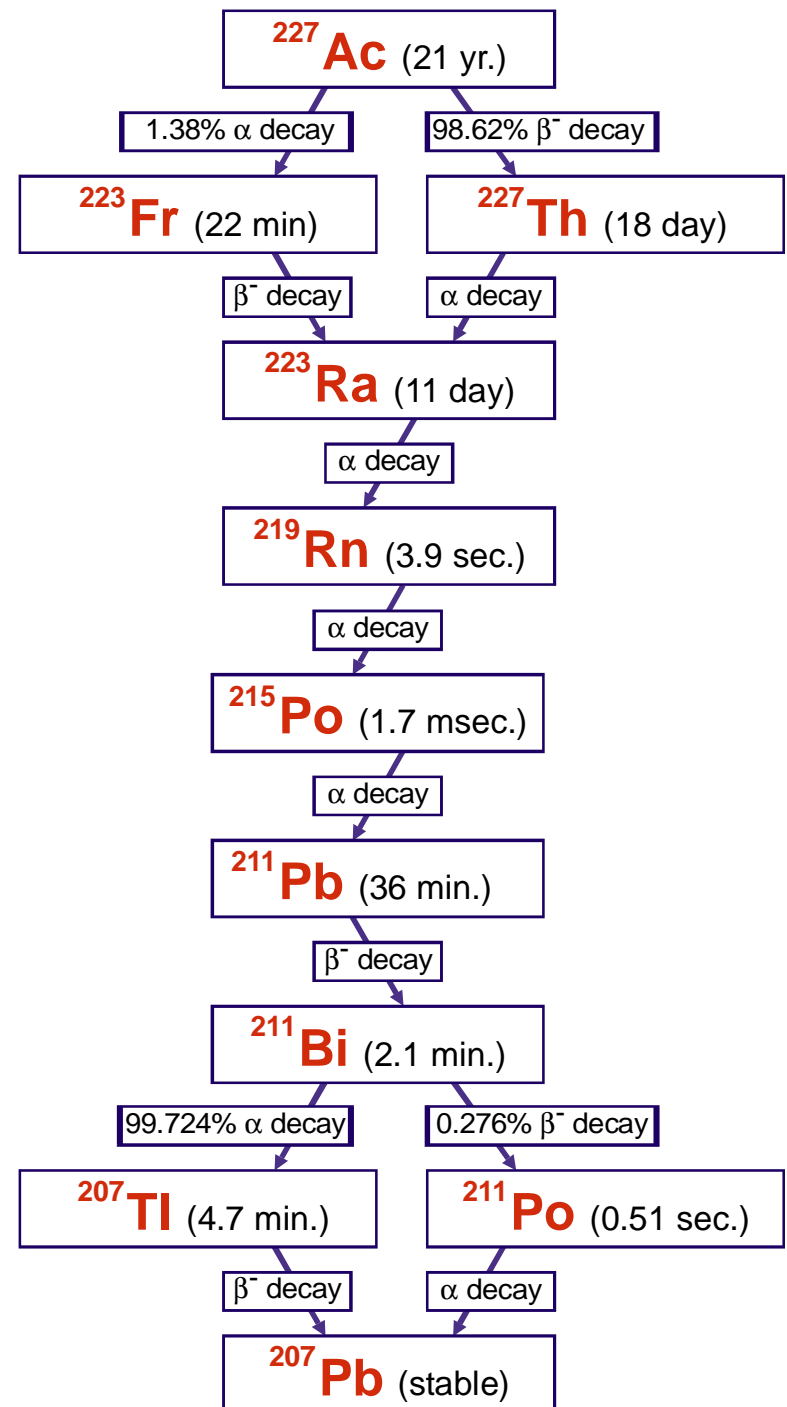




²²⁷Ac(21 yr.) Decay Scheme



²²⁷Ac Decay Chain



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ²²⁷AcE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 21.773(3) yr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: ²³⁵U decay

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²²⁷ Ac	12.7					4	²²⁷ Th	184.65	0.05	0.9	0.038	0.007	4
²²⁷ Th	49.89	0.07		0.57	0.19	4	²²³ Fr	184.68	0.03		0.22	0.04	
²²³ Fr	49.89	0.07		2.7	1.1		3	²²⁷ Th	204.27	0.17	4	0.20	0.05
²²³ Fr	50.104	0.005		36	8	²²³ Fr		204.95	0.02	0.95		0.19	
²²⁷ Th	50.13	0.01		8.0	0.9	4	²²⁷ Th	205.03	0.09	10	0.15	0.04	4
²²⁷ Ac	55.03			0.070	0.021		²²⁷ Th	206.05	0.05		0.21	0.07	
²²⁷ Ac	69.21	0.04		0.47	0.15	4	²²⁷ Th	210.65	0.05	1	1.11	0.24	3
	76.99	0.1	4.96		2		²²⁷ Th	212.65	0.04		0.06	0.04	
²²³ Fr	79.651	0.005		9.1	1.9	4	²²⁷ Th	212.7	0.3	1.5	0.018	0.006	4
²²⁷ Th	79.72	0.01		1.89	0.27		²²³ Ra	219.0	0.8		0.014	0.006	
²²⁷ Ac	82.0			0.090	0.027	4	²²⁷ Th	219.00	0.13	3	0.103	0.015	4
²²⁷ Th	93.93	0.08	20	1.37	0.18		²²³ Fr	234.800	0.010		3.0	0.6	
²²⁷ Ac	100.0		5	0.66	0.20	3	²²⁷ Th	234.81	0.09	2	0.40	0.15	2
²²⁷ Th	100.27	0.03		0.076	0.017		²²⁷ Th	235.971	0.02		100	12.3	
²²⁷ Th	102.5		2.5			4	²²⁷ Ac	241.7	0.2	3	0.12	0.04	4
	103.06	0.03		0.5			²²³ Ra	249.4	0.3		0.038	0.010	
²²⁷ Ac	106.79	0.06		0.10	0.03	4	²²⁷ Th	250.35	0.05	3	0.086	0.026	3
²²⁷ Th	113.159	0.02	6	0.148	0.016		²²⁷ Th	250.35	0.05		0.34	0.06	
²²⁷ Th	113.16	0.02			0.52	0.05	4	²²³ Ra	251.1	0.3	4	0.041	0.014
²²⁷ Th	117.20	0.05	1.4	0.0170	0.026	²²³ Ra		251.8	0.1	0.067		0.008	
²²⁷ Th	117.5	0.5			0.0123	0.0028	4	²²⁷ Th	256.25	0.02	55	7.0	0.8
²²⁷ Ac	121.53	0.04	9	0.15	0.05	²²⁷ Th		262.91	0.09	1		0.095	0.014
²²³ Ra	122.319	0.010			1.192	0.022	3	²²³ Ra	269.459	0.01	97.8	13.7	0.3392
²¹⁹ Rn	130.59	0.03	0.6	0.119	0.013	²¹⁹ Rn		271.23	0.01	85		10.8	0.7
²²⁷ Ac	134.0		0.6		0.3	4	²²⁷ Th	272.93	0.09	3	0.48	0.09	4
²²⁷ Th	141.49	0.05	0.65	0.12	0.07		²²⁷ Th	279.72	0.09		0.4	0.06	
²²³ Ra	144.232	0.01	23	3.22	0.08	2	²²⁷ Th	285.50	0.09	14	0.048	0.011	4
²²⁷ Ac	147.48	0.04		0.22	0.07		²²⁷ Th	286.122	0.02		1.54	0.20	
²²³ Ra	154.21	0.01	39.8	5.62	0.16	2	²²³ Ra	288.18	0.03	4	0.158	0.005	4
²²³ Ra	158.633	0.010	5.5	0.685	0.017		²²³ Fr	289.68	0.05		0.23	0.05	
²²⁷ Ac	160.26	0.05		0.42	0.13	4	²²⁷ Th	292.41	0.09	3	0.066	0.020	4
²²⁷ Ac	171.90	0.08		0.092	0.029		²¹⁹ Rn	293.54	0.04		0.38	0.073	
²²³ Ra	179.54	0.05	1.73	0.151	0.014	4	²²³ Ra	293.8	0.2		0.0658	0.0010	3

NOTE: ²²⁷Th - Multiply I_γ(%) values by 0.9862% to account for branching from ²²⁷Ac.
²²³Fr - Multiply I_γ(%) values by 0.0138% to account for branching from ²²⁷Ac.

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ²²⁷AcE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

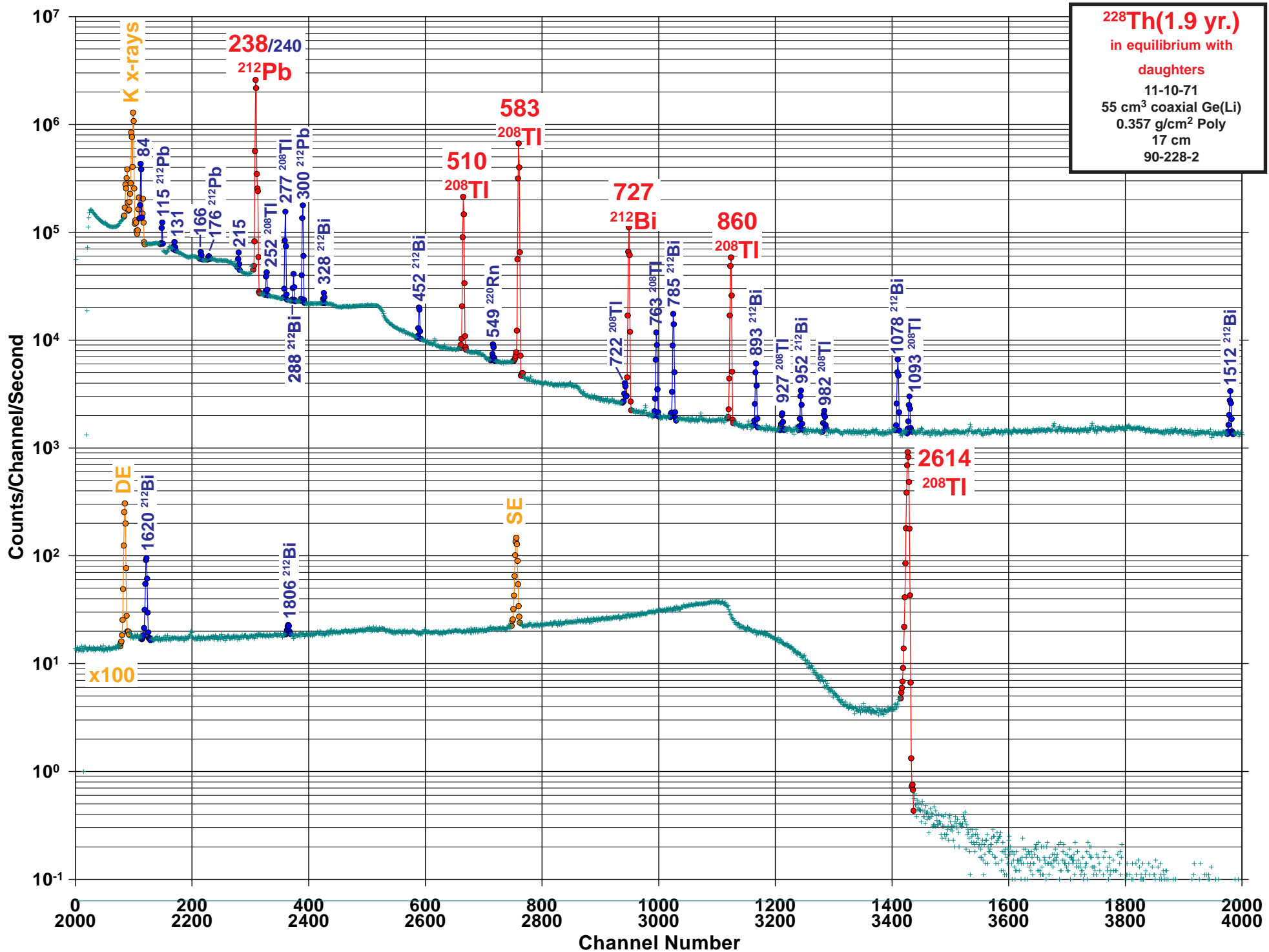
Half Life: 21.773(3) yr.

Detector: 35 cm³ coaxial Ge (Li)Method of Production: ²³⁵U decay

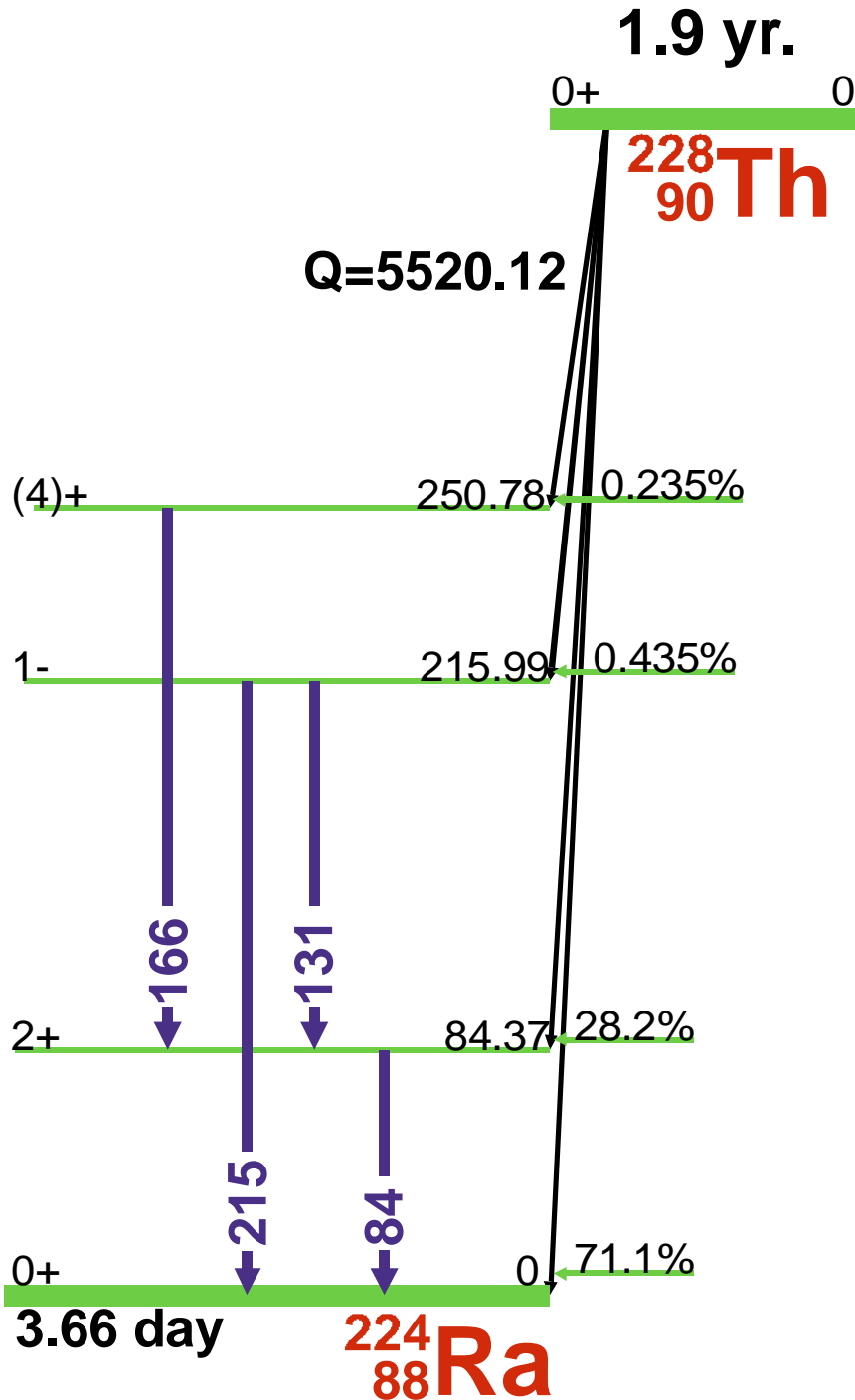
	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²²⁷ Th	296.51	0.05	3.3	0.46	0.08	3	²¹¹ Pb	427.088	0.010	13.1	1.76	0.04	1
²²⁷ Th	300.00	0.03	17	0.34	0.06	1	²²³ Ra	432.1	0.1	0.3	0.0343	0.0028	4
²²⁷ Th	300.00	0.03		2.3	0.3		²²⁷ Th	432.33	0.09		0.0047	0.0011	
²²⁷ Th	304.52	0.02		1.2	0.4	2	²¹⁹ Rn	438.2	0.6	0.4	0.0302	0.0017	4
²²⁷ Th	312.69	0.09	5	0.48	0.09	4	²¹⁵ Po	438.8	0.3		0.04		
²¹¹ Pb	313.59	0.09		0.031	0.004	4	²²³ Ra	439.3		0.081	0.014		
²²⁷ Th	314.78	0.09	4	0.44	0.08	4	²²³ Ra	445.03	0.01	9	1.27	0.05	1
²²³ Fr	319.26	0.02		0.50	0.10	4	²¹⁹ Rn	517.63	0.06	0.36	0.044	0.003	4
²²³ Ra	323.871	0.01	27.5	3.93	0.09	1	²²³ Ra	527.61	0.01	0.52	0.070	0.004	4
²²³ Ra	328.40	0.03		0.206	0.008	4		583	0.07	0.25		0.04	4
²²⁷ Th	329.851	0.02	20.8	2.7	0.4	1	²²³ Ra	598.72	0.02	0.57	0.0932	0.0043	4
²²³ Ra	333.99	0.05		0.100	0.006	3	²¹⁹ Rn	608.3	1.0	0.24	0.0043	0.0022	4
²²⁷ Th	334.381	0.02	8.2	1.05	0.15	2	²²³ Ra	609.32	0.04		0.056	0.003	
²²³ Ra	338.281	0.01	19.2	2.79	0.071	1	²¹¹ Pb	609.38	0.04	0.18	0.043	0.006	4
²²⁷ Th	342.50	0.09	4.8	0.39	0.10	2	²¹⁹ Rn	676.64	0.07		0.0205	0.0024	
²²³ Ra	342.9	0.04		0.219	0.014		²¹¹ Pb	676.69	0.07	0.013	0.004		
²¹¹ Pb	342.91	0.04		0.035	0.005		²¹¹ Pb	704.64	0.03	3.3	0.462	0.011	1
²¹¹ Bi	351.06	0.04	100	12.95	0.11	1	²¹¹ Pb	766.51	0.03	4.7	0.617	0.016	1
²²³ Ra	362.06	0.02	0.53	0.0452	0.0028	4	²¹¹ Pb	832.01	0.03	24.1	3.52	0.06	1
²¹¹ Pb	362.072	0.017		0.0426	0.0026		²⁰⁷ Tl	897.77	0.12	2.1	0.26	0.009	1
²²⁷ Th	362.50	0.14		0.0047	0.001		²¹¹ Pb	1014.64	0.05	0.12	0.0173	0.0005	3
²²³ Ra	371.68	0.02	4	0.479	0.015	2	²¹¹ Pb	1080.16	0.06	0.10	0.0123	0.0007	3
²²⁷ Th	382.4	0.4	0.37	0.0062	0.0007	4	²¹¹ Pb	1109.48	0.05	0.79	0.115	0.004	1
²²³ Ra	382.8	0.3		0.014	0.004			1120					2
²²⁷ Th	383.52	0.09		0.047	0.011	4	²¹¹ Pb	1196.33	0.05	0.07	0.0102	0.0004	3
²¹⁹ Rn	401.81	0.01	45.1	6.4	0.4	1	²¹¹ Pb	1270.71	0.08	0.05	0.0068	0.0005	3
²¹¹ Pb	404.853	0.010	28.2	3.78	0.06	1							

NOTE: ²²⁷Th - Multiply I_γ(%) values by 0.9862% to account for branching from ²²⁷Ac.
²²³Fr - Multiply I_γ(%) values by 0.0138% to account for branching from ²²⁷Ac.

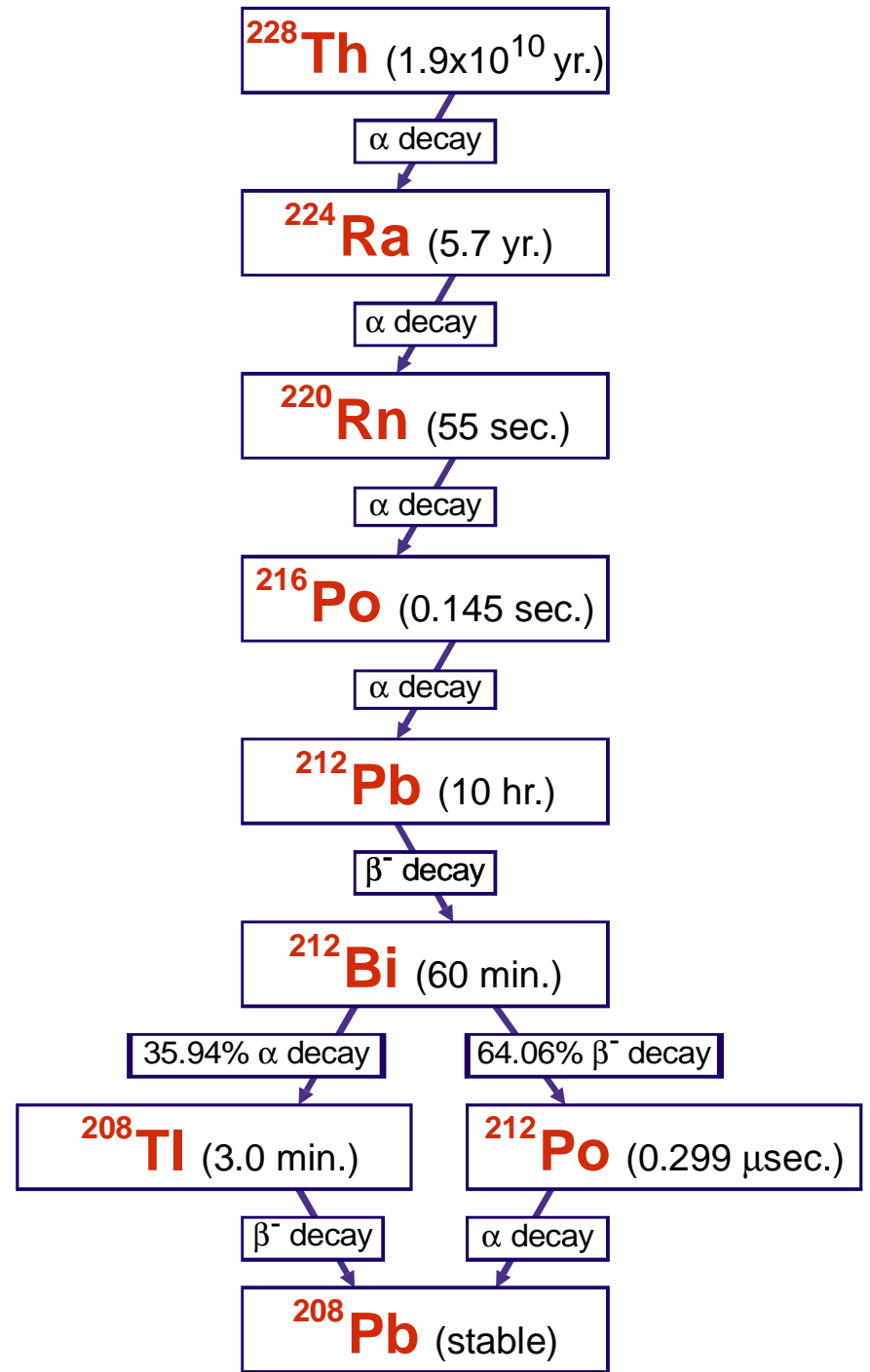




²²⁸Th(1.9 yr.) Decay Scheme



²²⁸Th Decay Chain



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{228}Th E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

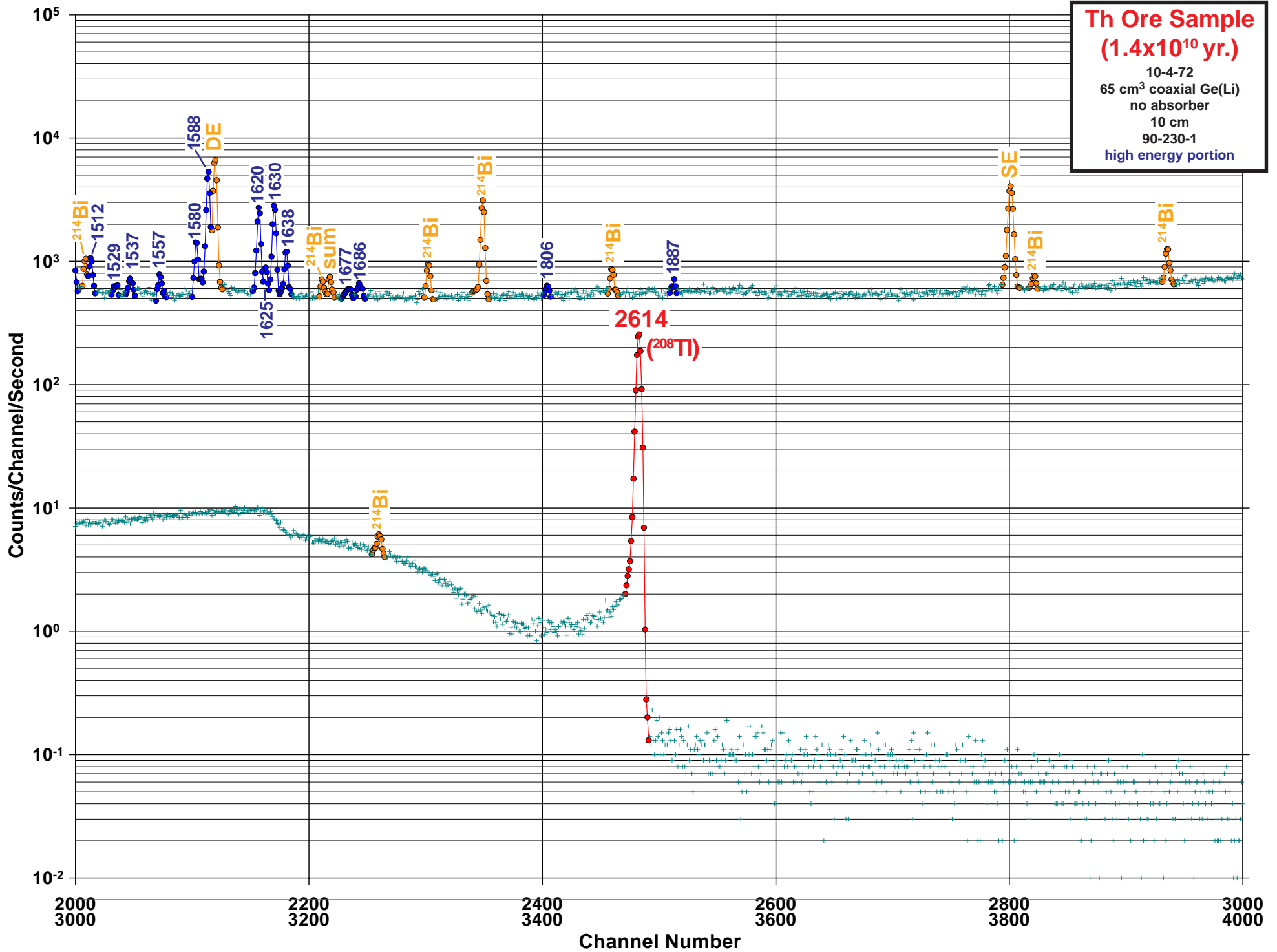
Half Life: 1.9116(16) yr.

Detector: 55 cm³ coaxial Ge (Li)Method of Production: ^{232}Th decay

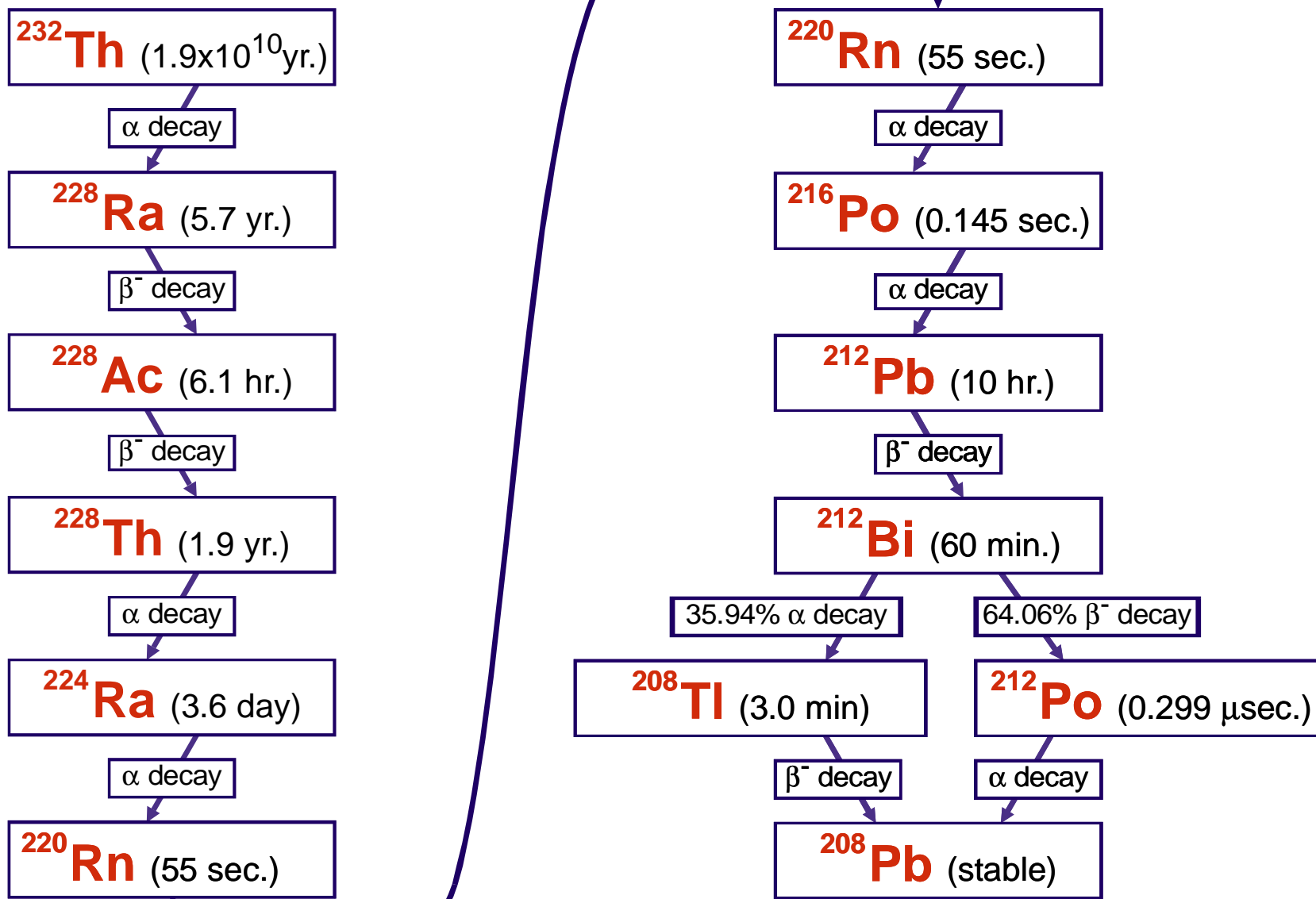
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
^{228}Th	74.40	0.10		0.0004	0.0001	4	^{208}Tl	583.191	0.002	83.2	84.5	0.7	1
^{228}Th	84.376	0.003		1.220	0.020	4	^{228}Th	700.5	0.5				4
^{212}Pb	115.183	0.005		0.592	0.007	4	^{208}Tl	722.04	0.12	0.2	0.201	0.014	4
^{228}Th	131.613	0.004		0.1305	0.0018	4	^{212}Bi	727.330	0.009	18.4	10.27	0.08	1
^{228}Th	142.0	0.5				4	^{228}Th	742.2	0.5				4
^{228}Th	166.410	0.004		0.1036	0.0015	4	^{208}Tl	763.13	0.08	1.68	1.81	0.05	2
^{212}Pb	176.680	0.050	0.15	0.052	0.006	4	^{212}Bi	785.37	0.08	2.95	1.72	0.02	2
^{228}Th	182.20	0.20				4	^{228}Th	832.00	0.20				4
^{228}Th	205.93	0.05		0.0196	0.0006	4	^{208}Tl	860.564	0.005	12.5	12.42	0.10	1
^{228}Th	215.983	0.005	0.78	0.254	0.003	4	^{212}Bi	893.408	0.005	0.94	0.59	0.03	3
^{228}Th	228.50	0.20				4	^{228}Th	908.10	0.10				4
^{212}Pb	238.632	0.002	120	43.3	0.3	1	^{208}Tl	927.60	0.20	0.15	0.131	0.009	4
^{224}Ra	240.986	0.006	10	4.10	0.05	3	^{212}Bi	952.120	0.011	0.65	0.26	0.05	4
^{208}Tl	252.61	0.10	0.80	0.69	0.04	4	^{208}Tl	982.70	0.20	0.2	0.203	0.011	4
^{208}Tl	277.358	0.010	6.34	6.31	0.09	2	^{228}Th	992.9	1.0				4
^{212}Bi	288.20	0.04	0.92	0.938	0.009	4	^{212}Bi	1078.62	0.10	1.51	0.88	0.03	3
^{212}Pb	300.087	0.010	8.76	3.28	0.03	2	^{208}Tl	1093.90	0.20	0.41	0.40	0.03	3
^{212}Bi	328.03	0.04	0.36	0.349	0.017	4	^{212}Bi	1512.7	0.3		0.45	0.06	4
^{212}Bi	452.98	0.05	1.06	1.010	0.009	3	^{212}Bi	1620.50	0.10	4.09	2.32	0.05	3
^{208}Tl	510.77	0.10	22.0	22.6	0.3	1	^{212}Bi	1806.0	0.5		0.14	0.03	4
^{220}Rn	549.73	0.05	0.33	0.114	0.017	4	^{208}Tl	2614.533	0.013	100	99.16		1

NOTE: ^{208}Th - Multiply I_γ (%) values by 0.3594 to account for branching from ^{212}Bi





Th Ore Decay Chain



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: **Thorium Ore (^{232}Th)** E_γ , σE_γ - 1998 ENSDF DataHalf Life: $7.538(39) \times 10^4$ yr.Detector: 65 cm³ coaxial Ge (Li)

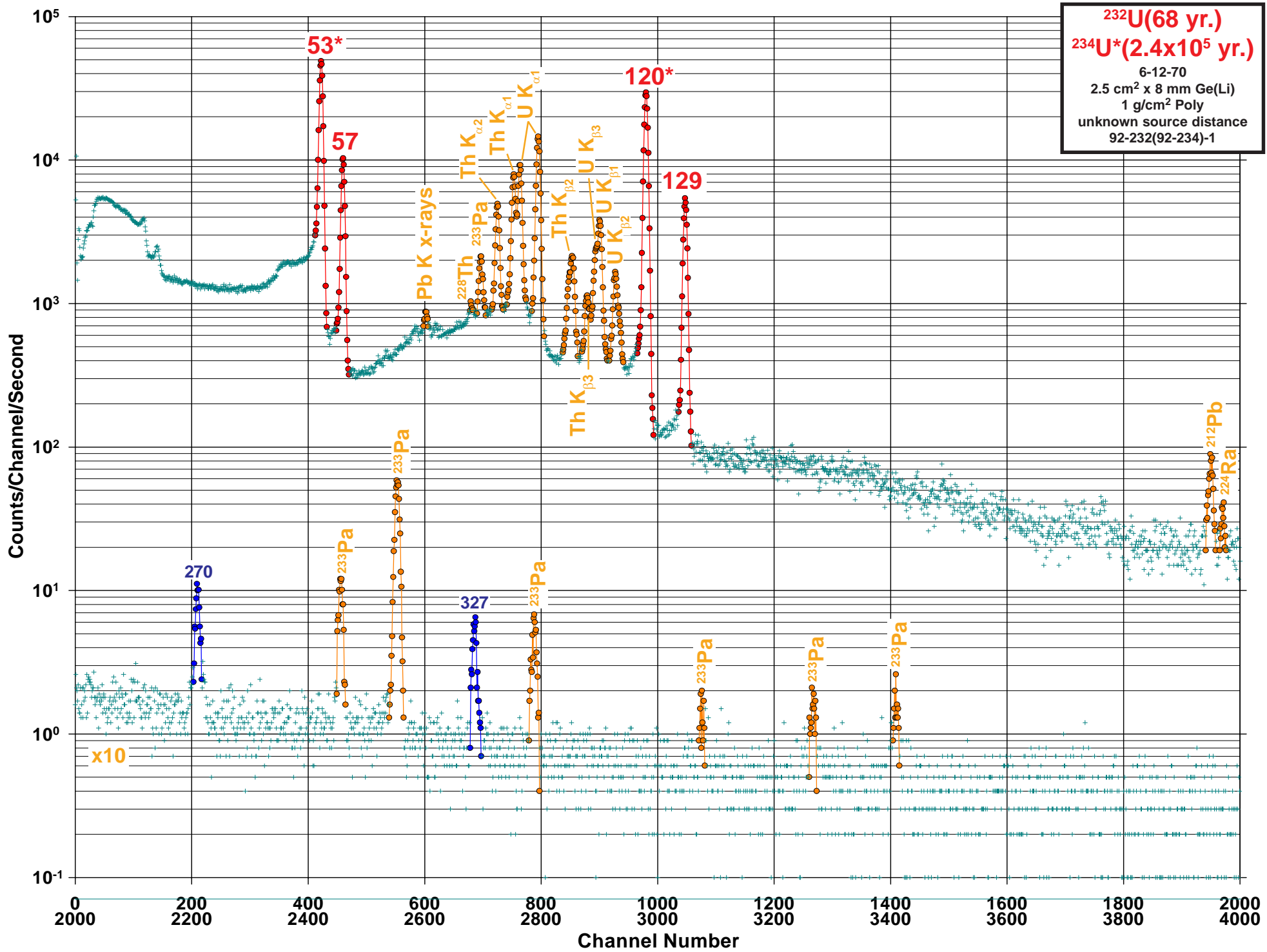
Method of Production: Natural Radioactivity

Isotope	E_γ (keV)	σE_γ	S
^{212}Pb	114.8	0.3	4
^{228}Ac	129.065	0.001	4
	204.2	0.3	4
^{228}Ac	209.253	0.006	3
^{228}Th	215.983	0.005	4
^{212}Pb	238.632	0.002	1
^{224}Ra	240.986	0.006	4
^{208}Tl	252.61	0.10	4
^{228}Ac	270.245	0.002	3
^{208}Tl	277.358	0.010	4
^{212}Bi	288.20	0.04	4
^{212}Bi	295.19	0.05	4
^{214}Pb	295.19	0.05	4
^{212}Pb	300.087	0.010	3
^{228}Ac	321.646	0.008	4
^{212}Bi	328.03	0.04	3
^{228}Ac	328.000	0.006	
^{228}Ac	338.320	0.003	2
^{228}Ac	340.96	0.05	4
^{228}Ac	409.462	0.006	3
^{228}Ac	440.44	0.05	4
^{212}Bi	452.98	0.05	4
^{228}Ac	463.004	0.006	3
^{228}Ac	478.33	0.05	4
^{228}Ac	503.823	0.013	4
^{228}Ac	508.959	0.017	2
^{208}Tl	510.77	0.10	4
^{228}Ac	520.151	0.016	4
^{228}Ac	523.131	0.016	4
^{228}Ac	546.47	0.05	4
^{214}Pb	549.73	0.05	4
^{220}Rn	549.73	0.05	4
^{228}Ac	562.500	0.004	4
^{228}Ac	570.91	0.10	
^{228}Ac	572.14	0.08	

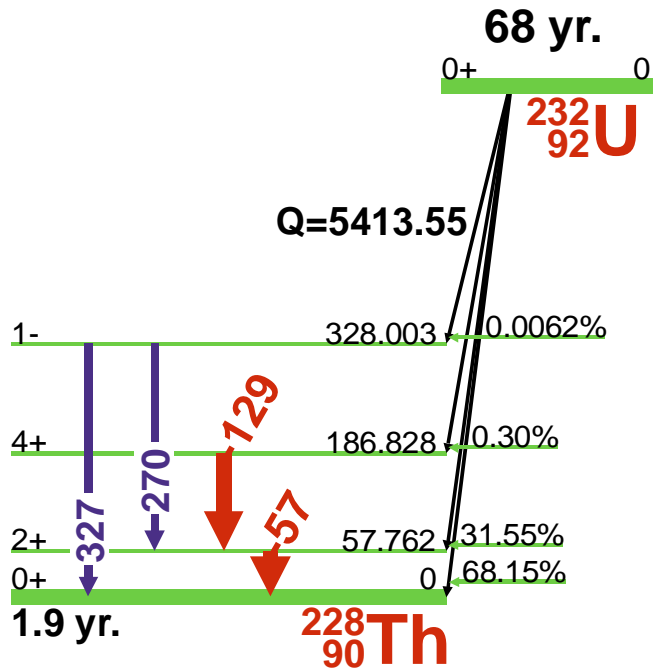
Isotope	E_γ (keV)	σE_γ	S
^{208}Tl	583.191	0.002	1
^{214}Bi	609.321	0.018	2
^{212}Bi	616.02	0.12	4
^{228}Ac	616.22	0.03	4
^{228}Ac	620.38	0.05	4
	640.34	0.30	4
^{214}Bi	651.41	0.30	4
^{228}Ac	651.51	0.03	4
^{214}Bi	665.76	0.14	4
^{228}Ac	666.45	0.10	4
^{228}Ac	701.747	0.014	4
^{212}Bi	727.330	0.009	2
^{228}Ac	755.315	0.004	4
^{208}Tl	763.13	0.08	4
^{214}Bi	768.36	0.20	4
$^{234\text{m}}\text{Pa}$	768.36	0.20	4
^{228}Ac	772.291	0.005	4
^{228}Ac	782.142	0.005	4
^{212}Bi	782.2	0.3	4
^{212}Bi	785.37	0.08	4
^{228}Ac	794.974	0.005	2
^{228}Ac	830.486	0.008	4
^{228}Ac	835.710	0.006	3
^{228}Ac	840.377	0.007	3
^{208}Tl	860.564	0.005	2
^{212}Bi	893.408	0.005	4
^{228}Ac	904.20	0.04	4
^{228}Ac	911.204	0.004	1
	927.9	0.3	4
^{228}Ac	944.196	0.014	4
^{228}Ac	947.982	0.011	4
^{212}Bi	952.120	0.011	4
^{228}Ac	958.61	0.04	4
^{228}Ac	964.766	0.010	2
^{228}Ac	968.971	0.017	1

Isotope	E_γ (keV)	σE_γ	S
	975	2	4
^{208}Tl	982.70	0.20	4
	988.19	0.20	4
^{228}Ac	1033.248	0.009	4
^{228}Ac	1065.18	0.04	4
^{212}Bi	1078.62	0.10	3
^{208}Tl	1093.70	0.20	4
^{228}Ac	1095.679	0.020	
^{228}Ac	1110.610	0.010	
	1133	2	4
^{228}Ac	1153.52	0.04	4
^{228}Ac	1164.50	0.08	4
^{228}Ac	1245.05	0.20	4
^{228}Ac	1247.08	0.04	3
	1287.1	0.3	4
^{228}Ac	1459.138	0.015	
^{40}K	1460.		3
^{228}Ac	1495.91	0.02	3
^{228}Ac	1501.57	0.05	4
^{212}Bi	1512.7	0.3	4
^{228}Ac	1529.05	0.10	4
^{228}Ac	1537.89	0.10	
^{228}Ac	1557.11	0.04	4
^{228}Ac	1580.53	0.03	3
^{228}Ac	1588.20	0.03	2
	1599	2	4
^{212}Bi	1620.50	0.10	2
^{228}Ac	1625.06	0.05	4
^{228}Ac	1630.63	0.01	2
^{228}Ac	1638.281	0.010	3
^{228}Ac	1677.67	0.03	4
^{228}Ac	1686.09	0.07	4
^{212}Bi	1806.0	0.5	3
^{228}Ac	1887.10	0.05	4
^{208}Tl	2614.533	0.013	1

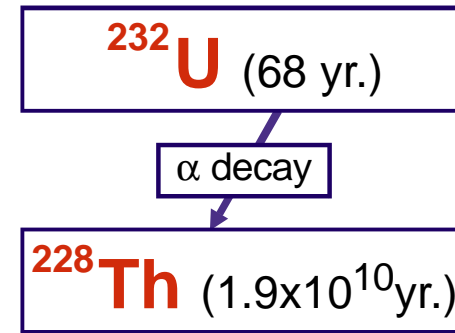




²³²U(68 yr.) Decay Scheme

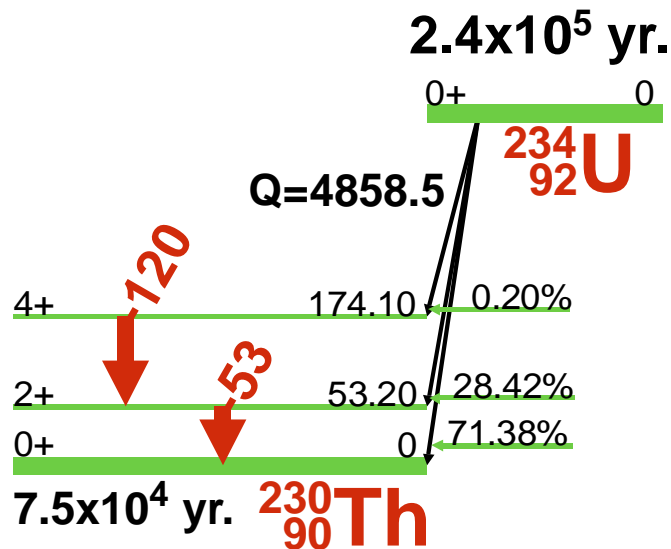


²³²U Decay Chain

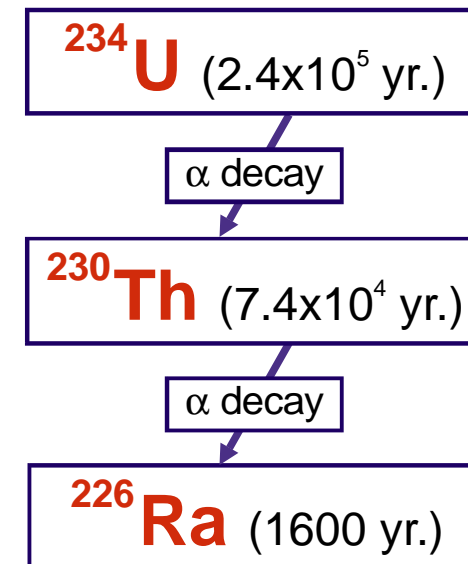


See ²²⁸Th for Chain completion

²³⁴U(2.4x10⁵ yr.) Decay Scheme



²³⁴U Decay Chain



See ²²⁶Ra for Chain completion



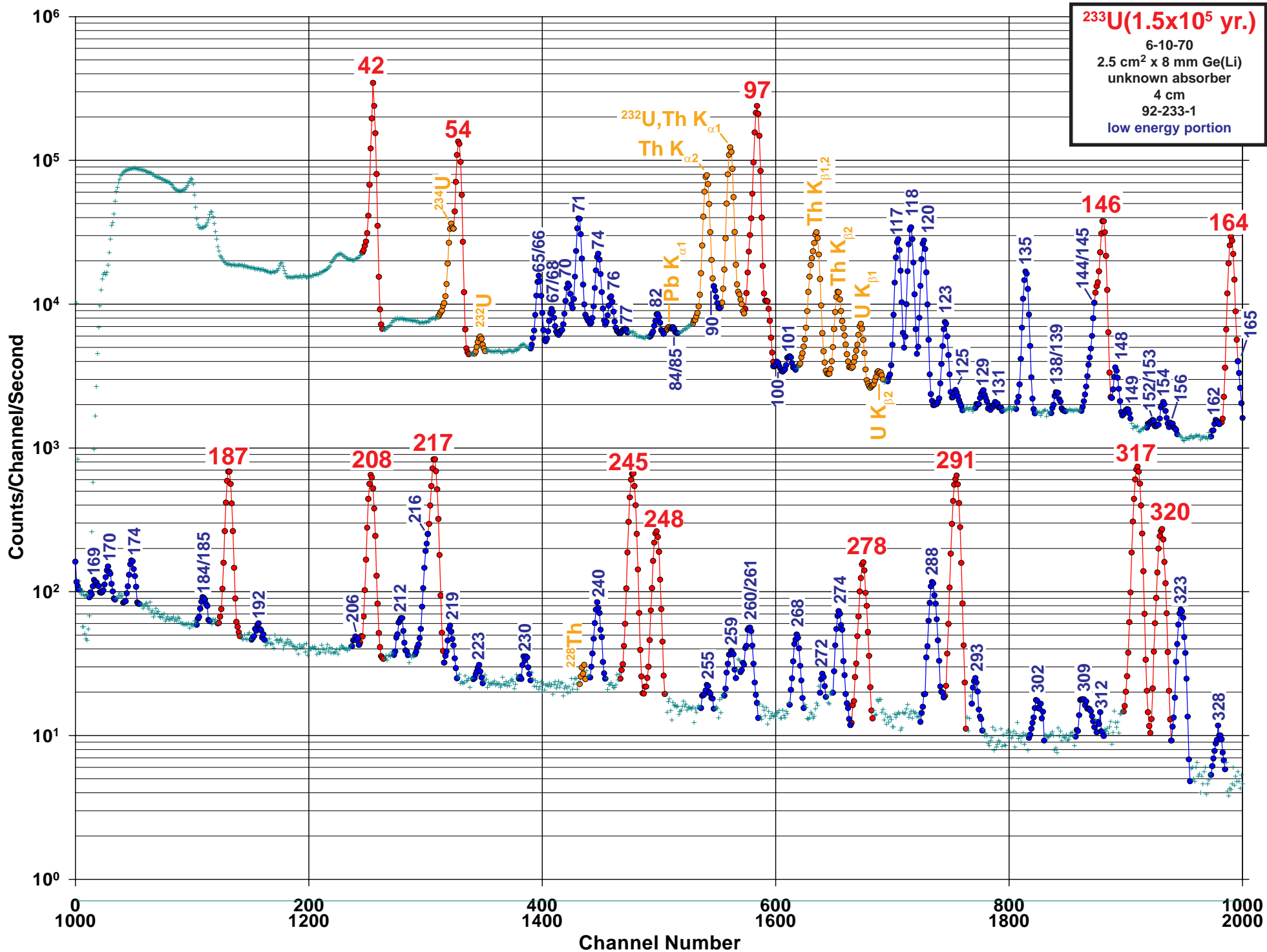
GAMMA-RAY ENERGIES AND INTENSITIES

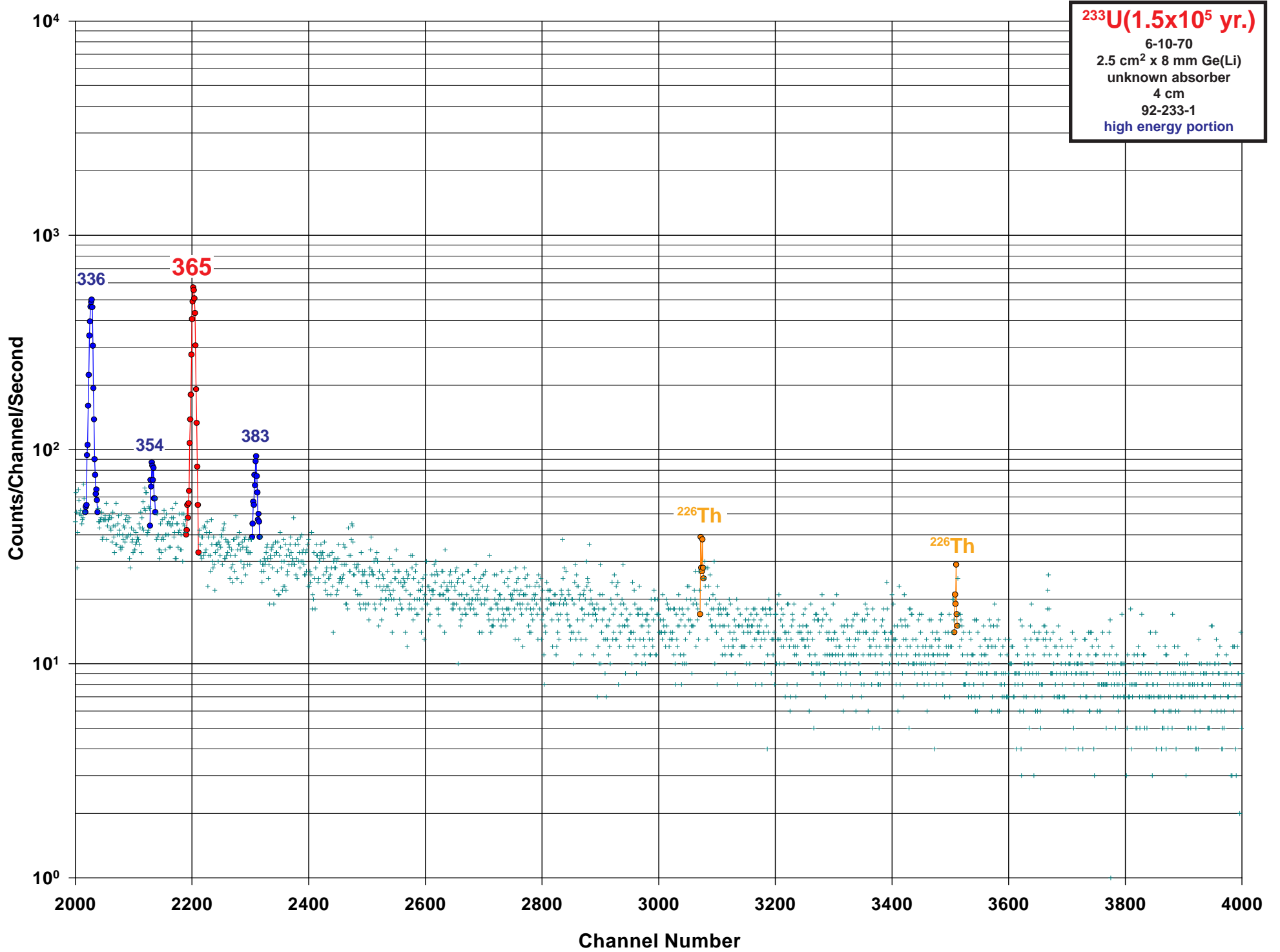
Nuclide: ^{232}U - $^{234}\text{U}^*$ Half Life: 68.9(4) yr. - $2.457 \times 10^5(3)$ yr.*
 Detector: 2.5 cm² x 8 mm Ge (Li) Method of Production: U (m.s.)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
*	53.2	0.02	100	0.123	0.002	1
	57.78	0.05	100.	0.1999	0.0018	1
*	120.9	0.02	34.2	0.0342	0.0005	1
	129.08	0.05	39.0	0.0682	0.0004	1
	141.0	0.5				4
	191.00	0.20				4
	209.5	0.5				4
	270.20	0.20	18.0	0.0032		2
	327.90	0.20		0.0028	0.0001	2
	332.3	0.3				4
	338.10	0.20				4
*	454.95	0.05				4
	478.0	1.0				4
*	503.5	0.2				4
	503.6	0.3				4
*	508.2	0.05				4
	547.0	1.0				4
*	581.7	0.2				4
*	624.4	0.1				4
*	634.9	0.2				4
*	677.6	0.1				4
	773.4	0.5				4
	817.0	1.0				4
	831.0					4

E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

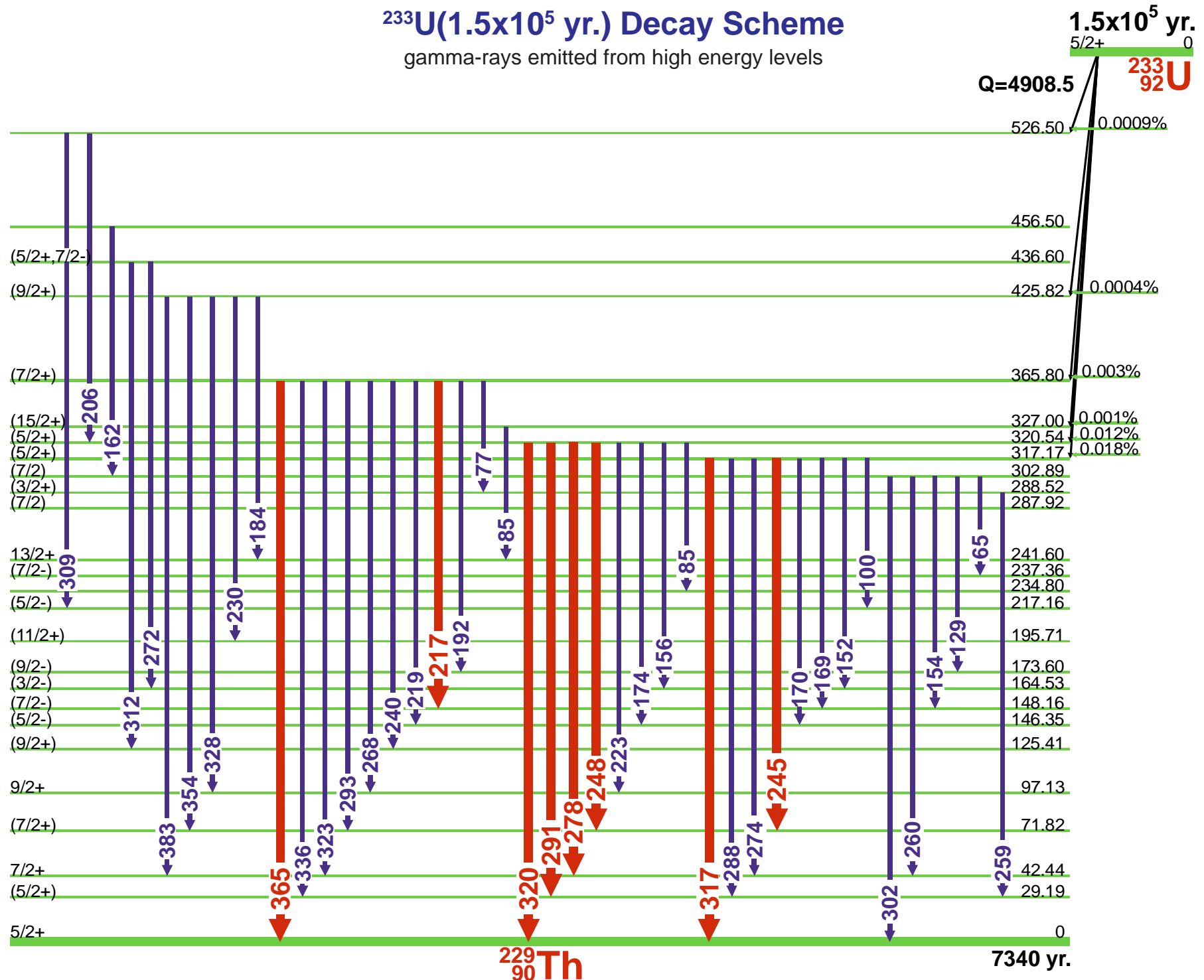






$^{233}\text{U}(1.5 \times 10^5 \text{ yr.})$ Decay Scheme

gamma-rays emitted from high energy levels



^{229}Th

7340 yr.



²³³U(1.5x10⁵ yr.) Decay Scheme

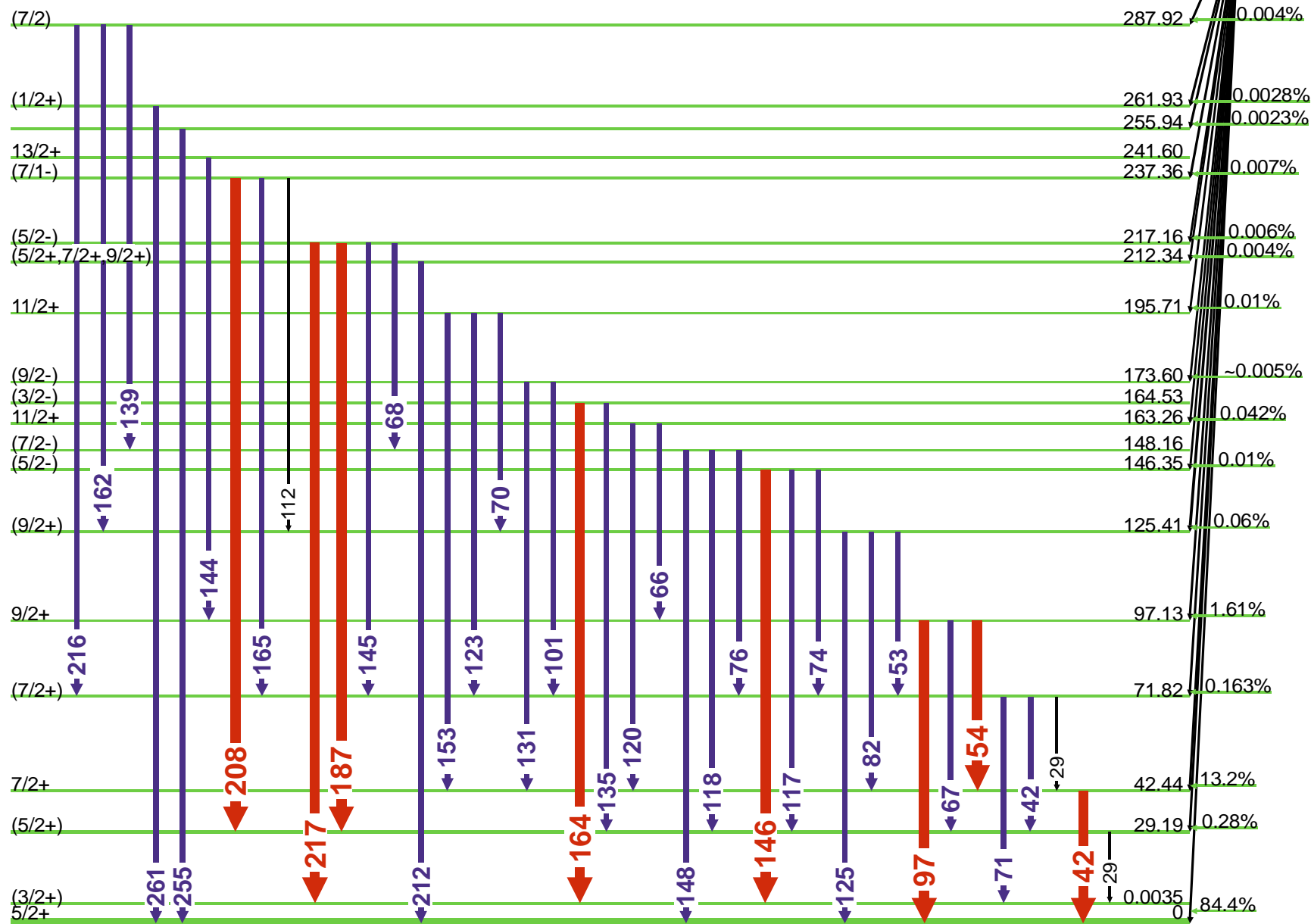
gamma-rays emitted from low energy levels

1.5x10⁵ yr.

5/2+ 0

²³³₉₂U

Q=4908.5



7340 yr.

²²⁹₉₀Th

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GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ^{233}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $1.592(1) \times 10^5$ yr.Detector: $2.5 \text{ cm}^2 \times 8 \text{ mm Ge (Li)}$

Method of Production: U(mass separation)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	25.318	0.004		0.0011	0.0002	4
	25.40					4
	27.20					4
D	29.192	0.001	19.1	0.0120	0.0003	2
	29.36					
	31.52	0.04		0.0003		4
	32.40	0.20		0.0009	0.0001	4
	37.98	0.12		0.0003	0.0001	4
D	42.440	0.020	100.	0.0862	0.0013	1
	42.62					
	50.50					4
	52.62	0.10		0.0002		4
	53.608	0.002		0.0041	0.0003	4
	54.699	0.001	21.9	0.0182	0.0003	1
	63.88	0.15				4
D	65.51	0.18	1.10			3
	66.122	0.005		0.0008	0.0001	
D	67.943	0.006	0.37	0.0003		4
	68.87	0.05		0.0001		
	70.280	0.004	0.85	0.0006	0.0001	3
	71.819	0.002	4.44	0.0024	0.0004	3
	72.88	0.07		0.0005	0.0001	4
	74.57	0.05	2.33	0.0015	0.0002	3
	76.39	0.08	0.85	0.0004	0.0001	4
	77.13	0.04	0.05	0.0007	0.0001	4
	78.15	0.10		0.0001		4
	82.957	0.030	0.21	0.0002		4
	84.50	0.20		0.0001		4
D	85.43		0.05			4
	85.430	0.020		0.0002		
	86.77	0.15		0.0001		4
	87.27	0.11		0.0002		4
	88.46	0.08		0.0004	0.0001	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	91.03	0.10		0.0003	0.0001	4
	96.244	0.002		0.0013	0.0002	4
	97.134	0.001	31.7	0.0203	0.0030	1
	100.03	0.05	0.053	0.0001		4
	101.77	0.07	0.11	0.0001		4
	103.60	0.20		0.0001		4
	109.50	0.10	0.53	0.0003		3
	112.00	0.10	0.68	0.0005	0.0001	3
	114.4	0.3		0.0002		4
	116.41	0.07		0.0002		4
	117.159	0.002	4.55	0.0023	0.0004	2
	118.968	0.002	5.72	0.0041		2
	120.816	0.001	4.70	0.0033		2
	123.893	0.005	1.11	0.0006	0.0001	3
	125.41	0.06	0.16	0.0001		4
	129.25	0.15		0.0001		4
	131.20	0.20	0.10			4
	135.36	0.03	3.40	0.0023		2
D	138.50		0.16			4
	139.76	0.06		0.0001		
	141.60					4
D	144.40	0.20	2.75	0.0003		3
	145.337	0.004		0.0015	0.0003	
	146.345	0.002	9.73	0.0066	0.0001	1
	148.156	0.008	0.53	0.0003	0.0001	3
	149.83	0.12	0.16	0.0001		4
D	152.60		0.16			4
	153.10	0.20		0.0001		
	154.77	0.12	0.25	0.0001		4
	156.14	0.16	0.10	0.0001		4
D	162.40		0.21			4
	162.40	0.20		0.0001		
	164.522	0.002	9.40	0.0062	0.0001	1



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ^{233}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $1.592(1) \times 10^5$ yr.Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: U(mass separation)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	165.70	0.10	0.75	0.0004	0.0001	3
	169.01	0.05	0.16	0.0001		4
	170.84	0.05	0.25	0.0001		3
	172.36	0.12				4
	174.19	0.05	0.48	0.0002		3
	176.13	0.07				4
	177.81	0.06				4
D	184.30	0.20				4
	185.810	0.020				4
	187.969	0.002	2.96	0.0019	0.0003	1
	192.13	0.04	0.16			4
	200.70	0.10				4
	206.00	0.12	0.10	0.0001		4
	208.171	0.002	3.60	0.0023		1
	212.34	0.05	0.16	0.0001		3
	216.08	0.10	1.37	0.0006	0.0001	3
D	217.159	0.002	4.34	0.0032	0.0005	1
	217.70					
	219.38	0.05	0.26	0.0001		3
	223.30	0.20	0.05			4
	225.0	0.3				4
	226.7	0.3				4
	228.10	0.10				4
	230.110	0.020	0.16	0.0001		4
	236.42	0.21				4
	240.39	0.06	0.48	0.0004	0.0001	3
	245.345	0.002	5.66	0.0036		1
	248.726	0.006	2.28	0.0014	0.0002	1
	252.53	0.11				4
	255.94	0.04	0.10			4
	259.33	0.04	0.32	0.0002		3
D	260.65	0.22	0.48	0.0001		3
	261.92	0.05		0.0003	0.0001	

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	268.66	0.03	0.42	0.0002		3
	272.34	0.05	0.16	0.0001		4
	274.728	0.010	0.90	0.0004	0.0001	2
	278.111	0.008	1.70	0.0011	0.0002	1
	284.25	0.15				4
	288.033	0.005	1.42	0.0010	0.0001	2
	291.354	0.004	8.46	0.0054		1
	293.91	0.04	0.21	0.0001		3
	295.2	0.5				4
	302.89	0.10	0.16	0.0001		4
	309.50	0.20	0.16	0.0001		4
	312.0	0.5				4
	317.160	0.010	12.2	0.0078	0.0001	1
	320.541	0.005	4.60	0.0029		1
	323.42	0.05	1.32	0.0008	0.0001	2
	328.537	0.011	0.16	0.0001		3
	336.610	0.020	0.90	0.0005	0.0001	2
	338.9	0.5				4
	351.810	0.010				4
	354.03	0.03	0.16	0.0001		4
	365.790	0.010	1.32	0.0008	0.0001	1
	383.47	0.08	0.16	0.0001		3
	384.0	0.5				4
	393.70	0.15				4
	393.7					4
	396.70	0.10				4
	402.40	0.20				4
	406.7	0.3				4
	416.40	0.20				4
	436.6	0.4				4
	449.50	0.20				4
	459.80	0.20				4
	471.10	0.20				4



GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

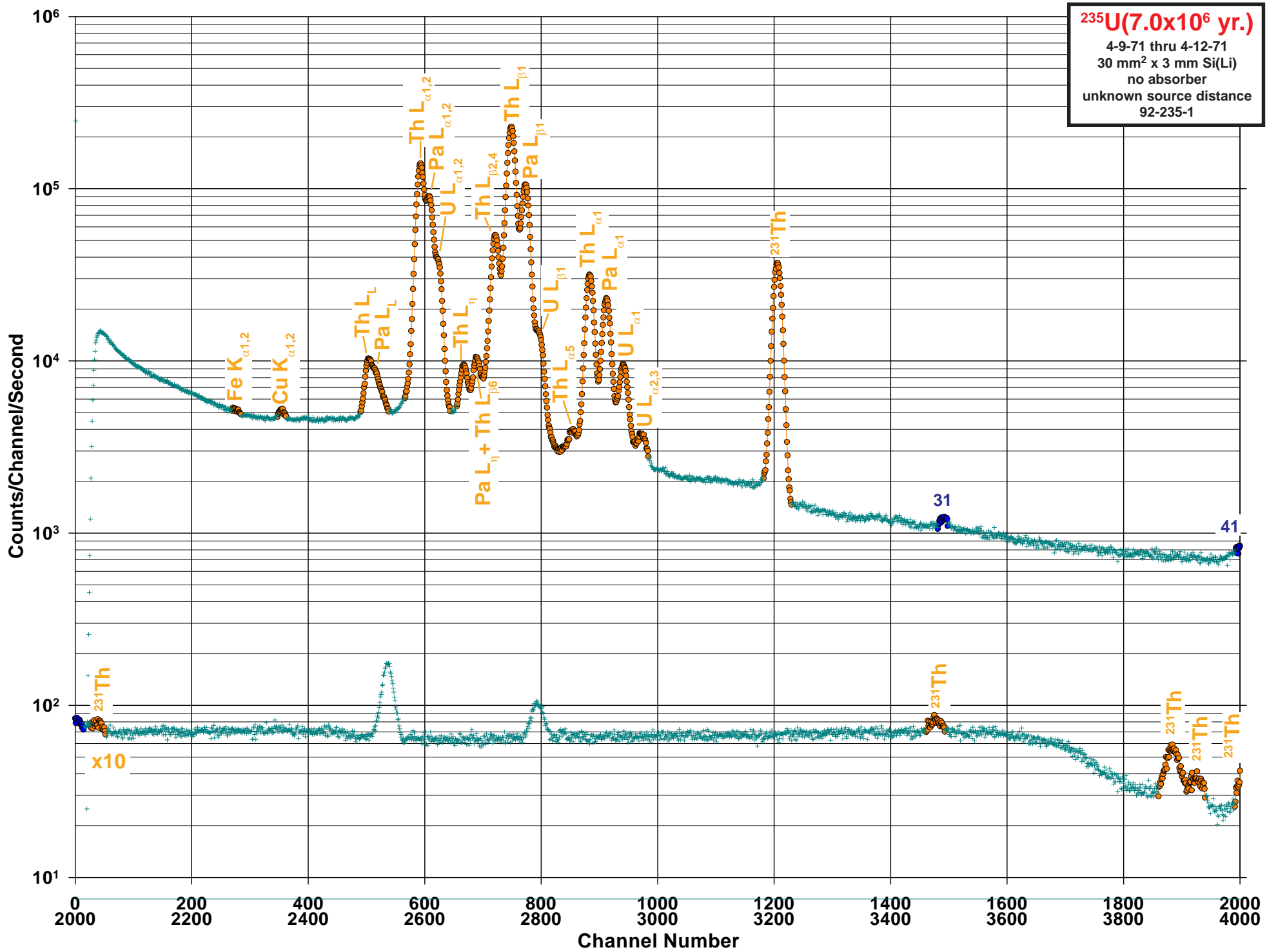
Nuclide: ^{233}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $1.592(1) \times 10^5$ yr.Detector: $2.5 \text{ cm}^2 \times 8 \text{ mm Ge (Li)}$

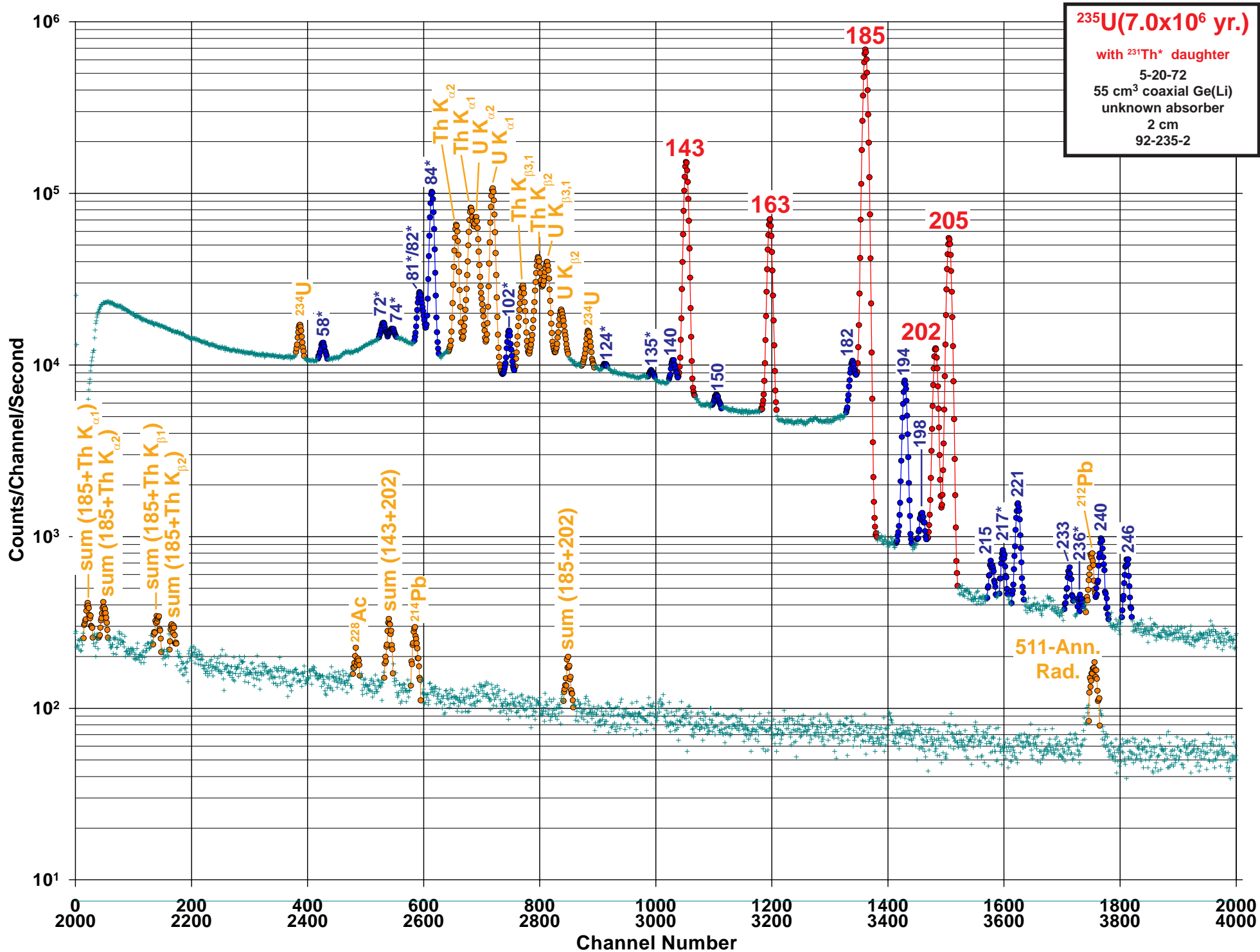
Method of Production: U(mass separation)

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
478.60	0.20				4
484.10	0.20				4
514.0	0.5				4
537.6	0.5				4
540.30	0.20				4
545.1	0.3				4
562.8	0.5				4
569.40	0.20				4
578.50	0.20				4
620.90	0.20				4

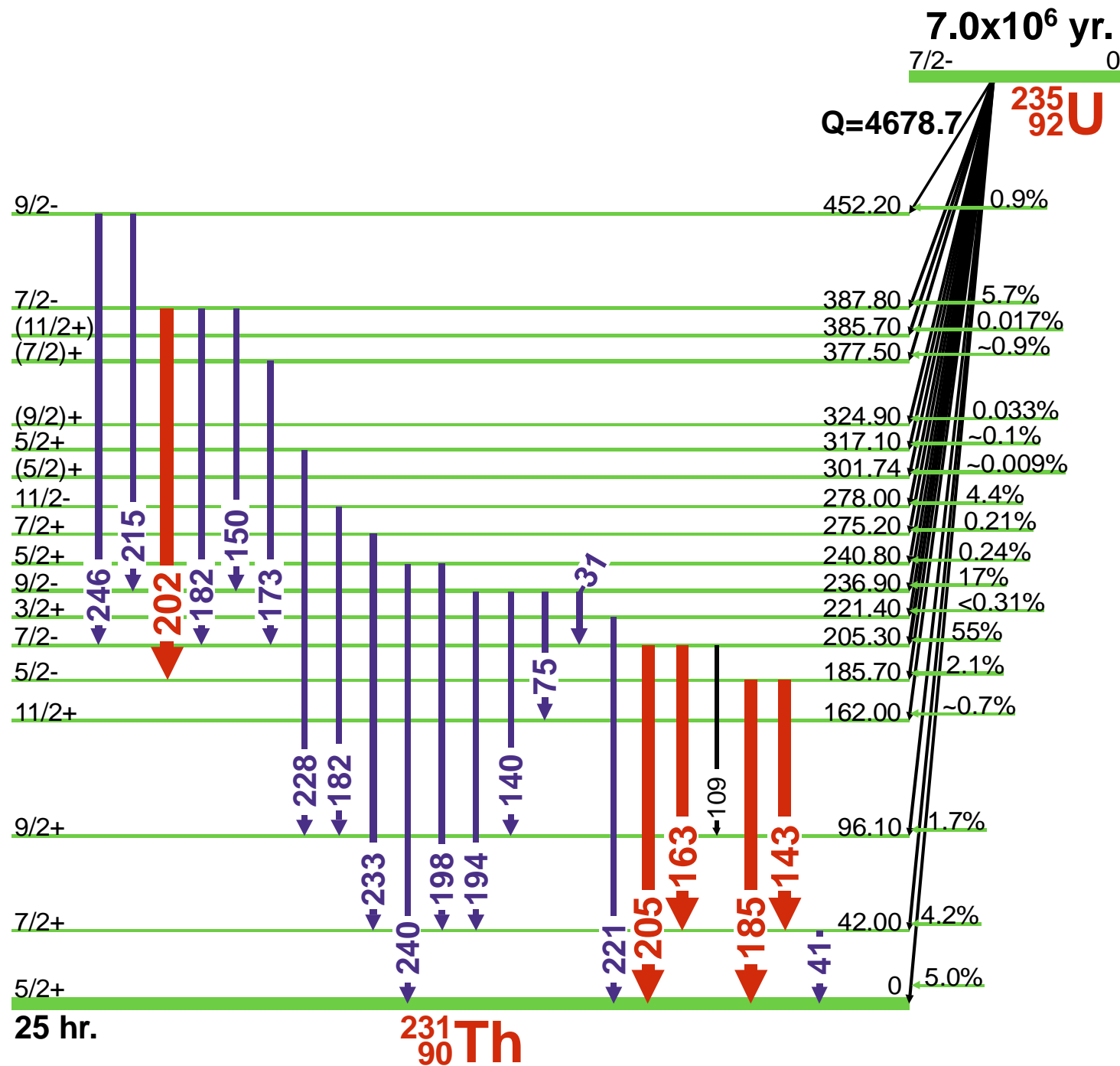
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
657.00	0.20				4
707.50	0.20				4
710.8	0.5				4
826.3	0.5				4
867.9	0.4				4
920.0	1.0				4
1003.0	1.0				4
1055.0	1.0				4
1119.0	1.0				4



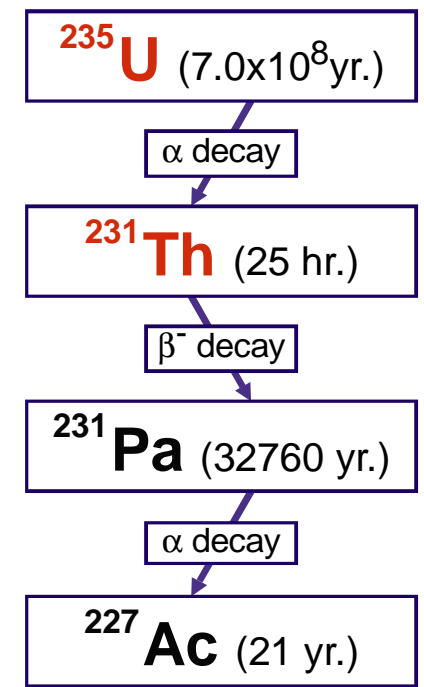




²³⁵U(7.0x10⁶ yr.) Decay Scheme



²³⁵U Decay Chain



See ²²⁷Ac for Chain completion



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{235}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: 7.038(5) x10⁶ yr.Detector: 30 mm² x 3 mm Si (Li)

Method of Production: U(mass separation)

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	19.59					4		143.760	0.020	18.0	10.96	0.14	1
	31.60	0.05		0.016	0.005	4		147.00					4
^{231}Th	32.73	0.05		0.073	0.004	4		150.930	0.020	0.20	0.076	0.010	4
	34.70	0.10		0.0370	0.0004	4	^{231}Th	163.101	0.005		0.155	0.009	4
	41.4	0.3		0.030	0.020	4		163.330	0.020	8.52	5.08	0.06	1
^{231}Th	41.55	0.05		0.016	0.001	4		173.3	1.0	0.03	0.010	0.005	4
	41.96	0.15		0.060	0.010	4	D	182.10		0.74			4
^{231}Th	42.22	0.05		0.052	0.003	4	^{231}Th	182.61	0.05		0.340	0.020	4
	51.22	0.10		0.020	0.015	4		183.50	0.02		0.0329	0.013	4
	54.10	0.10		0.0020		4		185.715	0.005	100.	57.2	0.8	1
	54.25	0.05		0.0300	0.0003	4		194.940	0.010	1.20	0.630	0.012	2
^{231}Th	58.570	0.003		0.48	0.02	3		198.900	0.020	0.05	0.042	0.006	4
	60.50					4		202.110	0.020	1.54	1.080	0.023	1
	64.370	0.020		0.0400	0.0004	4		205.311	0.010	9.08	5.01	0.07	1
	72.70	0.20		0.1100	0.0011	4	^{231}Th	215.28	0.03	0.05	0.027	0.003	4
^{231}Th	72.751	0.003		0.251	0.015	4		217.94	0.03		0.040	0.03	4
	73.72	0.05		0.0100	0.0001	4		221.380	0.020	0.22	0.120	0.010	3
	75.02	0.05	0.25	0.060	0.010	4		228.78	0.05	0.015	0.008	0.003	4
^{231}Th	81.228	0.003		0.89	0.05	4		233.50	0.03	0.075	0.029	0.005	4
^{231}Th	82.087	0.003		0.40	0.03	4	^{231}Th	236.01	0.03		0.0092	0.0006	4
^{231}Th	84.214	0.003		6.6	0.3	2		240.87	0.03	0.14	0.075	0.006	3
^{231}Th	89.95	0.02		0.94	0.06	4		246.84	0.04	0.11	0.053	0.003	3
	94.	5.				4		251.50	0.10		0.0400	0.0004	4
	95.70					4		266.45	0.05		0.0060	0.0020	4
	96.090	0.020		0.086	0.011	4		275.129			0.042	0.005	4
^{231}Th	102.270	0.003		0.41	0.03	4		275.43	0.10		0.0070	0.0020	4
	109.160	0.020	2.77	1.54	0.05	4		279.50	0.05		0.2700	0.0027	4
	115.45	0.05		0.07	0.04	4		281.42	0.05		0.0060	0.0001	4
	120.35	0.05		0.0260	0.0003	4		282.92	0.05		0.0050	0.0020	4
^{231}Th	124.914	0.017		0.056	0.003	4		289.56	0.04		0.0070	0.0001	4
^{231}Th	135.664	0.011		0.078	0.005	4		291.20					4
	136.55	0.05		0.0120	0.0001	4		291.65	0.03		0.038	0.005	4
	140.76	0.04	0.31	0.220	0.020	4		301.70	0.10		0.0050	0.0001	4
	142.40	0.05		0.0050	0.0001	4							

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

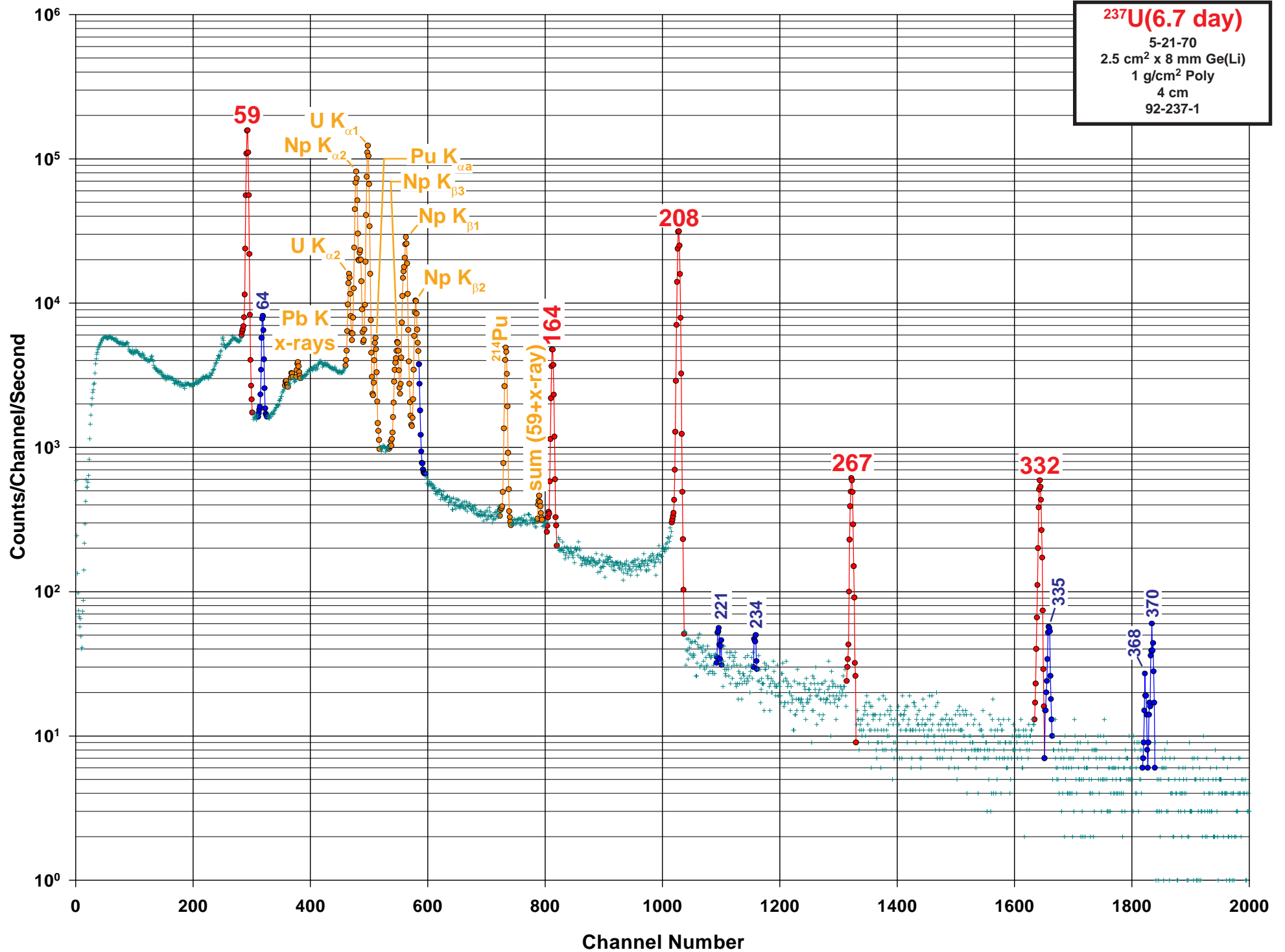
Nuclide: ^{235}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $7.038(5) \times 10^6$ yr.Detector: $30 \text{ mm}^2 \times 3 \text{ mm Si (Li)}$

Method of Production: U(mass separation)

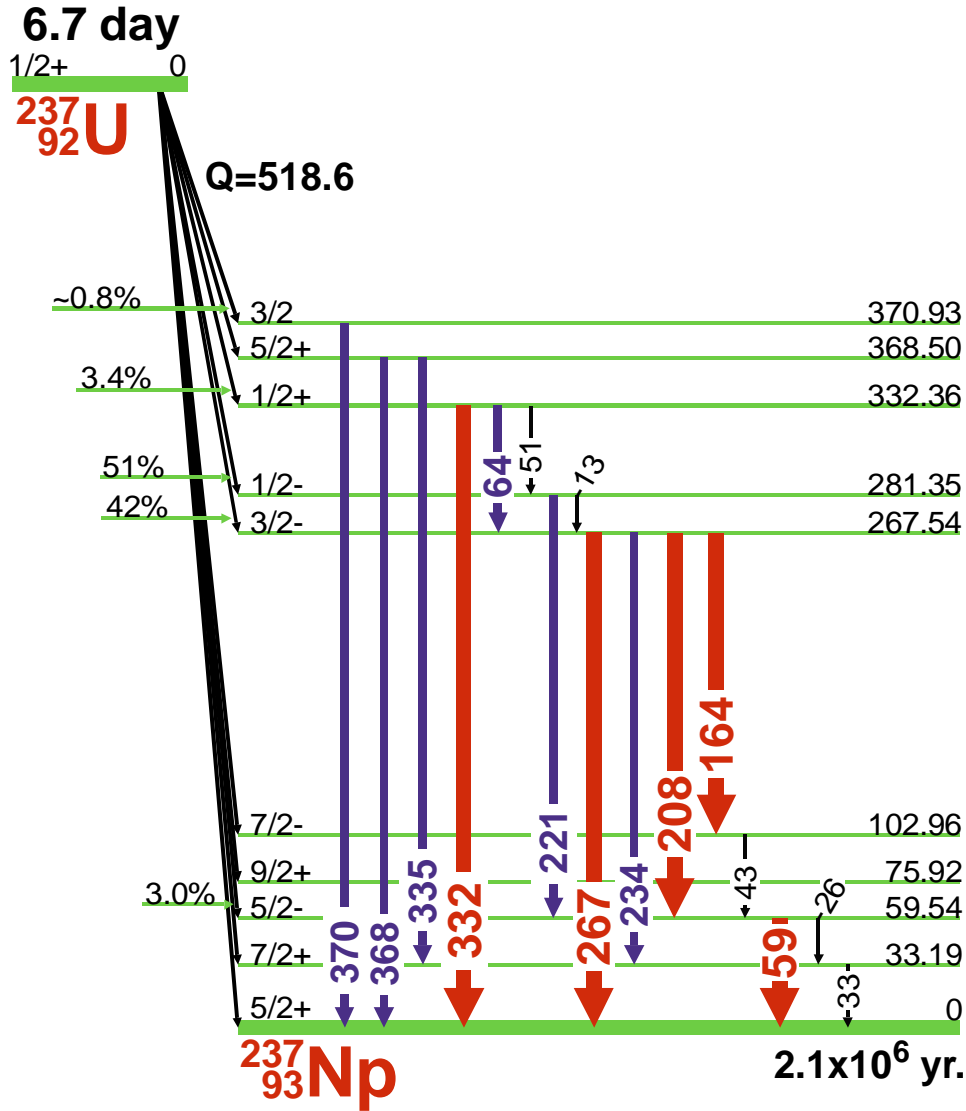
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
^{231}Th	310.69	0.06		0.0040		4
	311.00	0.05		0.0029	0.0002	4
	317.10	0.08		0.0010		4
	325.80	0.10		0.0004		4
	343.50	0.20		0.0030		4
	345.90	0.03		0.038	0.005	4
	356.03	0.05		0.0050	0.0001	4
	387.82	0.03		0.038	0.005	4

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	390.30	0.20		0.040	0.010	4
	410.29	0.04		0.0030		4
	433.0	0.5		0.0040		4
	448.40	0.06		0.0010		4
	455.10	0.10		0.0080	0.0001	4
	517.2			0.0004		4
	742.50	0.20		0.0004		4
	794.70	0.10		0.0006		4





²³⁷U(6.7 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²³⁷U

Half Life: 6.75(1) day

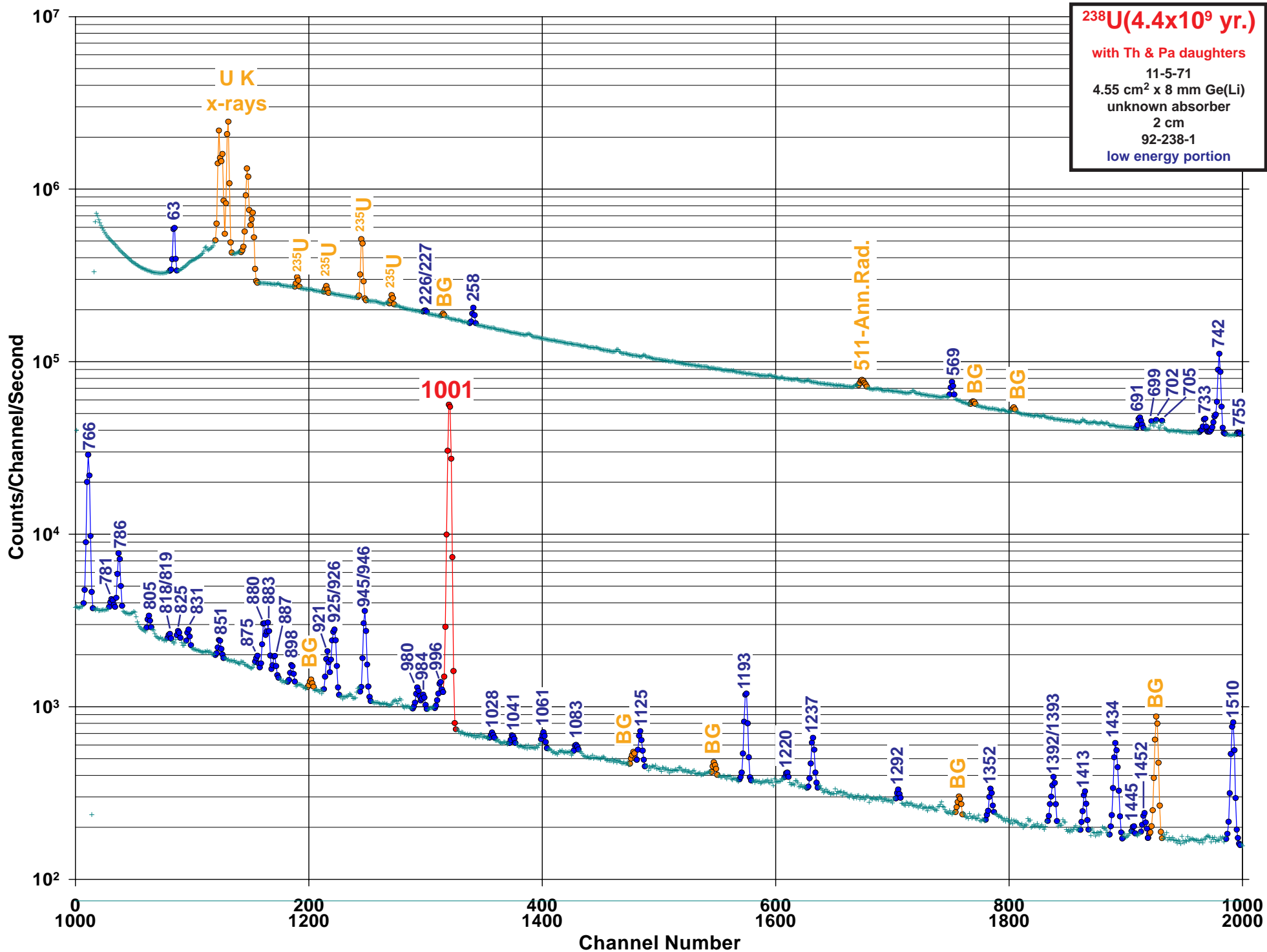
Detector: 2.5 cm² x 8 mm Ge (Li)

Method of Production: ²³⁸U(γ,n)

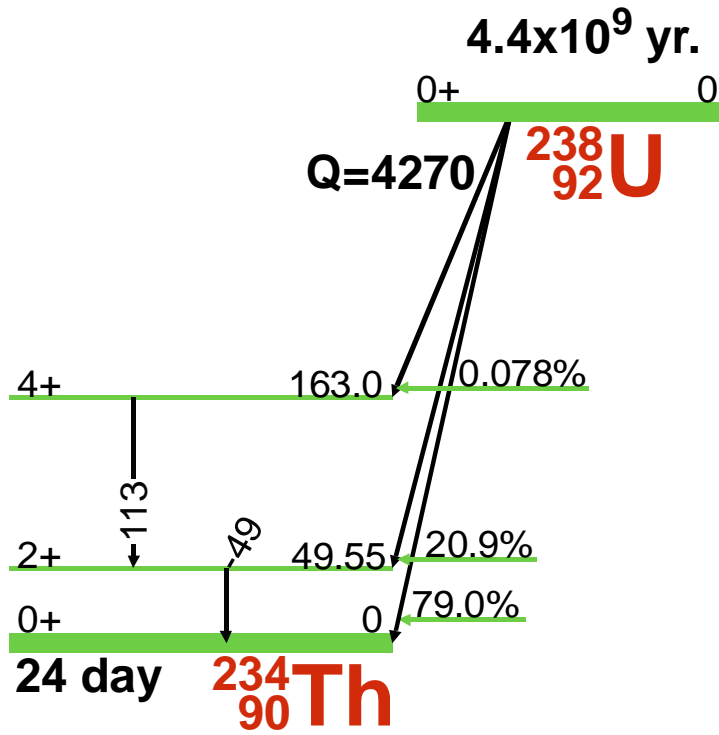
E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
2.3					
13.81	0.02		0.099	0.004	
26.348	0.01		2.43	0.06	
33.195	0.011		0.13	0.005	
38.54	0.03		<0.021		
42.73					
43.423	0.02		0.024	0.002	
51.01	0.03		0.34	0.01	
59.536	0.003	100	34.5	0.8	1
64.83	0.02	3.61	1.282	0.017	3
69.76	0.03		0.00095	0.00019	
75.8	0.2				
102.98	0.02		0.0064	0.0009	
114.09	0.05				
164.61	0.02	5.56	1.86	0.03	1
208	0.01	64.72	21.2	0.3	1
221.8	0.04	0.05	0.0212	0.0007	4
234.4	0.04	0.08	0.0205	0.0007	4
267.54	0.04	2.3	0.712	0.01	1
292.7	0.1		0.0025	0.0007	
309.1			0.00027		
332.36	0.04	3.61	1.2	0.0016	1
335.38	0.04	0.33	0.0951	0.0022	2
337.7	0.2		0.0089	0.0005	
340.45			0.00165	0.00033	
368.59	0.04	0.13	0.0392	0.0017	3
370.94	0.04	0.38	0.1073	0.0017	2

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

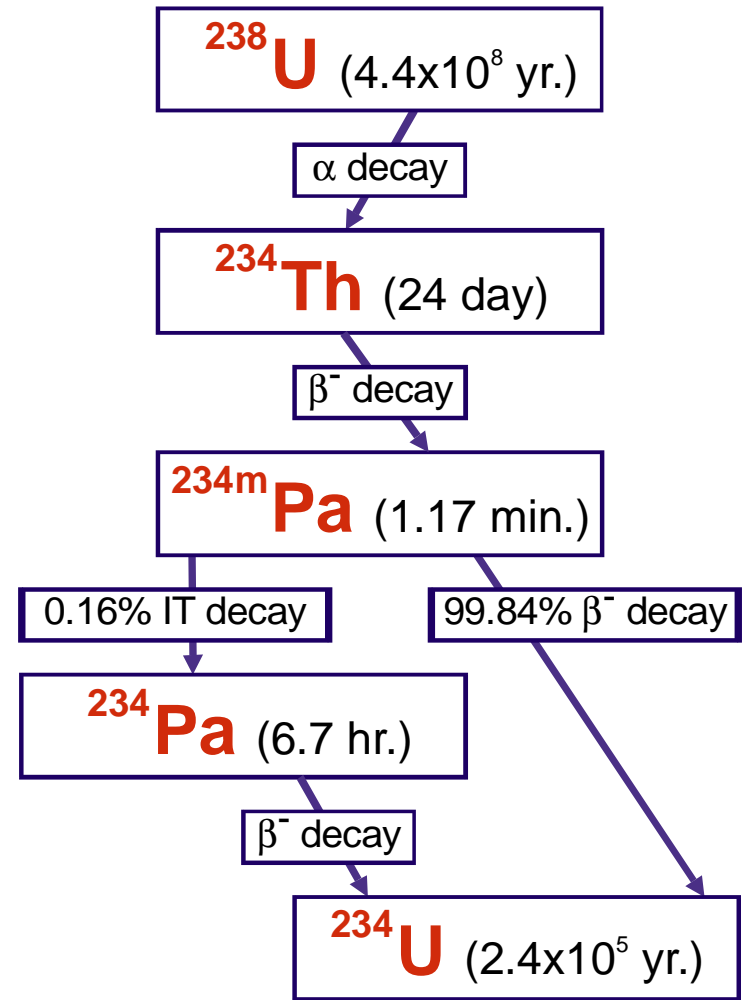




^{238}U (4.4×10^9 yr.) Decay Scheme



^{238}U Decay Chain



See ^{234}U for Chain completion



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ²³⁸U with Th & Pa DaughtersE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF DataHalf Life: 4.468(3) x 10⁹ yr.Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: natural U

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S		E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
²³⁸ U	49.55	0.06		0.064	0.008	4	²³⁴ Pa	824.2	0.2		1.24	0.16	
²³⁴ Th	63.29	0.02		4.8	0.6	3	²³⁴ Pa	825.1	0.2	0.9	1.88	0.21	4
²³⁴ Th	92.38	0.01		2.81	0.26	4	^{234m} Pa	825.6	0.5		0.0014	0.0003	
²³⁴ Th	92.80	0.02		2.77	0.26	4	²³⁴ Pa	831.5	0.1	1.5	4.1	0.4	4
²³⁸ U	113.5	0.1		0.0102	0.0015	4	^{234m} Pa	851.57	0.10	0.95	0.0062	0.0006	4
²³⁴ Pa	131.30	0.01	0.433	18.0	1.7	3	²³⁴ Pa	876.0	0.1	0.085	2.52	0.24	4
²³⁴ Pa	186.15	0.02	23.3	1.76	0.20	3	²³⁴ Pa	880.5	0.1		4.2	0.4	4
²³⁴ Pa D	226.50	0.03	2.83	4.2	0.5	4	²³⁴ Pa	880.5	0.1		6.2	0.6	
²³⁴ Pa D	227.25	0.03		5.8	0.6	4	^{234m} Pa	880.9	0.5	3.17	0.0038	0.0005	3
^{234m} Pa	258.26	0.1	3.6	0.0729	0.0004	4	^{234m} Pa	883.24	0.04		0.0017	0.0005	4
^{234m} Pa D	387.6	0.8	0.06	0.0005		4	^{234m} Pa	883.24	0.04		0.0018	0.0003	4
^{234m} Pa D	387.6	0.8		0.0010	0.0002			²³⁴ Pa	883.24	0.04	3	9.6	1.1
²³⁴ Pa	568.9	0.2		3.6	0.5	4	^{234m} Pa	887.28	0.10	1	0.0071	0.0001	4
²³⁴ Pa	569.5	0.1	2.16	8.2	1.1	3	²³⁴ Pa	898.67	0.05	1	3.2445	0.3764	4
^{234m} Pa	691.0	0.3	1.3	0.0078	0.0007	4	^{234m} Pa	921.7	0.1	2.16	0.0127	0.0001	4
²³⁴ Pa	699.0	1.0	0.78	0.0008	0.0002	4	²³⁴ Pa D	925.0	0.1	4.3	7.8	0.9	3
²³⁴ Pa	699.03	0.05		3.6	0.4			²³⁴ Pa D	926.0		0.2	1.7	
^{234m} Pa	702.05	0.1	0.85	0.0071	0.0002	4	^{234m} Pa	926.61	0.10		0.0012	0.0001	
^{234m} Pa	705.90	0.10		0.0040	0.0005	4	²³⁴ Pa	926.72	0.15		7.2	1.2	
²³⁴ Pa	705.9	0.1		2.27	0.24	4	^{234m} Pa	936.3	1	0.13	0.0018	0.0005	4
²³⁴ Pa	733.39	0.05	1.13	6.9	0.8	4	^{234m} Pa	945.90	0.10	4.5	0.0099	0.0010	3
^{234m} Pa	739.95	0.10		0.0117	0.0003	4	²³⁴ Pa	946.00	0.03		3.4	1.5	
^{234m} Pa	742.81	0.03	12.2	0.080	0.004	3	²³⁴ Pa	980.3	0.1	0.67	1.75	0.17	4
²³⁴ Pa	742.81	0.03		2.06	0.225			²³⁴ Pa	980.3		0.1	2.68	
²³⁴ Pa	755.0	.01		1.22	0.13	4	²³⁴ Pa	984.2	0.1	0.35	1.62	0.22	4
^{234m} Pa	766.36	0.02	40	0.294	0.012	2	^{234m} Pa	996.1	2.0	1.02	0.0041	0.0007	4
^{234m} Pa	781.37	0.10	1.17	0.0078	0.0002	4	^{234m} Pa	1001.7	0.1		0.838	0.10	1
^{234m} Pa	786.27	0.03	7.17	0.0486	0.0019	3	²³⁴ Pa	1028.7	0.1	0.25	0.57	0.06	4
^{234m} Pa	805.74	0.10	2.3	0.0043	0.0005	4	^{234m} Pa	1041.7	0.1	0.14	0.0012	0.0001	4
²³⁴ Pa	805.8	0.05		2.52	0.29			^{234m} Pa	1061.86	0.1	0.48	0.0023	0.0001
^{234m} Pa	818.2	0.5	0.48	0.0010	0.0003	4	²³⁴ Pa	1083.2	0.1	0.15	0.50	0.06	4
²³⁴ Pa	819.2	0.1		1.88	0.21			^{234m} Pa	1125.7	0.5	0.3	0.0035	0.0006

NOTE: ²³⁴Pa - multiply I_γ(%) values by 0.0016 to account for branching from ^{234m}Pa

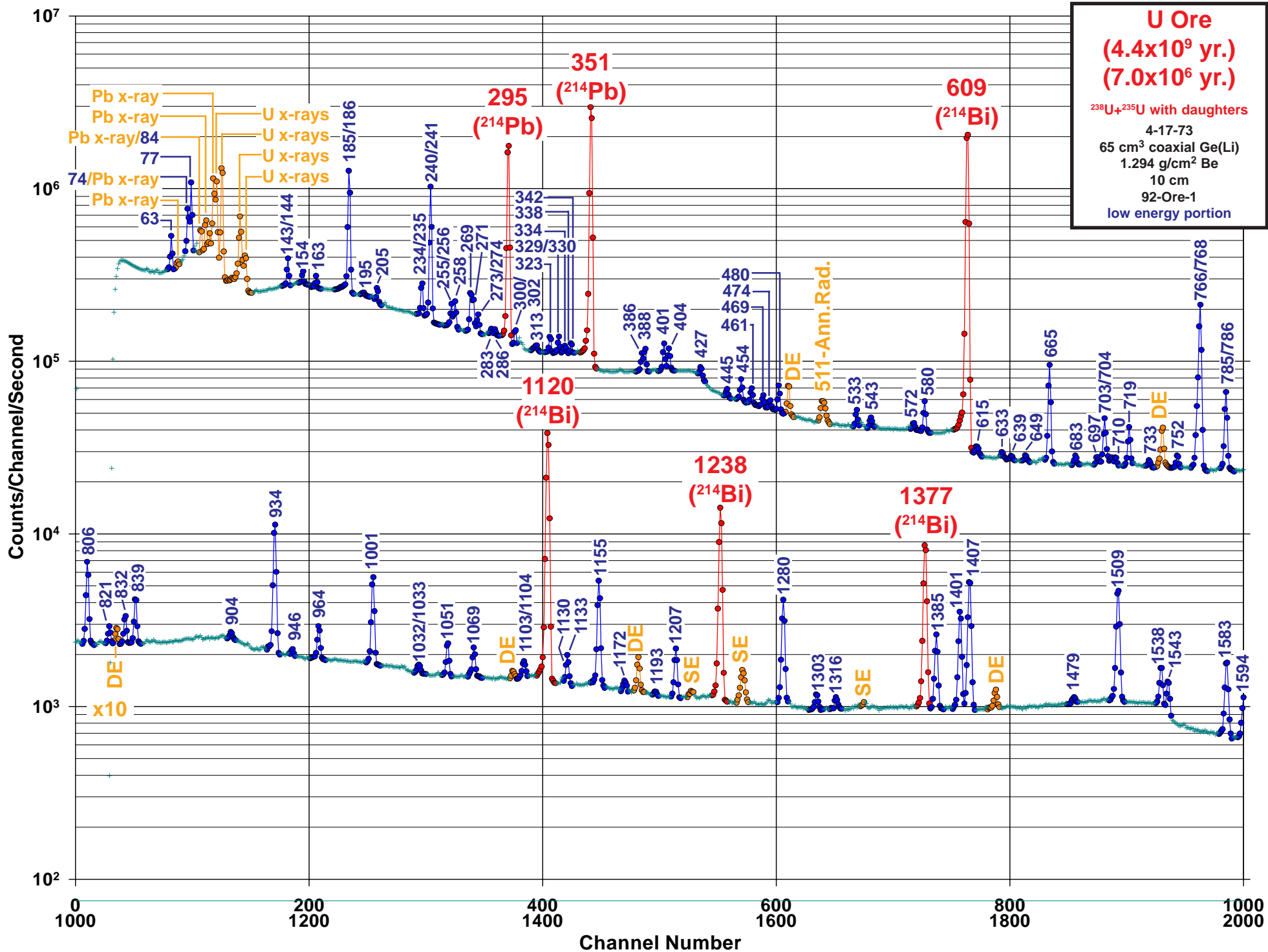
GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

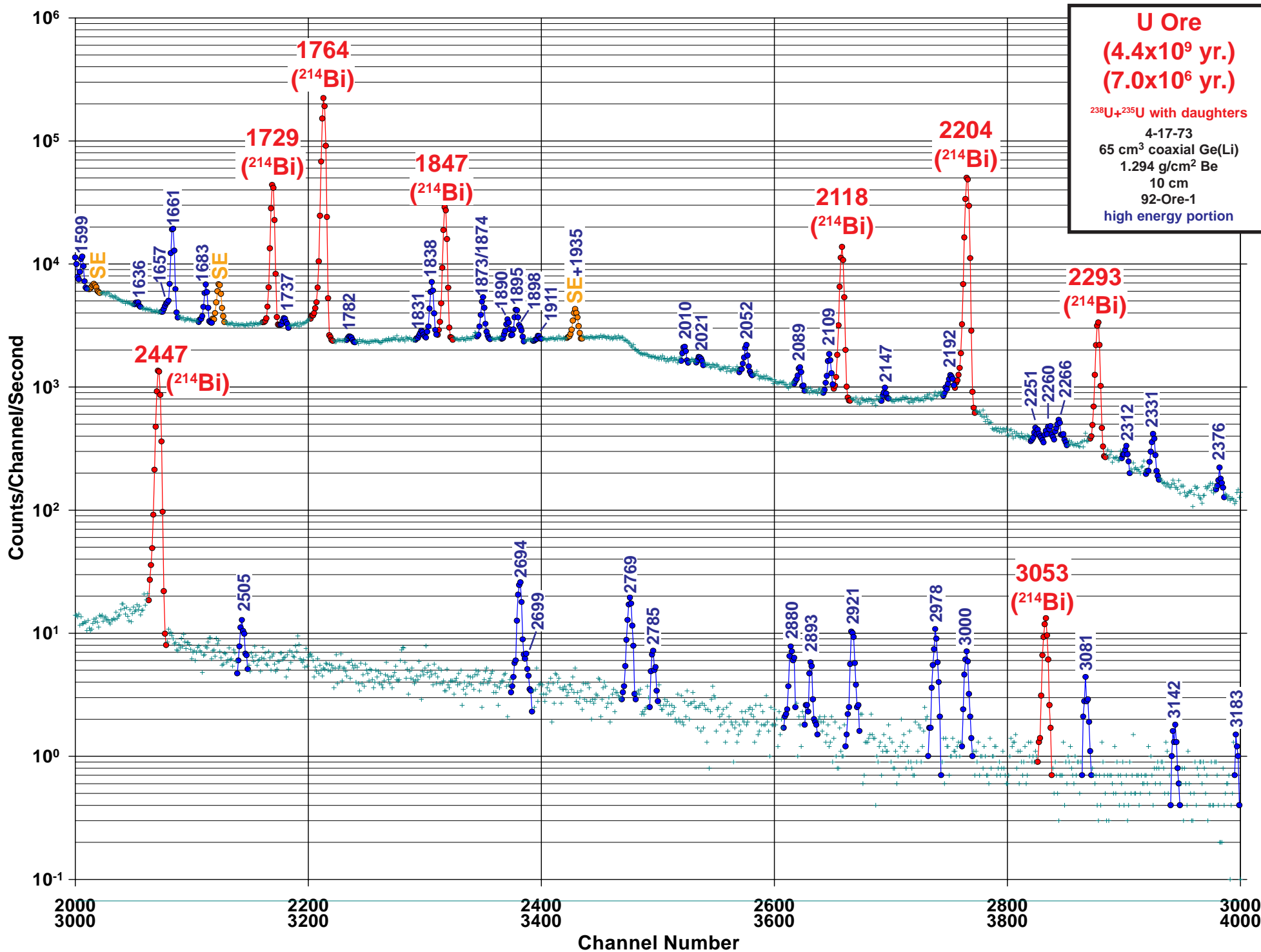
Nuclide: ^{238}U with Th & Pa Daughters E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: 4.468(3) x 10⁹ yr.Detector: 4.55 cm² x 8 mm Ge (Li)

Method of Production: natural U

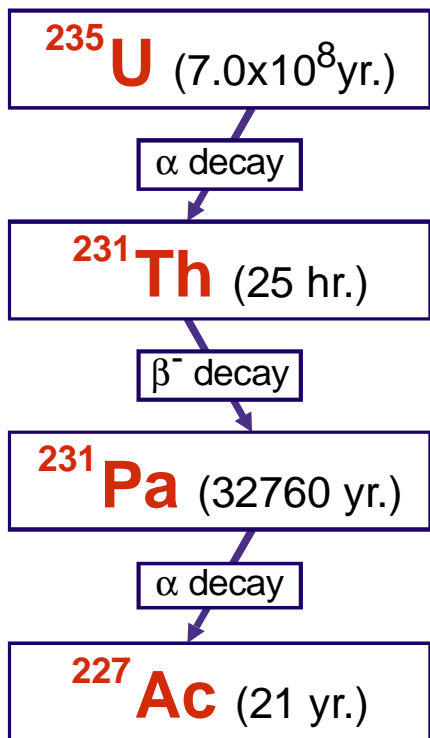
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
^{234}Pa	1151.4	0.3	0.03	0.031	0.010	4	^{234}Pa	1668.4	0.1	0.18	0.76	0.09	3
$^{234\text{m}}\text{Pa}$	1193.77	0.03	1.65	0.0135	0.0001	3	^{234}Pa	1685.7	0.1	0.07	0.31	0.04	4
$^{234\text{m}}\text{Pa}$	1220.37	0.10	0.14	0.0009	0.0001	4	$^{234\text{m}}\text{Pa}$	1694.1	1.0	1.8	0.0005	0.0001	3
	1226.4	0.2	0.08		0.03	4	$^{234\text{m}}\text{Pa}$	1732.2	1.5		0.0018	0.0003	4
$^{234\text{m}}\text{Pa}$	1237.24	0.10	0.62	0.0053	0.0001	3	$^{234\text{m}}\text{Pa}$	1737.73	0.1		0.0211	0.0003	1
^{234}Pa	1292.8	0.1	0.07	0.46	0.05	4	$^{234\text{m}}\text{Pa}$	1759.81	0.10	0.2	0.0014	0.0007	3
^{234}Pa	1352.9	0.1	0.15	1.15	0.12	4	$^{234\text{m}}\text{Pa}$	1765.44	0.10	1	0.0087	0.0001	2
$^{234\text{m}}\text{Pa}$	1392.7	1.0		0.0034	0.0002	3	$^{234\text{m}}\text{Pa}$	1796.2	1	0.09	0.0003	0.0001	3
^{234}Pa	1393.9	0.1	0.48	2.06	0.22	3	$^{234\text{m}}\text{Pa}$	1809.04	0.10	0.45	0.0037	0.0001	2
^{234}Pa	1400.3	0.1	0.08	0.175	0.026	4	$^{234\text{m}}\text{Pa}$	1819.69	0.10		0.0009	0.0001	3
$^{234\text{m}}\text{Pa}$	1413.88	0.10	0.32	0.0023	0.0001	4	^{234}Pa	1819.8	0.3	0.1	0.0041	0.0011	3
^{234}Pa	1426.9	0.1	0.05	0.164	0.026	4	$^{234\text{m}}\text{Pa}$	1831.3	0.1	2.2	0.0172	0.0003	1
$^{234\text{m}}\text{Pa}$	1434.13	0.10	1.2	0.0097	0.0001	3	^{234}Pa	1849.8	0.2	0.01	0.0278	0.0067	4
^{234}Pa	1445.4	0.1	0.06	0.31	0.04	4	$^{234\text{m}}\text{Pa}$	1863.09	0.10	0.18	0.0012	0.0001	3
^{234}Pa	1452.7	0.1	0.12	0.80	0.09	4	$^{234\text{m}}\text{Pa}$	1867.68	0.10	1.2	0.0092	0.0001	1
$^{234\text{m}}\text{Pa}$	1510.2	0.1	1.6	0.0129	0.0002	2	$^{234\text{m}}\text{Pa}$	1874.85	0.10	1.2	0.0082	0.0001	1
$^{234\text{m}}\text{Pa}$	1527.27	0.10	0.28	0.0024	0.0001	3	$^{234\text{m}}\text{Pa}$	1893.5	0.1	0.35	0.0022	0.0001	2
$^{234\text{m}}\text{Pa}$	1550.0	1.0	0.2	0.0018	0.0002	4	$^{234\text{m}}\text{Pa}$	1911.17	0.10	0.77	0.0063	0.0001	1
$^{234\text{m}}\text{Pa}$	1553.74	0.10	1	0.0081	0.0001	3	$^{234\text{m}}\text{Pa}$	1926.5	1.0	0.08	0.0004	0.0001	3
$^{234\text{m}}\text{Pa}$	1570.67	0.10		0.0011	0.0001	4	$^{234\text{m}}\text{Pa}$	1937.01	0.10	0.35	0.0029	0.0001	1
$^{234\text{m}}\text{Pa}$	1593.88	0.10		0.0027	0.0001	4	$^{234\text{m}}\text{Pa}$	1970.0	1.5	0.045	0.0006	0.0001	3
$^{234\text{m}}\text{Pa}$	1667.6	1.0		0.0008	0.0002	4							

NOTE: ^{234}Pa - multiply I_γ (%) values by 0.0016 to account for branching from $^{234\text{m}}\text{Pa}$ 



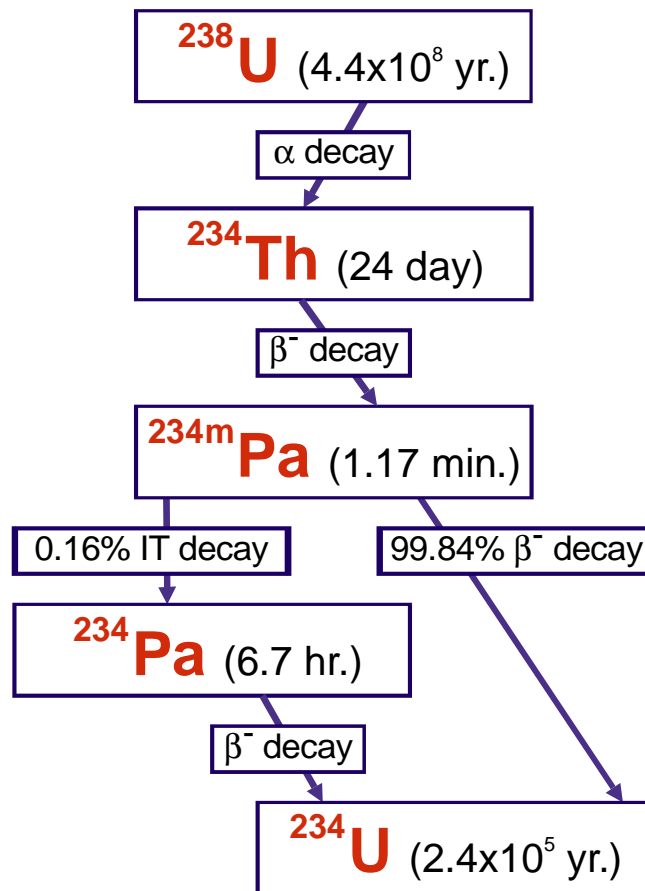


²³⁵U Decay Chain



See ²²⁷Ac for Chain completion

²³⁸U Decay Chain



See ²³⁴U for Chain completion



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: **Uranium Ore ($^{238}\text{U} + ^{235}\text{U}$ with daughters)**Half Life: $4.468(3) \times 10^9$ yr. + $7.038(5) \times 10^6$ yr. E_γ , σ_{E_γ} - 1998 ENSDF Data For I_γ , σ_{I_γ} - 1998 ENSDF Data, See: ^{226}Ra , ^{235}U , and ^{238}U SpectraDetector: 65 cm³ coaxial Ge (Li)

Method of Production: Natural Radioactivity

Isotope	E_γ (keV)	σ_{E_γ}	S
^{234}Th	63.29	0.02	4
^{231}Pa	63.65	0.02	4
^{231}Pa	74.15	0.04	4
^{231}Pa	77.34	0.03	3
^{231}Th	84.214	0.003	4
^{234}Th	92.38	0.01	3
^{234}Th	92.80	0.02	3
^{235}U	143.76	0.02	4
^{223}Ra	144.23	0.01	4
^{223}Ra	154.21	0.01	4
^{235}U	163.33	0.02	4
^{235}U	185.715	0.005	2
^{226}Ra	186.211	0.013	4
	195.70	0.20	4
^{235}U	205.311	0.010	4
^{223}Fr	234.80	0.01	4
$^{234\text{m}}\text{Pa}$	235.85	0.18	4
^{227}Th	235.971	0.020	4
^{224}Ra	240.986	0.006	2
^{214}Pb	241.977	0.003	2
^{231}Pa	255.77	0.05	4
^{227}Th	256.25	0.02	4
^{214}Pb	258.87	0.20	4
^{228}Ac	269.28	0.04	4
^{223}Ra	269.459	0.010	4
^{219}Rn	271.23	0.01	4
^{231}Pa	273.14	0.06	4
^{214}Bi	273.80	0.5	4
^{214}Pb	274.80	0.05	4
^{231}Pa	283.69	0.01	4
^{227}Th	286.122	0.020	4
^{214}Pb	295.224	0.002	1
^{227}Th	300.00	0.03	4
^{231}Pa	302.65	0.01	4
^{227}Th	314.78	0.09	4
^{223}Ra	323.87	0.01	4
^{227}Th	329.851	0.02	4
^{231}Pa	330.06	0.01	4

Isotope	E_γ (keV)	σ_{E_γ}	S
^{227}Th	334.38	0.02	4
^{223}Ra	338.281	0.010	4
^{228}Ac	338.32	0.06	4
^{227}Th	342.50	0.09	4
^{211}Bi	351.06	0.04	1
^{214}Bi	351.9	0.5	1
^{214}Pb	351.932	0.002	1
^{214}Bi	386.77	0.05	4
^{214}Bi	388.88	0.05	4
^{219}Rn	401.81	0.01	4
^{211}Pb	404.853	0.010	4
^{214}Bi	405.74	0.3	4
^{211}Pb	427.088	0.010	4
^{223}Ra	445.03	0.01	4
^{214}Bi	454.77	0.12	4
^{214}Bi	461.00	0.2	4
^{214}Bi	469.76	0.07	4
^{214}Bi	474.41	0.05	4
^{214}Pb	480.43	0.08	4
^{214}Pb	533.66	0.02	4
^{214}Bi	543.0	0.2	4
^{214}Bi	572.76	0.07	4
^{214}Pb	580.13	0.03	4
^{214}Bi	609.312	0.007	1
^{214}Bi	615.73	0.10	4
^{214}Bi	633.14	0.10	4
^{214}Bi	639.67	0.10	4
^{214}Bi	649.18	0.07	4
^{214}Bi	665.453	0.022	3
^{214}Bi	683.22	0.06	4
^{214}Bi	697.90	0.25	4
^{214}Bi	703.11	0.04	4
^{211}Pb	704.64	0.03	4
^{214}Bi	710.67	0.10	4
^{214}Bi	719.86	0.03	4
^{214}Bi	733.80	0.15	4

Isotope	E_γ (keV)	σ_{E_γ}	S
^{214}Bi	752.84	0.03	4
$^{234\text{m}}\text{Pa}$	766.36	0.02	2
$^{234\text{m}}\text{Pa}$	766.51	0.03	2
^{211}Pb	766.63	0.15	2
^{214}Bi	768.356	0.010	3
^{214}Pb	785.96	0.09	3
^{214}Bi	786.1	0.4	3
$^{234\text{m}}\text{Pa}$	786.27	0.03	3
^{214}Bi	806.174	0.018	3
^{214}Bi	821.18	0.03	4
^{211}Pb	832.01	0.03	4
	839.05	0.06	4
^{214}Bi	904.29	0.10	4
^{214}Bi	934.061	0.012	4
	946.04	0.10	4
^{214}Bi	964.08	0.03	4
$^{234\text{m}}\text{Pa}$	1001.7	0.1	3
^{214}Bi	1032.37	0.08	4
^{214}Bi	1033.3	0.2	4
^{214}Bi	1051.96	0.03	4
^{214}Bi	1069.96	0.08	4
^{214}Bi	1103.64	0.19	4
^{214}Bi	1104.79	0.19	4
^{214}Bi	1120.287	0.010	1
^{214}Bi	1130.29	0.19	4
^{214}Bi	1133.66	0.03	4
^{214}Bi	1155.19	0.02	3
^{214}Bi	1172.98	0.10	4
$^{234\text{m}}\text{Pa}$	1193.77	0.003	4
^{214}Bi	1207.68	0.03	4
^{214}Bi	1238.110	0.012	1
^{214}Bi	1280.96	0.02	3
^{214}Bi	1303.76	0.08	4
^{214}Bi	1316.96	0.15	4
^{214}Bi	1377.669	0.012	1
^{214}Bi	1385.31	0.03	3
^{214}Bi	1401.50	0.05	3

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: **Uranium Ore ($^{238}\text{U} + ^{235}\text{U}$ with daughters)**Half Life: $4.468(3) \times 10^9$ yr. + $7.038(5) \times 10^6$ yr. E_γ , σE_γ - 1998 ENSDF Data For I_γ , σI_γ - 1998 ENSDF Data, See: ^{226}Ra , ^{235}U , and ^{238}U SpectraDetector: 65 cm³ coaxial Ge (Li)

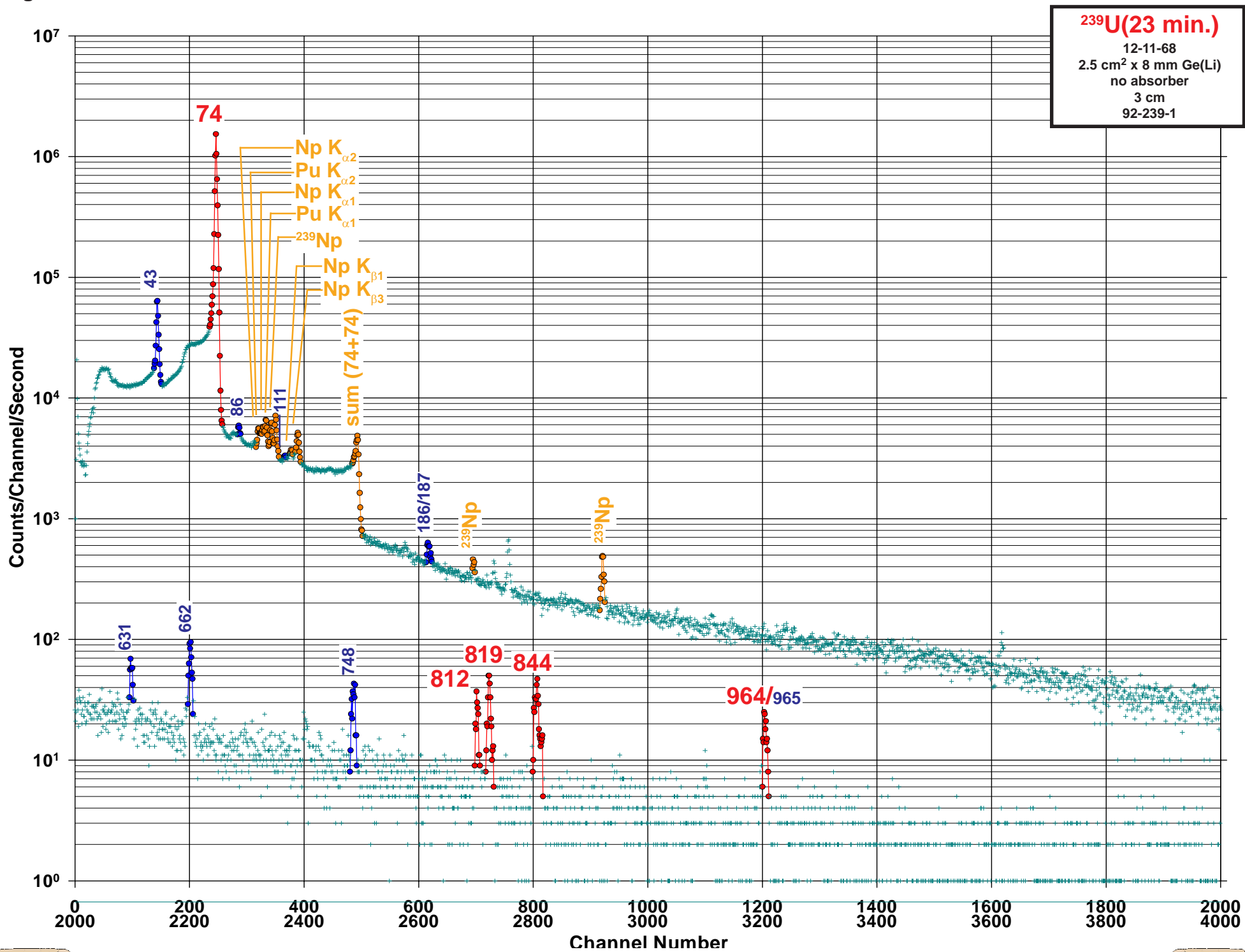
Method of Production: Natural Radioactivity

Isotope	E_γ (keV)	σE_γ	S
^{214}Bi	1385.31	0.03	3
^{214}Bi	1401.50	0.05	3
^{214}Bi	1407.98	0.04	2
^{214}Bi	1479.15	0.14	4
^{214}Bi	1509.228	0.015	3
^{214}Bi	1538.50	0.06	4
$^{214}\text{Bi} + \text{sum}(734+609)$	1543.32	0.06	4
^{214}Bi	1583.22	0.04	3
^{214}Bi	1594.73	0.08	4
^{214}Bi	1599.31	0.06	4
^{214}Bi	1636.3	0.2	4
^{214}Bi	1657.00	0.19	4
^{214}Bi	1661.28	0.06	2
^{214}Bi	1683.99	0.04	3
^{214}Bi	1729.595	0.015	1
$^{234\text{m}}\text{Pa}$	1737.73	0.01	4
^{214}Bi	1764.494	0.014	1
	1782.3	0.4	4
$^{234\text{m}}\text{Pa}$	1831.3	0.1	4
^{214}Bi	1838.36	0.05	3

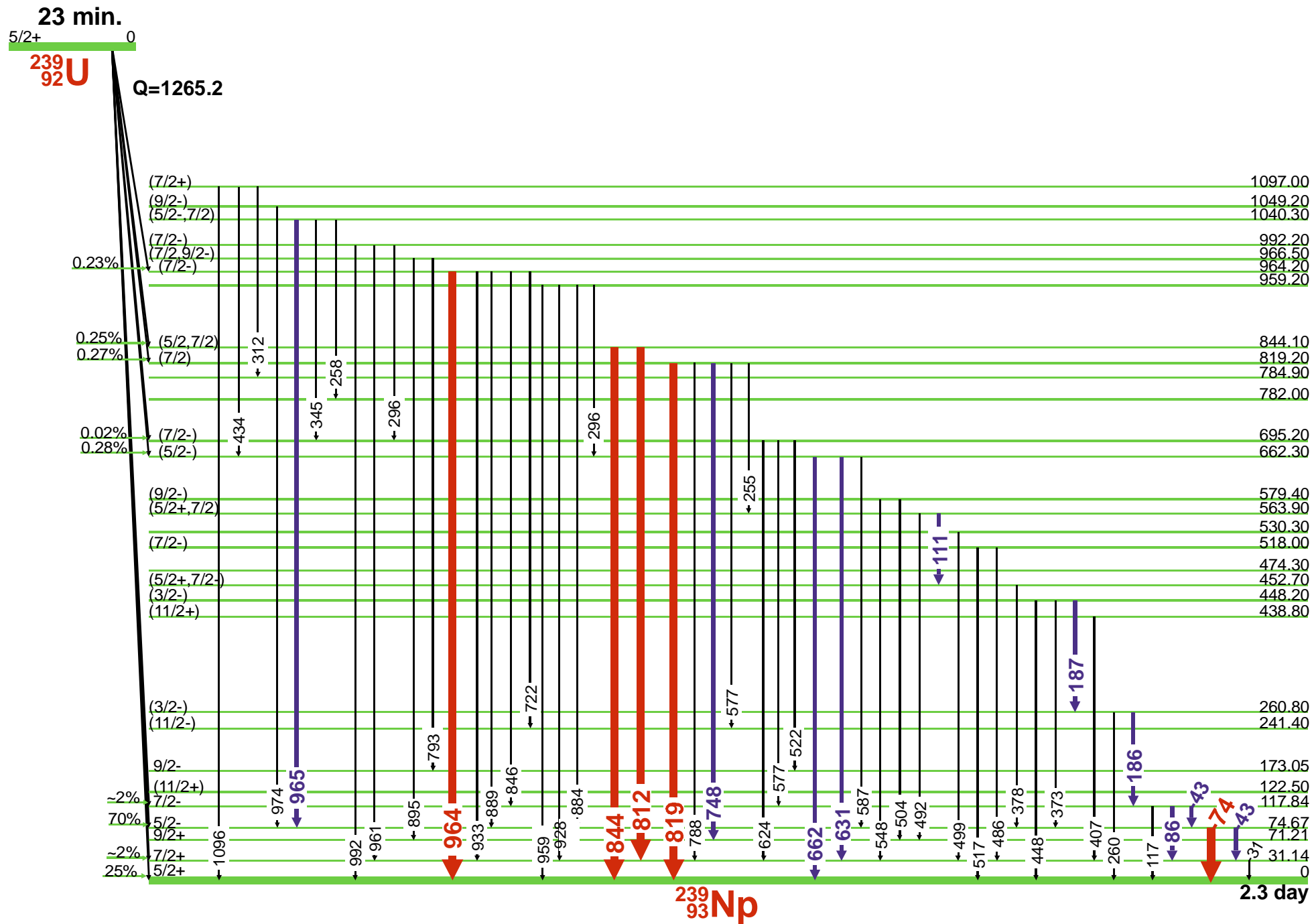
Isotope	E_γ (keV)	σE_γ	S
$^{214}\text{Bi} + \text{sum}(609+1238)$	1847.420	0.025	1
^{214}Bi	1873.16	0.06	3
$^{234\text{m}}\text{Pa}$	1874.85	0.10	3
^{214}Bi	1890.30	0.15	4
^{214}Bi	1895.92	0.14	4
^{214}Bi	1898.7	0.4	4
$^{234\text{m}}\text{Pa}$	1911.17	0.10	4
^{214}Bi	1935.5	0.2	4
^{214}Bi	2010.78	0.12	4
^{214}Bi	2021.6	0.2	4
^{214}Bi	2052.94	0.12	4
^{214}Bi	2089.70	0.20	4
^{214}Bi	2109.92	0.12	4
^{214}Bi	2118.55	0.03	1
^{214}Bi	2147.9	0.2	4
^{214}Bi	2192.58	0.16	4
^{214}Bi	2204.21	0.04	1
^{214}Bi	2251.6	0.2	4
^{214}Bi	2260.3	0.2	4

Isotope	E_γ (keV)	σE_γ	S
^{214}Bi	2266.51	0.13	4
^{214}Bi	2293.40	0.12	1
^{214}Bi	2312.4	0.2	4
^{214}Bi	2331.3	0.2	4
^{214}Bi	2376.9	0.2	4
^{214}Bi	2447.86	0.10	1
^{214}Bi	2505.4	0.2	4
^{214}Bi	2694.7	0.2	2
^{214}Bi	2699.4	0.3	4
^{214}Bi	2769.9	0.2	2
^{214}Bi	2785.9	0.2	3
^{214}Bi	2880.3	0.2	3
^{214}Bi	2893.5	0.2	3
^{214}Bi	2921.9	0.2	2
^{214}Bi	2978.9	0.2	2
^{214}Bi	3000.0	0.2	2
^{214}Bi	3053.9	0.2	1
^{214}Bi	3081.7	0.3	2
^{214}Bi	3142.6	0.4	4
^{214}Bi	3183.6	0.4	4





²³⁹U(23 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ²³⁹UE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 23.45(2) min.

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: ²³⁸U(n,γ)

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	31.131	0.002		0.0649	0.0069	4
D	43.10					3
	43.533	0.001		4.14	0.13	
	50.60					4
	55.18			0.0001		4
	71.20					4
	74.664	0.001	27000*	48.1	1.0	1
	86.72	0.07	32*	0.052	0.006	4
	111.00	0.20	11*	0.0197	0.0004	4
	117.66	0.03	78.2	0.13	0.04	3
	142.20	0.20				4
	169.00					4
	186.150	0.020	17.7	0.0317	0.0007	4
	187.40	0.04	3.6	0.0065	0.0001	4
	191.97	0.06		0.0027	0.0001	4
	196.85	0.10		0.0021		4
	201.19	0.07		0.0020		4
	231.70	0.10		0.0030	0.0001	4
	255.25	0.10	1.4	0.0027	0.0001	4
	258.47	0.05	1.4	0.0025	0.0001	4
	260.77	0.06	1.2	0.0022		4
D	296.84	0.08	0.86	0.0015		4
	296.84	0.08				
	301.98	0.07		0.0014		4
	304.17	0.10		0.0017		4
	312.05	0.03	2.9	0.0053	0.0001	4
	321.71	0.15		0.0012		4
	343.74	0.10		0.0019		4
	345.12	0.04	1.7	0.0030	0.0001	4
	363.10	0.20		0.0008		4
	373.520	0.020	11.4	0.0202	0.0004	3
	378.070	0.020	5.9	0.0106	0.0002	4
	381.43	0.12		0.0014		4
	395.30	0.07		0.0014		4
	399.40	0.20		0.0005		4
	407.70	0.05	1.9	0.0034	0.0001	4
	434.70	0.03	2.4	0.0043	0.0001	4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	448.15	0.03	4.5	0.0082	0.0002	4
	455.60	0.06		0.0031	0.0001	4
	474.49	0.08		0.0034	0.0001	4
	486.870	0.020	31.8	0.0577	0.0012	3
	492.68	0.04	2.3	0.0045	0.0001	4
	499.20	0.12	0.8	0.0014		4
	504.77	0.04	2.4	0.0042	0.0001	4
	514.1	0.3		0.0007		4
	517.92	0.09	1.6	0.0029	0.0001	4
	522.07	0.07	1.3	0.0023		4
	530.50	0.20		0.0012		4
	532.75	0.07		0.0020		4
	535.01	0.14		0.0013		4
	544.58	0.06		0.0034	0.0001	4
	548.10	0.09	1.1	0.0020		4
	563.90	0.20		0.0012		4
	566.14	0.10		0.0020		4
D	577.49	0.09	0.95	0.0017		4
	577.49					
	587.77	0.04	12.7	0.0226	0.0005	3
	602.68	0.04	2.6	0.0047	0.0001	4
	624.00	0.04	3.8	0.0067	0.0001	4
	631.09	0.03	39.5	0.0721	0.0015	3
	646.17	0.08		0.0023		4
	658.5	0.4		0.0006		4
	662.24	0.03	100.	0.1780	0.0037	2
	664.08	0.06		0.0091	0.0002	4
	695.23	0.04		0.0042	0.0001	4
	700.93	0.08		0.0020		4
	703.48	0.10		0.0027	0.0001	4
	707.29	0.06		0.0028	0.0001	4
	710.35	0.15		0.0012		4
	714.09	0.07		0.0039	0.0001	4
	722.87	0.04	15.9	0.0269	0.0006	3
	730.92	0.04	6.4	0.0120	0.0003	4
	745.64	0.10		0.0038	0.0001	4
	748.08	0.04	54.5	0.1010	0.0021	2
	752.85	0.10		0.0014		4

NOTE: * from spectrum shown; other I_γ(rel) values were measured from a spectrum with Pb and Ta absorbers.



GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{239}U E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

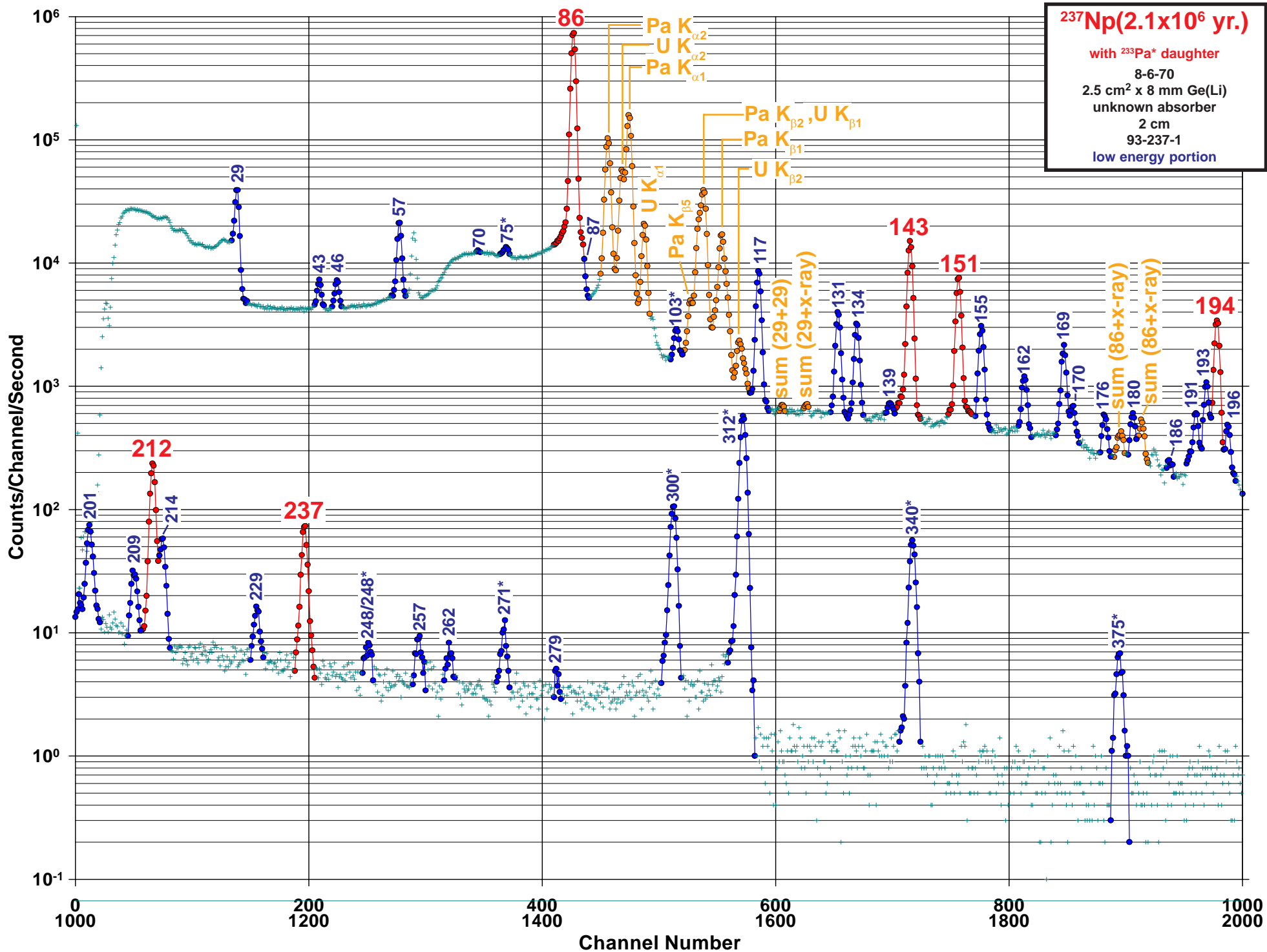
Half Life: 23.45(2) min.

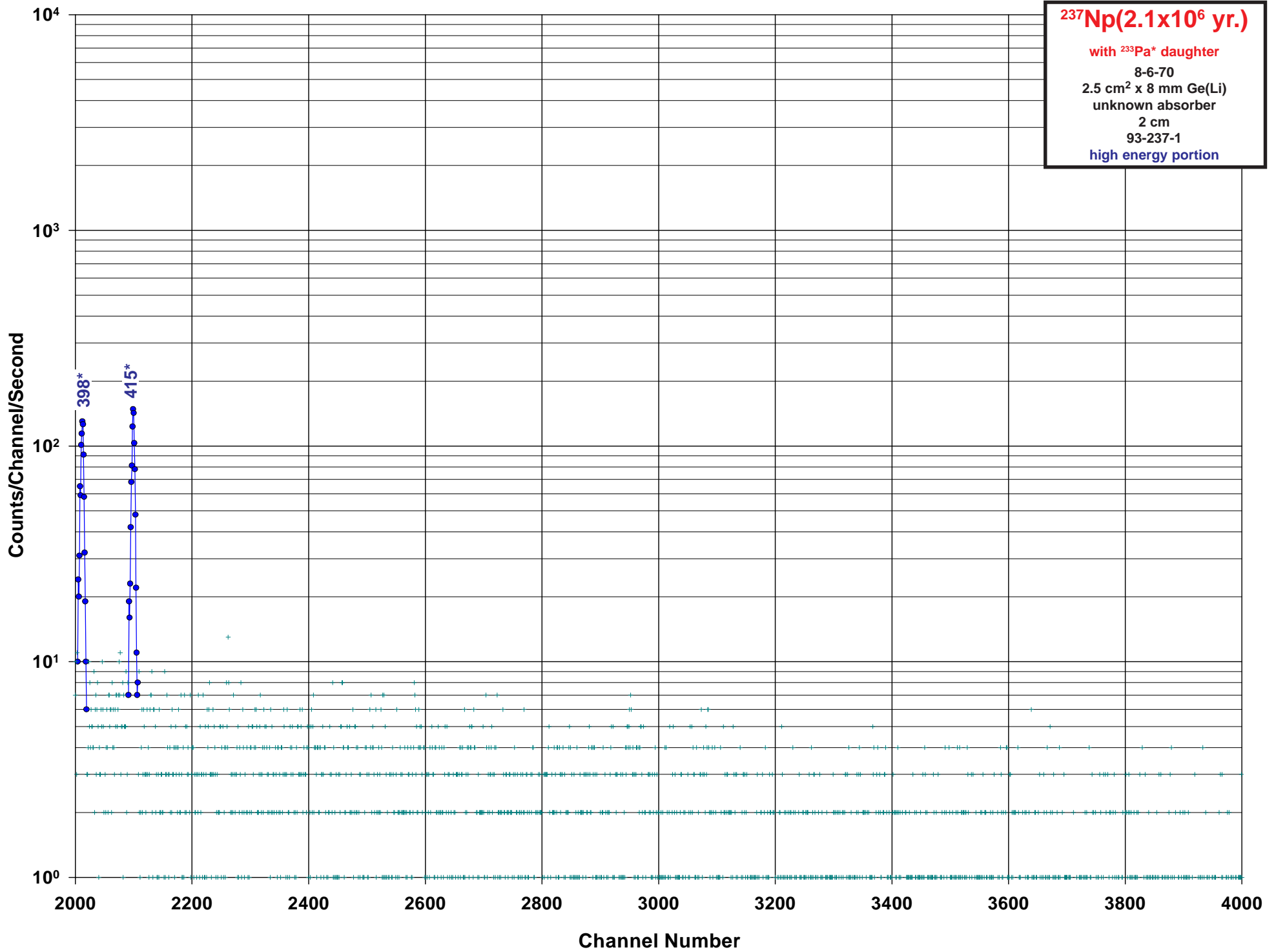
Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{238}\text{U}(n,\gamma)$

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
772.95	0.05		0.0034	0.0001	4
774.73	0.04	9.1	0.0164	0.0003	3
779.58	0.10		0.0012		4
788.19	0.06	3.0	0.0053	0.0001	4
791.30		5.0	0.0087	0.0002	4
793.55	0.08	16.4	0.0029	0.0001	4
812.93	0.04	43.2	0.0770	0.0016	1
819.22	0.04	81.8	0.1443	0.0030	1
831.86	0.04	1.9	0.0034	0.0001	4
840.3	0.3		0.0045	0.0001	4
844.10	0.04	86.4	0.159	0.003	1
846.45	0.04	20.9	0.0375	0.0008	2
849.10	0.08		0.0016		4
863.57	0.12		0.0007		4
867.30	0.10		0.0015		4
874.35	0.05		0.0038	0.0001	4
876.14	0.07		0.0020		4
884.50	0.04	6.8	0.0120	0.0003	3
889.56	0.04	12.7	0.0226	0.0005	3
895.31	0.05	1.0	0.0018		4
917.41	0.07		0.0031	0.0001	4

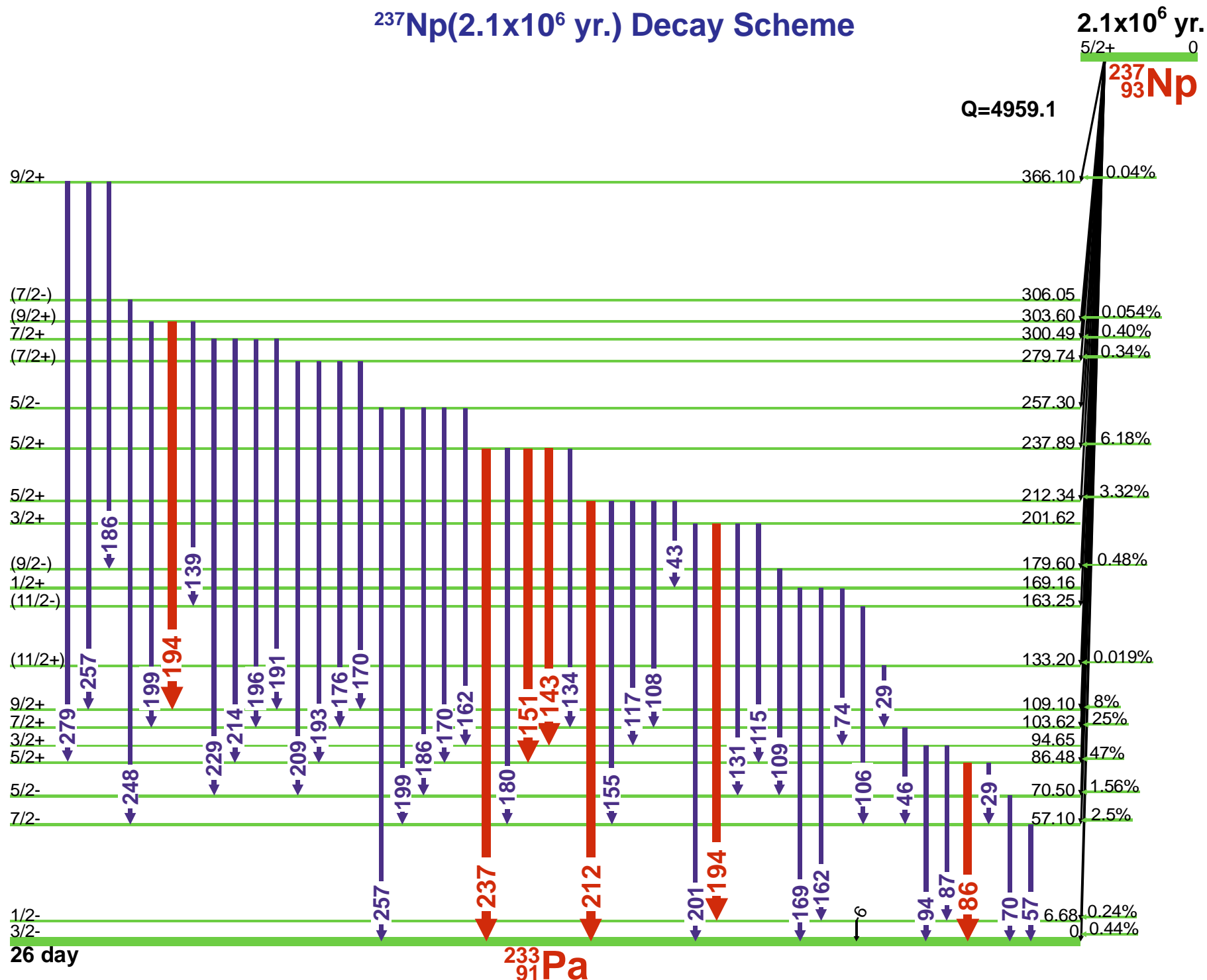
E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
920.87	0.08		0.0028	0.0001	4
922.70	0.20		0.0012		4
928.18	0.04	3.2	0.0058	0.0001	3
931.61	0.07		0.0047	0.0001	4
933.08	0.04	20.0	0.0356	0.0007	2
939.00	0.30		0.0004		4
959.22	0.05	3.9	0.0067	0.0001	4
961.09	0.04	9.5	0.0173	0.0004	3
964.30	0.04	50.0	0.0866	0.0018	1
965.58	0.10		0.0021		
974.54	0.04	2.2	0.0039	0.0001	3
992.21	0.04	1.7	0.0031	0.0001	3
1018.14	0.13		0.0011		4
1040.41	0.15		0.0011		4
1065.85	0.15		0.0007		4
1078.88	0.15		0.0015		4
1096.99	0.08	1.4	0.0026	0.0001	3
1122.8	0.3		0.0007		4
1161.40	0.20		0.0010		4
1196.90	0.15		0.0009		4
1204.90	0.20		0.0015		4







²³⁷Np(2.1x10⁶ yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: ^{237}Np E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $2.144(7) \times 10^6$ yr.Detector: $2.5 \text{ cm}^2 \times 8 \text{ mm Ge (Li)}$ Method of Production: ^{241}Am decay

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S		E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	5.50					4		151.414	0.020	2.0	0.232	0.012	1
	6.68					4		153.37					4
	8.22	0.05				4		153.37	0.10		0.0050	0.0010	4
	9.00					4		155.239	0.020	0.80	0.092	0.009	2
	10.70					4		162.41					
	17.40	0.05				4	D	162.41	0.08	0.30	0.032	0.004	3
	22.60					4		169.156	0.020	0.60	0.073	0.007	3
	24.14	0.10				4		170.59					
^{233}Pa	28.375	0.005		0.11	0.04		D	170.59	0.06	0.15	0.020	0.004	4
D	29.374	0.020	75.0	15.0	1.0	2		176.12	0.06	0.04	0.018	0.003	4
	29.60							180.81	0.10	0.17	0.020	0.004	3
	32.46					4		186.86					
	36.24	0.10				4	D	186.86	0.35	0.07	0.003	0.003	4
	43.20					4		191.46	0.05	0.24	0.025	0.004	3
	46.53	0.06		0.110	0.010	4		193.26	0.05	0.46	0.049	0.005	3
	48.96	0.10				4		194.67	0.20				
	54.40	0.10				4	D	194.67	0.20	1.60			1
	57.104	0.020	6.25	0.390	0.010	3		194.95	0.03		0.184	0.010	
	62.59	0.10		0.006	0.003	4		196.86	0.05	0.20	0.020	0.003	3
	63.90	0.10		0.012	0.002	4	D	199.95					
	70.49	0.10		0.012	0.003	4		199.95	0.06	0.04	0.0040	0.0010	4
	74.54	0.10		0.011	0.003	4		201.62	0.05	0.40	0.044	0.005	3
^{233}Pa	75.354	0.004		1.39	0.08			202.90	0.20		0.0048	0.0019	4
	86.477	0.010	100.	12.4	0.4	1		209.19	0.05	0.17	0.0160	0.0020	3
^{233}Pa	86.814	0.003		1.97	0.12			212.29	0.05	1.40	0.155	0.010	1
	87.99	0.03		0.140	0.010	4		214.01	0.05	0.35	0.045	0.009	3
	94.64	0.05		0.60	0.20	4		219.80					4
^{233}Pa	103.971	0.009		0.87	0.03			222.60	0.20		0.0020	0.0010	4
	106.15	0.25	0.81	0.053	0.005	4		229.94	0.05	0.08	0.014	0.004	3
	108.70			0.068	0.015	4		237.860	0.020	5.5	0.063	0.007	1
	109.10	0.10				4	^{233}Pa	248.5	0.5		0.059	0.003	
	115.40	0.35		0.0026	0.0008	4		248.95	0.10	0.04	0.0050	0.0014	4
	117.702	0.020	1.40	0.160	0.010	2		250.58					4
	131.101	0.025	0.70	0.085	0.009	2	D	257.09		0.05			
	134.285	0.020	0.60	0.067	0.007	2		257.09	0.20		0.0064	0.0014	4
	139.90	0.10		0.005		4	^{233}Pa	258.2	0.20		0.0039	0.0016	
	141.74	0.10				4		262.44	0.20		0.0068	0.0014	4
	143.249	0.020	3.60	0.430	0.020	1	^{233}Pa	271.48	0.08		0.328	0.012	
								279.65	0.20	0.02	0.0020	0.0020	4

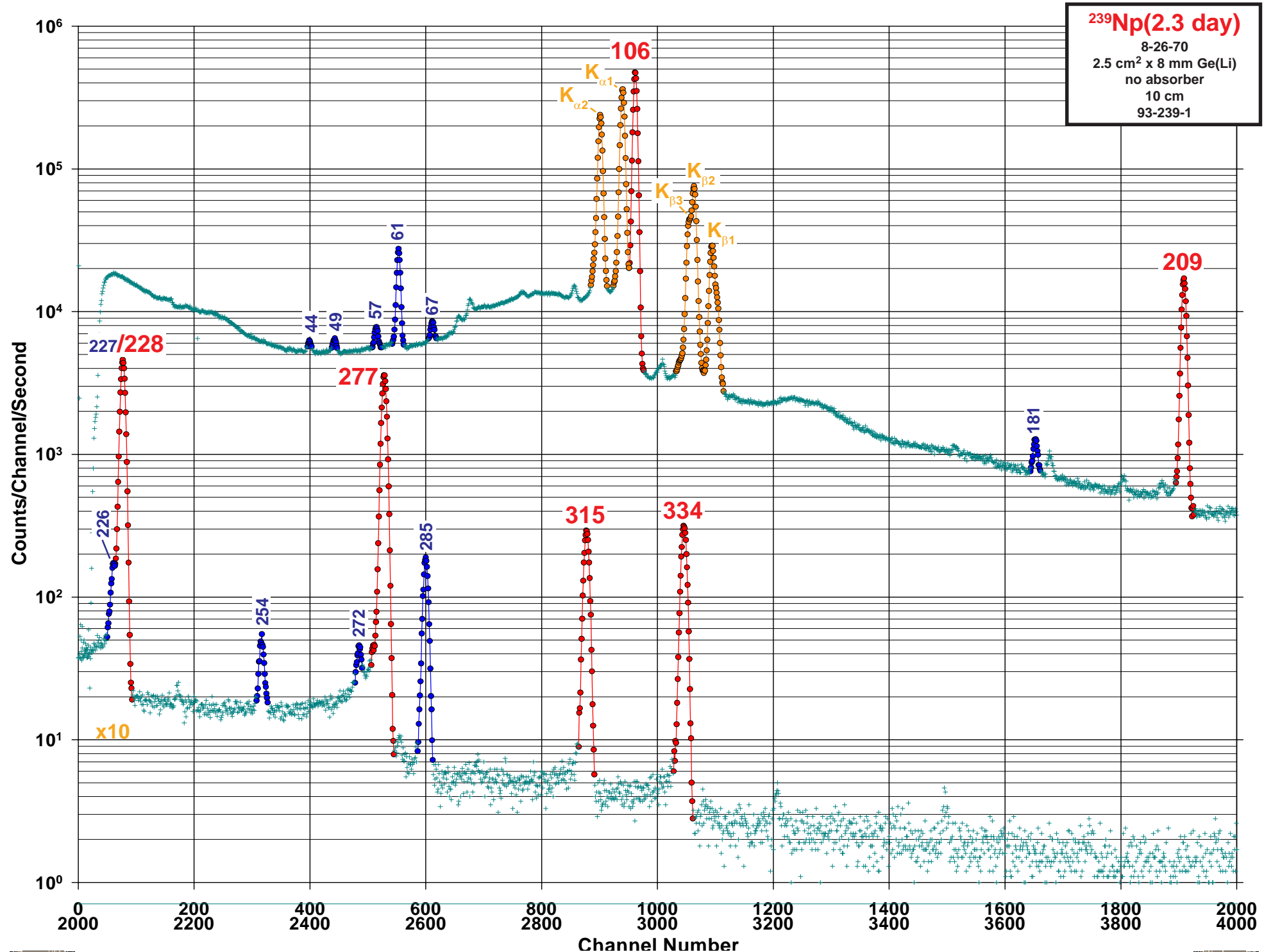
GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: ^{237}Np E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF DataHalf Life: $2.144(7) \times 10^6$ yr.Detector: $2.5 \text{ cm}^2 \times 8 \text{ mm Ge (Li)}$ Method of Production: ^{241}Am decay

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
^{233}Pa	295.8			0.035		
^{233}Pa	300.34	0.02		6.62	0.06	
^{233}Pa	312.17	0.02		38.6	0.4	
^{233}Pa	340.80	0.03		4.47	0.04	

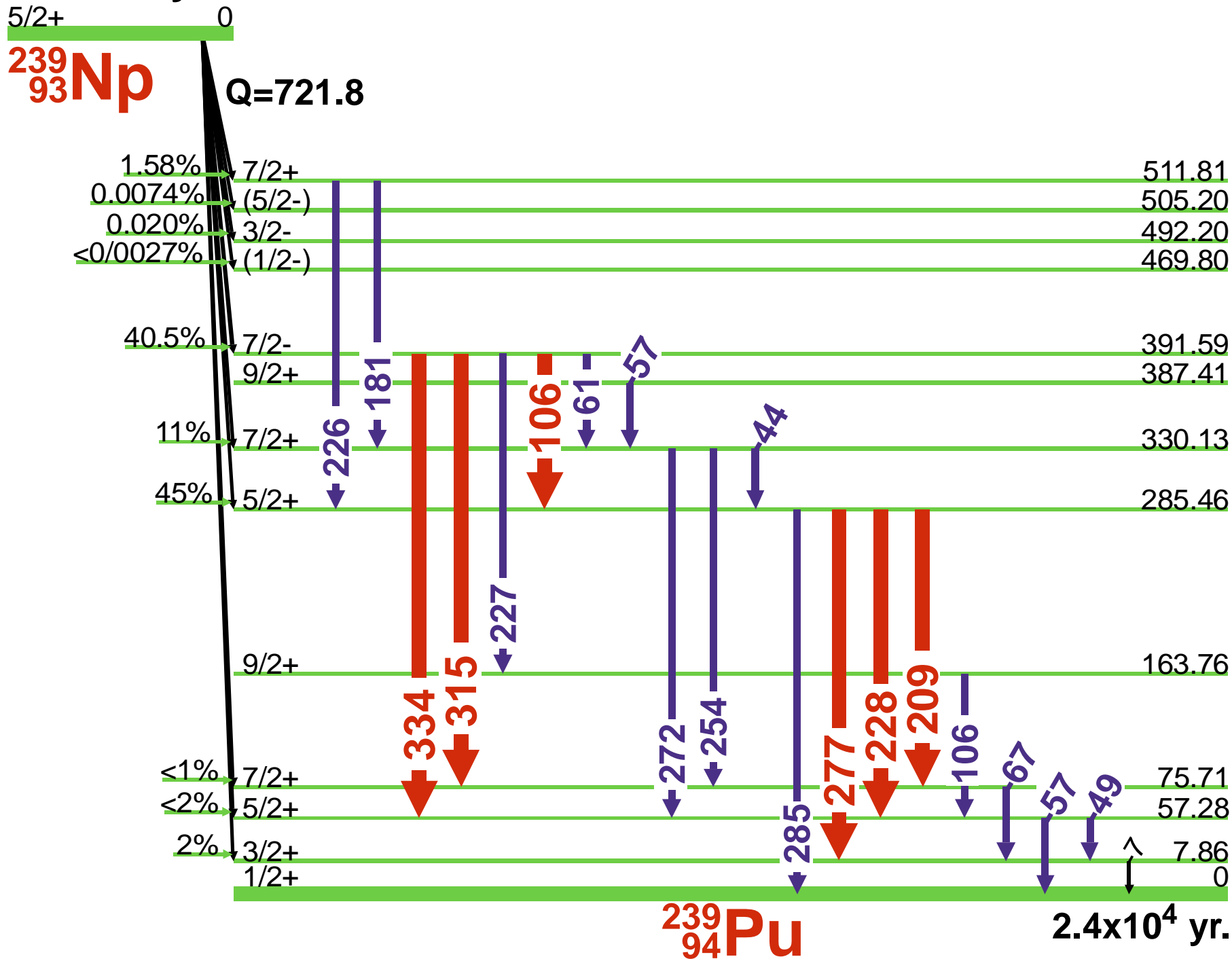
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
^{233}Pa	375.45	0.04		0.679	0.008	
^{233}Pa	398.62	0.08		1.390	0.012	
^{233}Pa	415.76	0.04		1.745	0.016	





2.3 day

²³⁹Np(2.3 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{239}Np E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

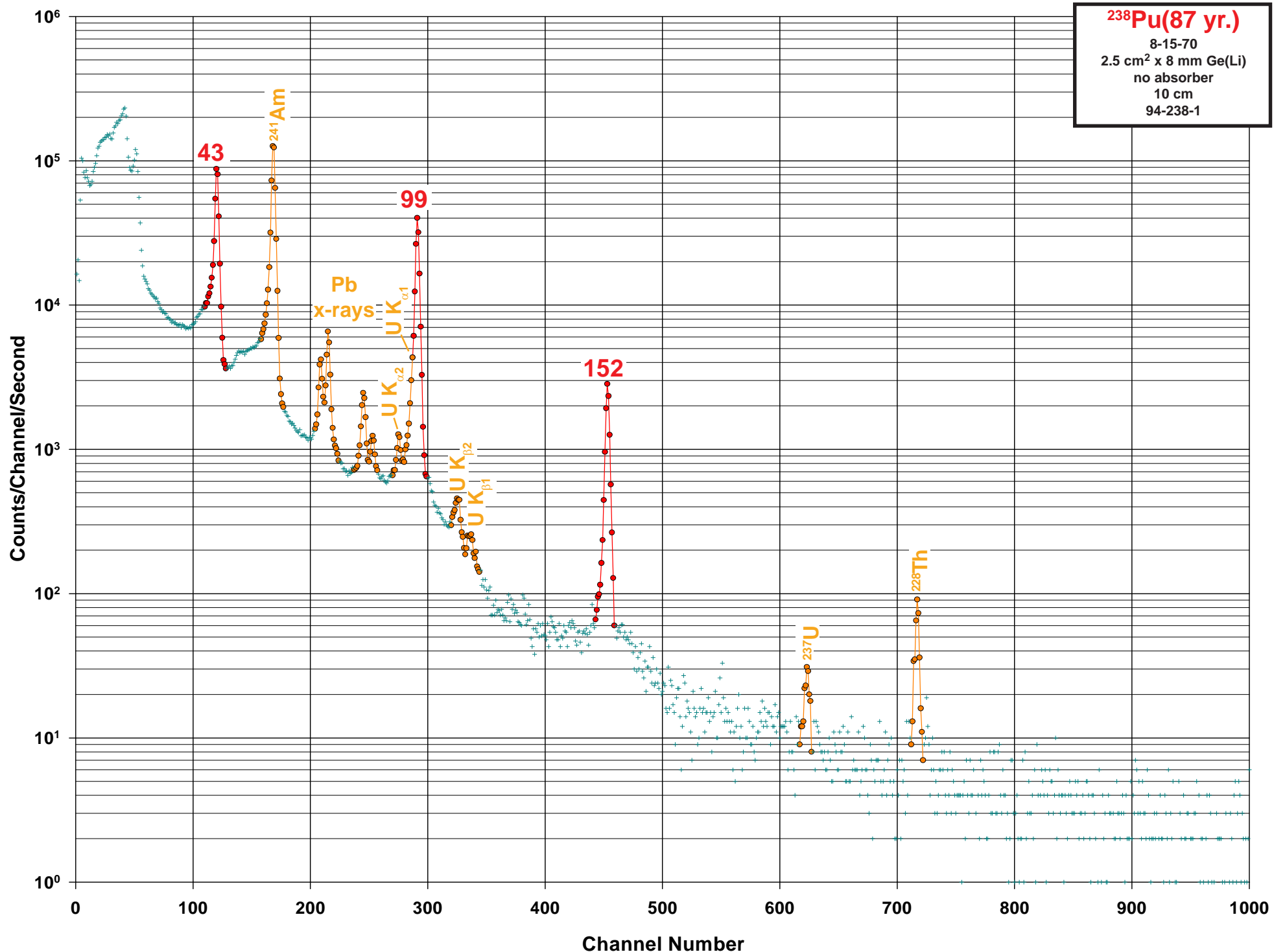
Half Life: 2.3565(4) day

Detector: 2.5 cm² x 8 mm Ge (Li)Method of Production: $^{238}\text{U}(n,\gamma)\beta$

	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	7.85					4
	18.40					4
	44.660	0.020	0.40	0.130	0.010	4
	49.410	0.020	0.67	0.130	0.020	4
D	57.28		0.4	0.130	0.007	4
	57.30			0.0048		
	61.460	0.002	4.2	1.290	0.020	3
	67.860	0.020	0.4	0.092	0.023	4
	88.06	0.03		0.0060	0.0020	4
	101.965	0.013		0.0008		4
D	106.123	0.002	100.	27.2	0.4	1
	106.47	0.04		0.049	0.008	
	124.40			0.010		4
	166.39	0.06		0.017	0.007	4
	181.70	0.03	0.49	0.081	0.004	3
	209.753	0.002	14.3	3.42	0.05	1
	226.380	0.020	2.8	0.280	0.020	4
D	227.83		47.0	0.51		1
	228.183	0.001		10.76	0.18	

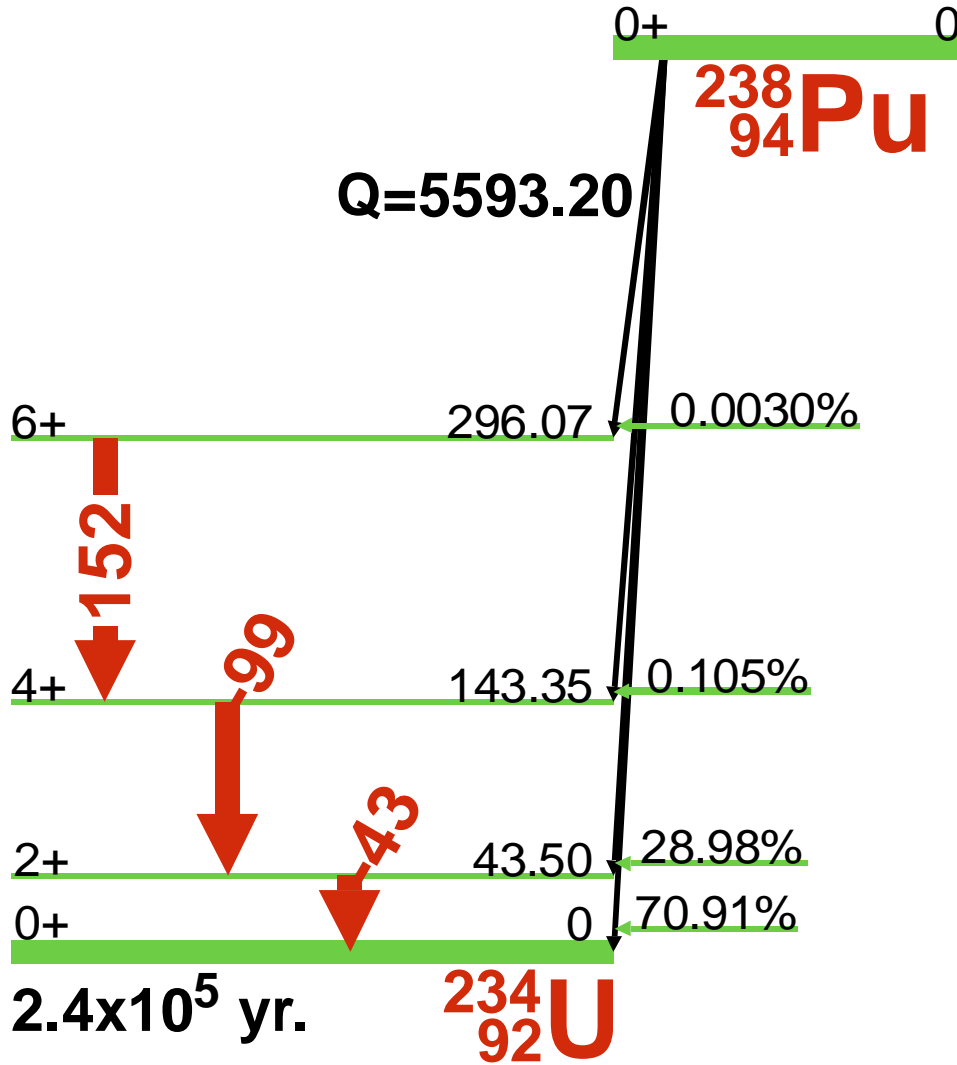
	E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
	254.40	0.03	0.44	0.110	0.006	3
	272.84	0.03		0.077	0.004	4
	277.599	0.001	62.0	14.38	0.21	1
	285.460	0.002	3.4	0.790	0.020	2
	315.880	0.003	7.0	1.60	0.03	1
	322.26			0.0052		4
	334.310	0.002	8.9	2.07	0.03	1
	392.4	0.5		0.0016		4
	429.5	0.5		0.0039		4
	434.7	0.5		0.0130		4
	447.6	0.5		0.0003		4
	454.2	0.5		0.0008		4
	461.9	0.5		0.0016		4
	469.8	0.5		0.0011		4
	484.3	0.5		0.0010		4
	492.3	0.5		0.0060		4
	497.8	0.5		0.0032		4
	498.7			0.0010		4
	504.2	0.5		0.0008		4





²³⁸Pu(87 yr.) Decay Scheme

87 yr.



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²³⁸Pu

Half Life: 87.7(3) yr.

Detector: 2.5 cm² x 8 mm Ge (Li)

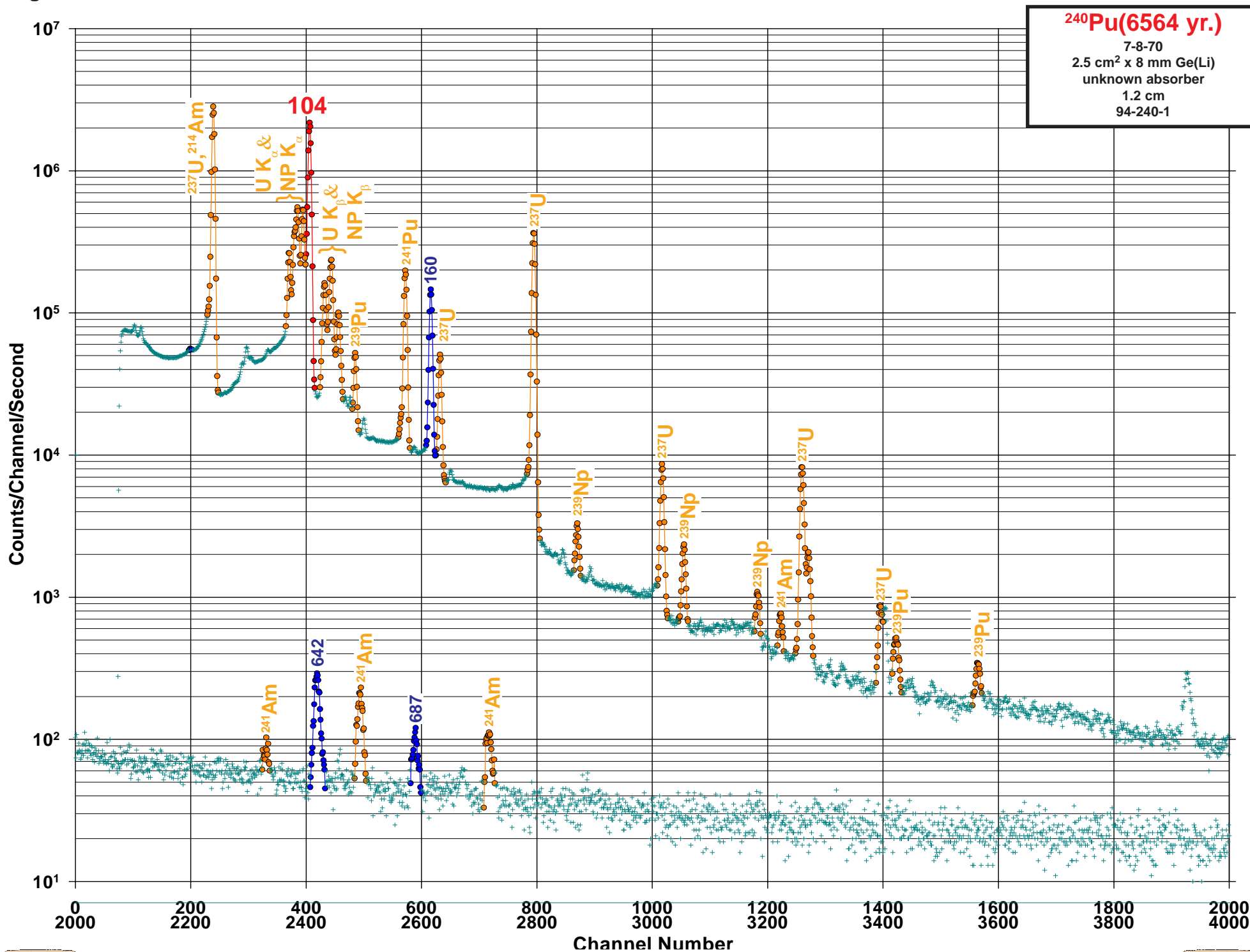
Method of Production: See Below

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
43.498	0.001	100.	0.0395	0.0008	1
62.700	0.010				4
99.853	0.003	21.1	0.0073	0.0001	1
140.150	0.020				4
152.720	0.002	3.34	0.0009		1
192.91	0.07				4
200.97	0.03				4
203.12	0.03				4
233.60	0.20				4
234.60	0.20				4
235.9	0.3				4
258.30	0.20				4
299.20	0.20				4
705.9	0.3				4
708.42	0.20				4
742.81	0.10				4
766.39	0.10				4
783.40	0.10				4
786.30	0.10				4
804.4	0.3				4
805.6	0.3				4
808.25	0.15				4
810.0					4
851.70	0.10				4
880.5	0.3				4
883.23	0.10				4
904.30	0.20				4
926.72	0.15				4
941.90	0.20				4
946.0	0.3				4
1001.03	0.15				4
1041.8	0.3				4
1085.4	0.3				4

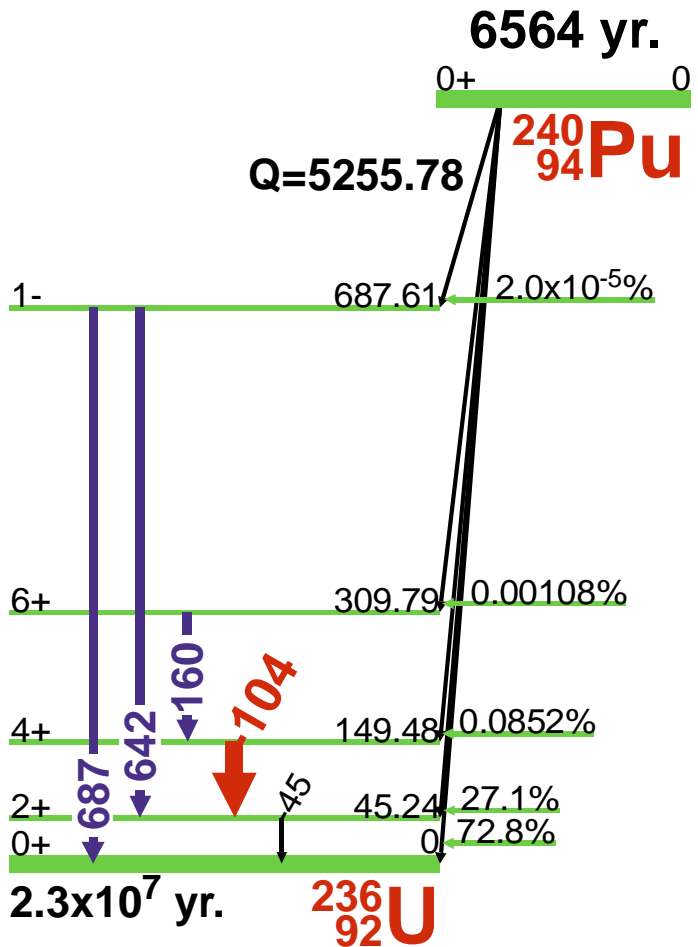
Method of Production: ²³⁸U multiple neutron capture and decays

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data





²⁴⁰Pu(6564 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²⁴⁰Pu

Half Life: 6564(11) yr.

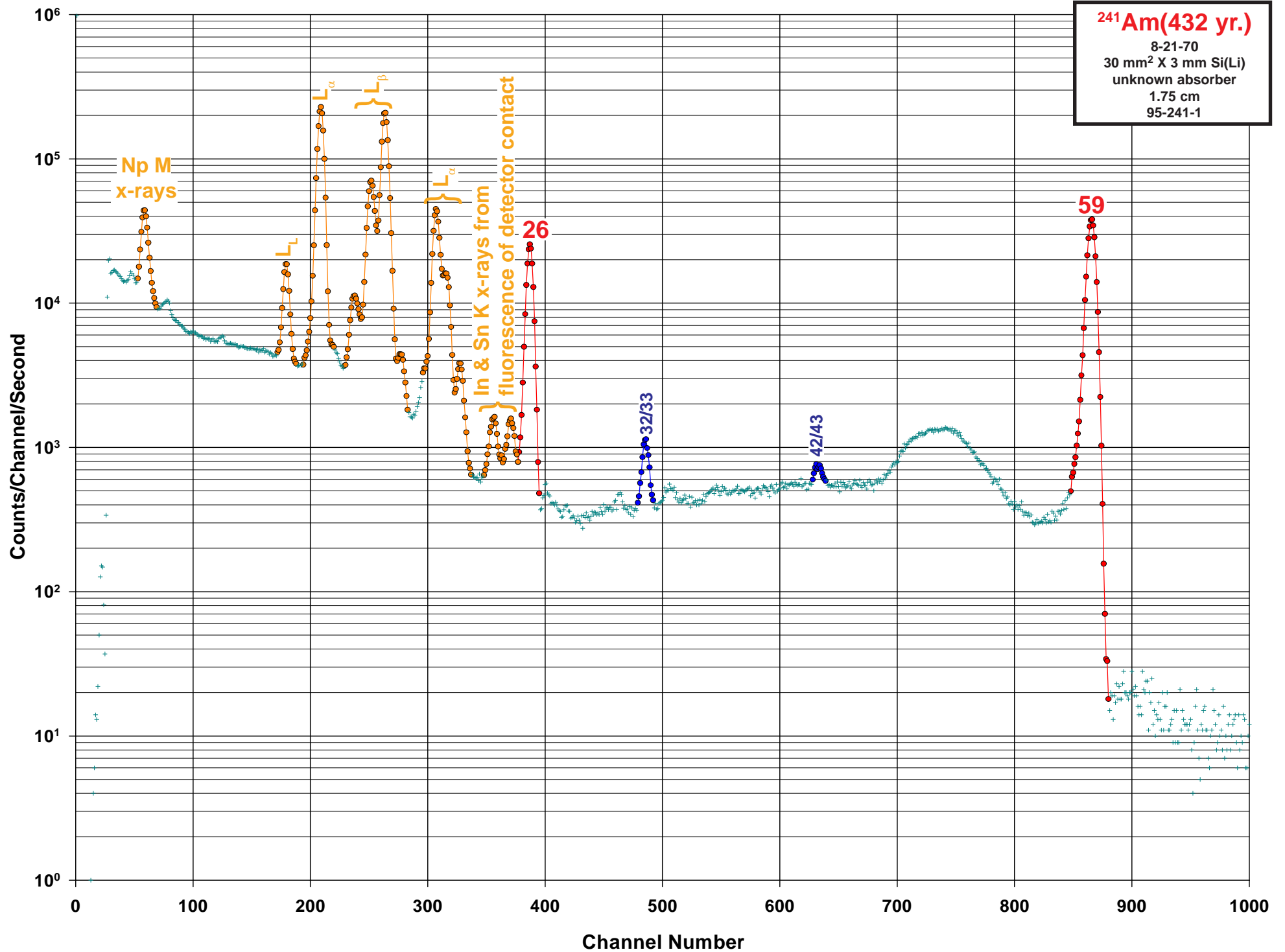
Detector: 2.5 cm³ x 8 mm Ge (Li)

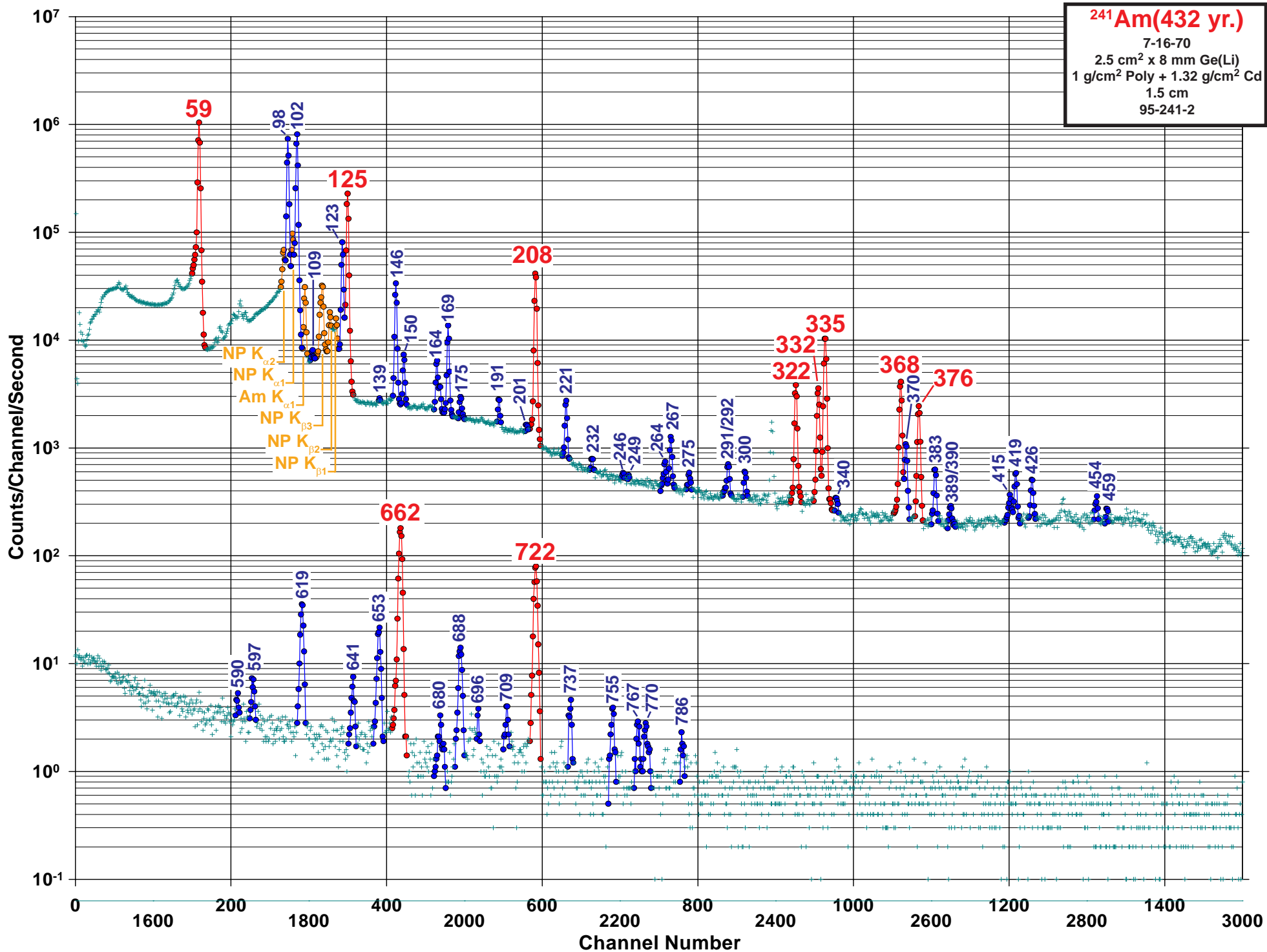
Method of Production: ²³⁹Pu(n,γ)

E _γ (keV)	σ E _γ	I _γ (rel)	I _γ (%)	σ I _γ	S
45.244	0.003		0.0450	0.0009	4
104.234	0.006	100.	0.0071	0.0001	1
160.308	0.003	10.4	0.0004	0.0000	2
212.460	0.050		0.0000	0.0000	4
538.090	0.150		0.0000	0.0000	4
642.350	0.050	0.41	0.0000	0.0000	3
687.570	0.160	0.08	0.0000	0.0000	3
699.000	0.000		0.0000	0.0000	4
873.920	0.150		0.0000	0.0000	4
919.000	0.000				4
958.000	0.000		0.0000	0.0000	4
960.000	0.000		0.0000	0.0000	4
967.000	0.000		0.0000	0.0000	4

E_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

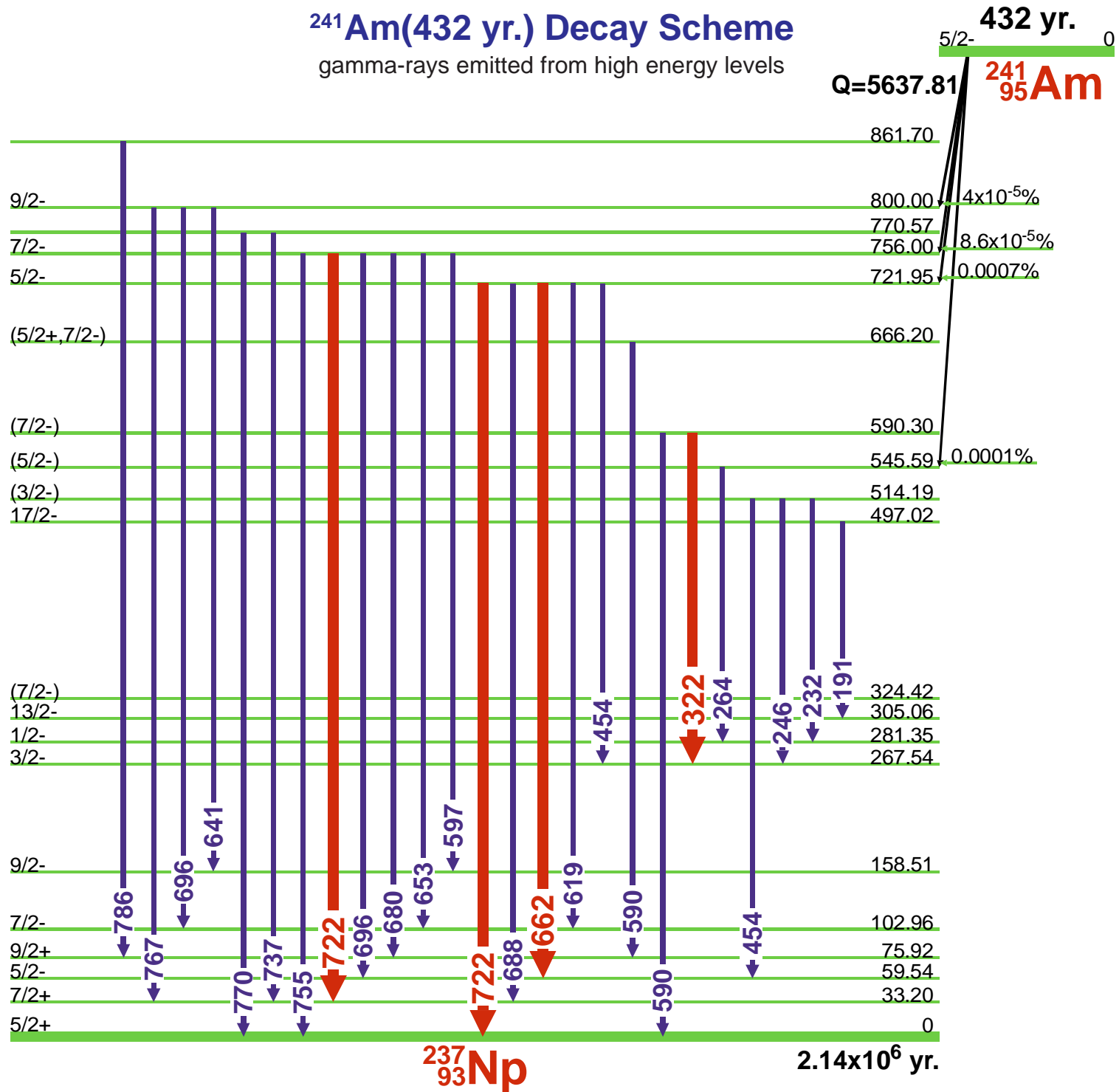






²⁴¹Am(432 yr.) Decay Scheme

gamma-rays emitted from high energy levels



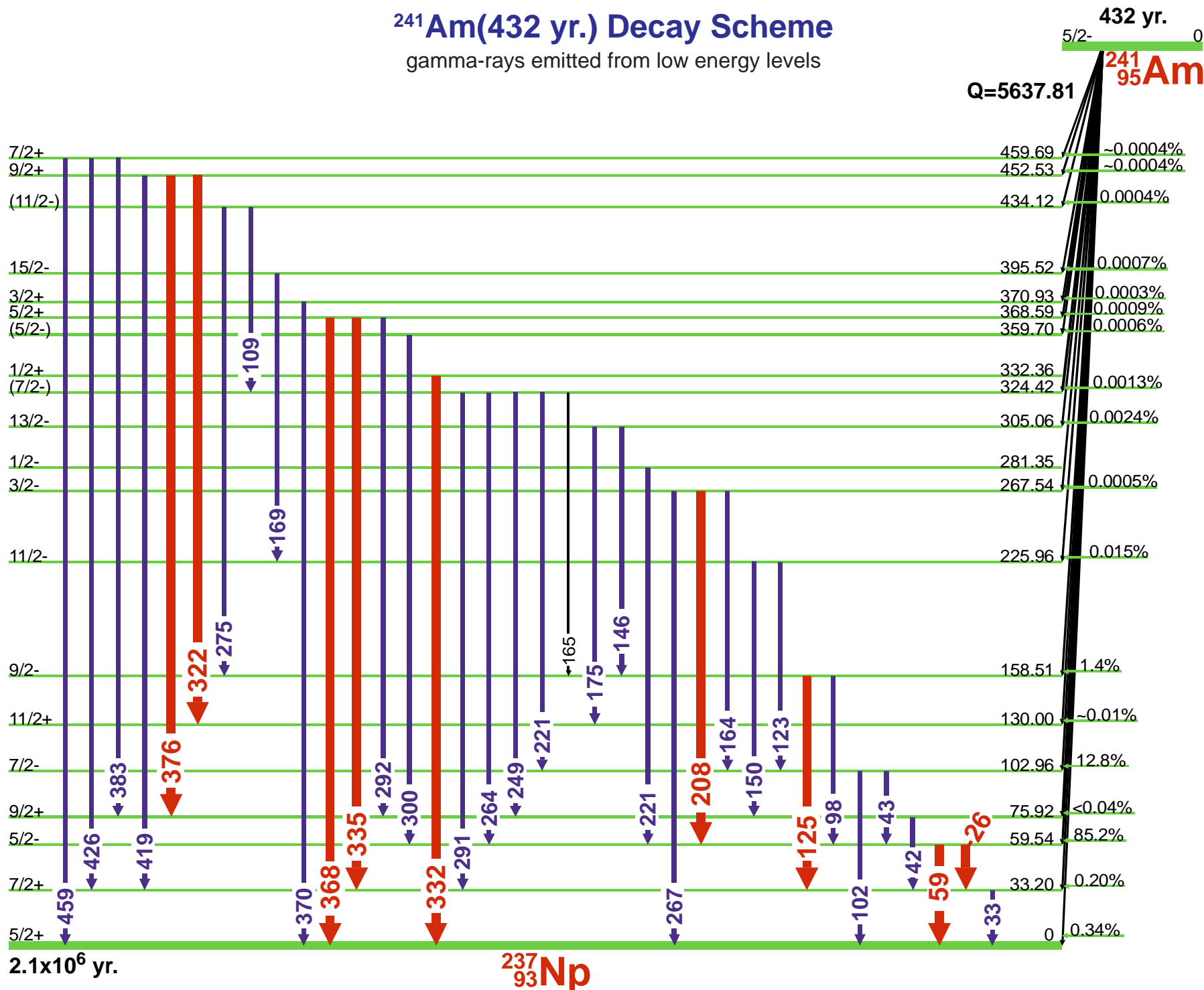
²³⁷₉₃Np

2.14x10⁶ yr.



²⁴¹Am(432 yr.) Decay Scheme

gamma-rays emitted from low energy levels



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: ²⁴¹AmE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 432.2(7) yr.

Detector: 30 mm² x 3 mm Si (Li) & 2.5 cm² x 8 mm Ge (Li)Method of Production: ²⁴¹Pu decay

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	13.81	0.02				4
	26.3448	0.0002	6.2	2.40	0.02	1
	27.03					4
	31.4					4
D	32.183		0.29	0.0174	0.0004	3
	33.196	0.001		0.126	0.003	
	38.54	0.03				4
D	42.73	0.05	0.16	0.0055	0.0011	4
	43.423	0.010		0.073	0.008	
	51.01	0.03		0.000026	0.000012	4
	54.0					4
	55.56	0.02		0.0181	0.0018	4
	56.8					4
	57.85	0.05		0.0052	0.0015	4
	59.5412	0.0001	100.	35.9	0.4	1
	61.46					4
	64.83	0.02		0.000145	0.000018	4
	67.45	0.05		0.00042	0.00010	4
	69.76	0.03		0.0029	0.0004	4
	75.8	0.2		0.00059		4
	78.1					4
	79.1					4
	92.1					4
	96.7	0.2				4
	98.97	0.02		0.0203	0.0004	4
	102.98	0.02	0.091	0.0195	0.0004	4
	106.42	0.05		0.000015		4
	109.70	0.07	0.00008	0.000049		4
	115.54					4
	120.36	0.08		0.0000045		4
	123.01	0.02	0.006	0.00100	0.00003	3
	125.30	0.02	0.017	0.00408	0.00009	1
	128.05					4
	129.2					4
	135.3					4
	136.7					4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	138.5					4
	139.44	0.08	0.00002	0.0000053	0.0000011	4
	146.55	0.03	0.022	0.000461	0.000011	2
	150.04	0.03	0.0004	0.0000740	0.0000021	3
	154.27	0.20		0.00000054		4
	156.4	0.3				4
	159.26	0.20		0.0000014	0.0000005	4
	161.54	0.10		0.0000015		4
	164.69	0.04	0.0003	0.0000667	0.0000024	3
	165.81	0.06	0.0012	0.0000232	0.0000011	4
	169.56	0.03	0.0009	0.000173	0.000004	2
	175.07	0.04	0.00011	0.0000182	0.0000010	4
	190.40			0.0000022	0.0000005	4
	191.96	0.04	0.00014	0.0000216	0.0000010	4
	197.0	0.2		0.00000049		4
	201.70	0.14		0.0000008		4
	204.06	0.06		0.00000290	0.00000019	4
	208.01	0.03	0.0045	0.000791	0.000017	1
D	221.46	0.03	0.0003	0.0000424	0.0000010	3
	221.80	0.04				
	232.81	0.05	0.00004	0.0000046	0.0000003	4
	234.33			0.00000066	0.00000027	4
	246.73	0.10	0.00002	0.00000242	0.00000025	4
	249.00	0.15	0.00002	0.00000054		4
	260.80	0.15				4
	260.80	0.15		0.00000121	0.00000019	4
D	264.89	0.06	0.00006			4
	264.89	0.06		0.0000090	0.0000004	
	267.58	0.05	0.00017	0.0000263	0.0000008	3
	270.63	0.15		0.00000064	0.00000020	4
	275.77	0.08	0.00045	0.0000066	0.0000004	4
	278.04	0.15		0.00000044		4
D	291.30	0.20	0.00010	0.0000031	0.0000003	4
	292.77	0.06		0.0000142	0.0000005	
	300.13	0.06	0.00006			4
	304.21	0.20		0.00000101	0.00000021	4
	309.1	0.3		0.0000014		4

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: ²⁴¹AmE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

Half Life: 432.2(7) yr.

Detector: 30 mm² x 3 mm Si (Li) & 2.5 cm² x 8 mm Ge (Li)Method of Production: ²⁴¹Pu decay

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	316.8	0.2				4
D	322.52	0.03	0.0009			1
	322.52	0.03		0.000152	0.000003	
	332.35	0.03		0.000149	0.000003	
	335.37	0.03		0.000496	0.000010	
	337.7	0.2		0.00000429	0.00000023	4
	340.56	0.08	0.00004	0.0000043		4
	358.25	0.20		0.00000120	0.00000024	4
	368.65	0.03	0.0014	0.000217	0.000005	1
	370.94	0.03	0.0003	0.0000523	0.0000012	3
	376.65	0.03	0.0008	0.000138	0.000003	1
	383.81	0.03	0.0002	0.0000282	0.0000007	3
D	389.0	0.3	0.00004	0.00000049		4
	390.62	0.10		0.00000590	0.00000027	
	398.64	0.15		0.0000020		4
	401.3	3.0		0.00000049		4
	406.35	0.15		0.00000145	0.00000022	4
	415.88	0.10	0.00007	0.0000031		4
	419.33	0.04	0.0018	0.0000287	0.0000008	3
	426.47	0.04	0.00015	0.0000246	0.0000007	4
	429.94	0.10		0.00000115	0.00000023	4
	442.81	0.07		0.0000035	0.0000003	4
	446.43	0.15		0.00000049		4
	452.6	0.2		0.00000240	0.00000025	4
D	454.66	0.08	0.0008			4
	454.66	0.08		0.0000097	0.0000004	
	459.68	0.10		0.00000363	0.00000027	
	463.22	0.20		0.000001		4
	468.12	0.15		0.00000288	0.00000021	4
	485.91	0.20		0.0000010	0.0000003	4
	487.3	0.3				4
	487.3	0.3		0.00000044		4
	512.5	0.3		0.00000115	0.00000023	4
	514.0	0.5		0.00000258	0.00000027	4
	522.06	0.15		0.00000095	0.00000029	4
	529.17	0.20		0.00000046		4

	E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
	545.4	0.3		0.00000074		4
	563.05	0.30		0.00000074		4
	573.94	0.20		0.00000125	0.00000019	4
	582.6			0.00000023	0.00000012	4
	586.59	0.20		0.00000131	0.00000020	4
D	590.28	0.15	0.00002			4
	590.28	0.15		0.00000286	0.00000021	
	597.48	0.08	0.00006	0.0000074	0.0000003	3
	619.01	0.02	0.0004	0.0000594	0.0000006	2
	627.18	0.20		0.00000056	0.00000017	4
	632.93	0.15		0.00000126	0.00000019	4
	641.47	0.05	0.00006	0.0000071	0.0000003	3
	653.02	0.04	0.00022	0.0000377	0.0000011	2
	662.40	0.02	0.0022	0.000364	0.000008	1
	666.5	0.3		0.00000049		4
	669.83	0.20		0.00000038	0.00000012	4
	676.03	0.30		0.00000064	0.00000013	4
	680.10	0.10	0.0003	0.00000313	0.00000017	4
	688.72	0.04	0.00019	0.0000325	0.0000008	2
	693.62	0.08		0.00000368	0.00000017	4
D	696.60	0.05	0.00003			4
	696.60	0.05		0.00000534	0.00000020	
	709.45	0.05	0.00004	0.00000641	0.0000018	3
D	722.01	0.03	0.0012			1
	722.01	0.03		0.000196	0.000004	
	729.72	0.15		0.00000133	0.00000014	4
	731.5			0.00000047	0.00000015	4
	737.34	0.05	0.00004	0.00000800	0.00000024	3
	742.9	0.3		0.00000035		4
	755.90	0.05	0.00004	0.00000760	0.00000028	3
	759.38	0.10		0.00000167	0.00000009	4
	763.9	0.3		0.00000020	0.00000006	4
	767.00	0.10	0.00004	0.00000500	0.00000018	3
	770.57	0.10	0.00004	0.00000474	0.00000021	3
	772.4	0.3		0.00000266	0.00000015	4
	777.2			0.00000006	0.00000003	4

GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: ²⁴¹AmE_γ, σE_γ, I_γ, σI_γ - 1998 ENSDF Data

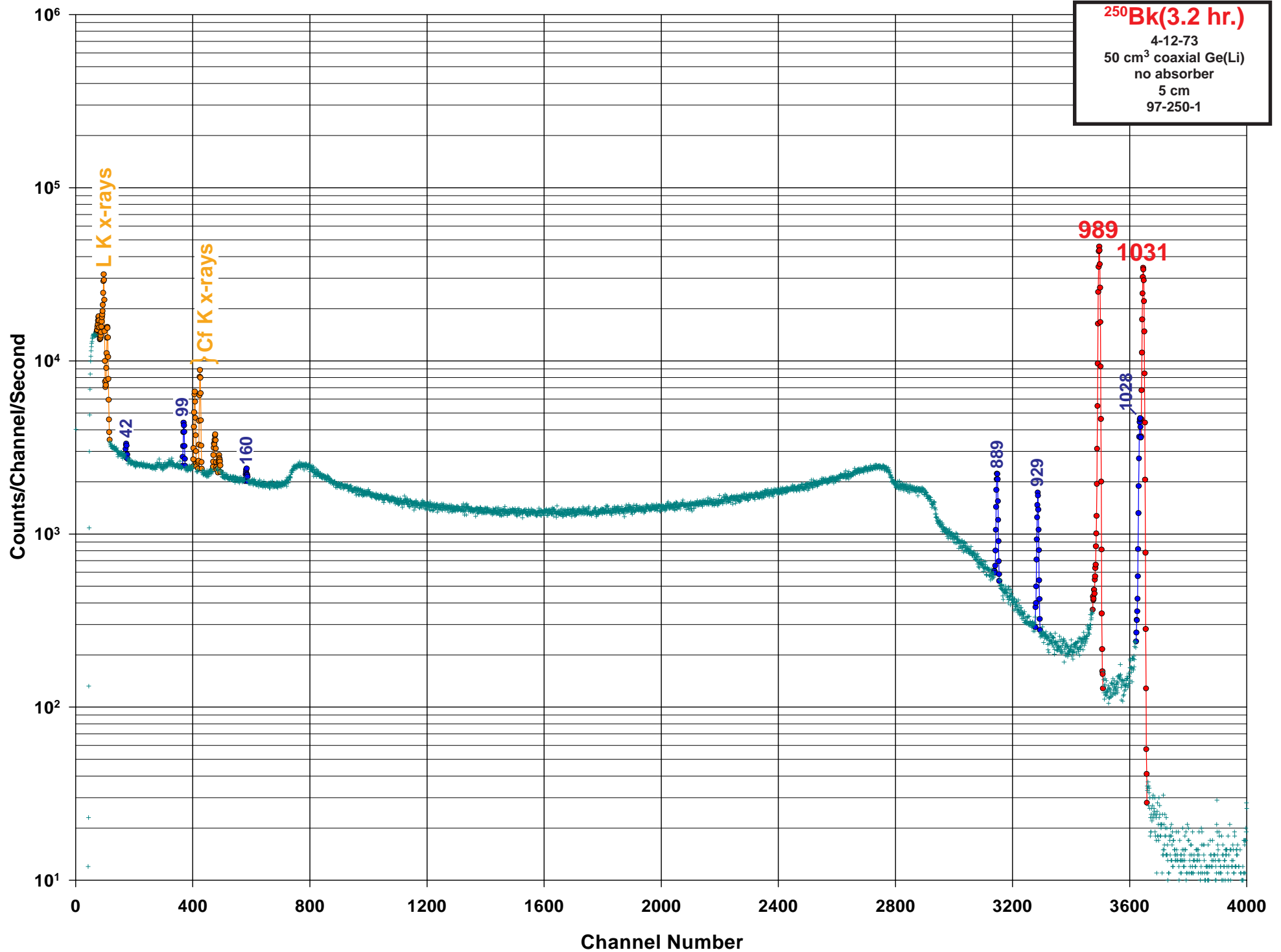
Half Life: 432.2(7) yr.

Detector: 30 mm² x 3 mm Si (Li) & 2.5 cm² x 8 mm Ge (Li)Method of Production: ²⁴¹Pu decay

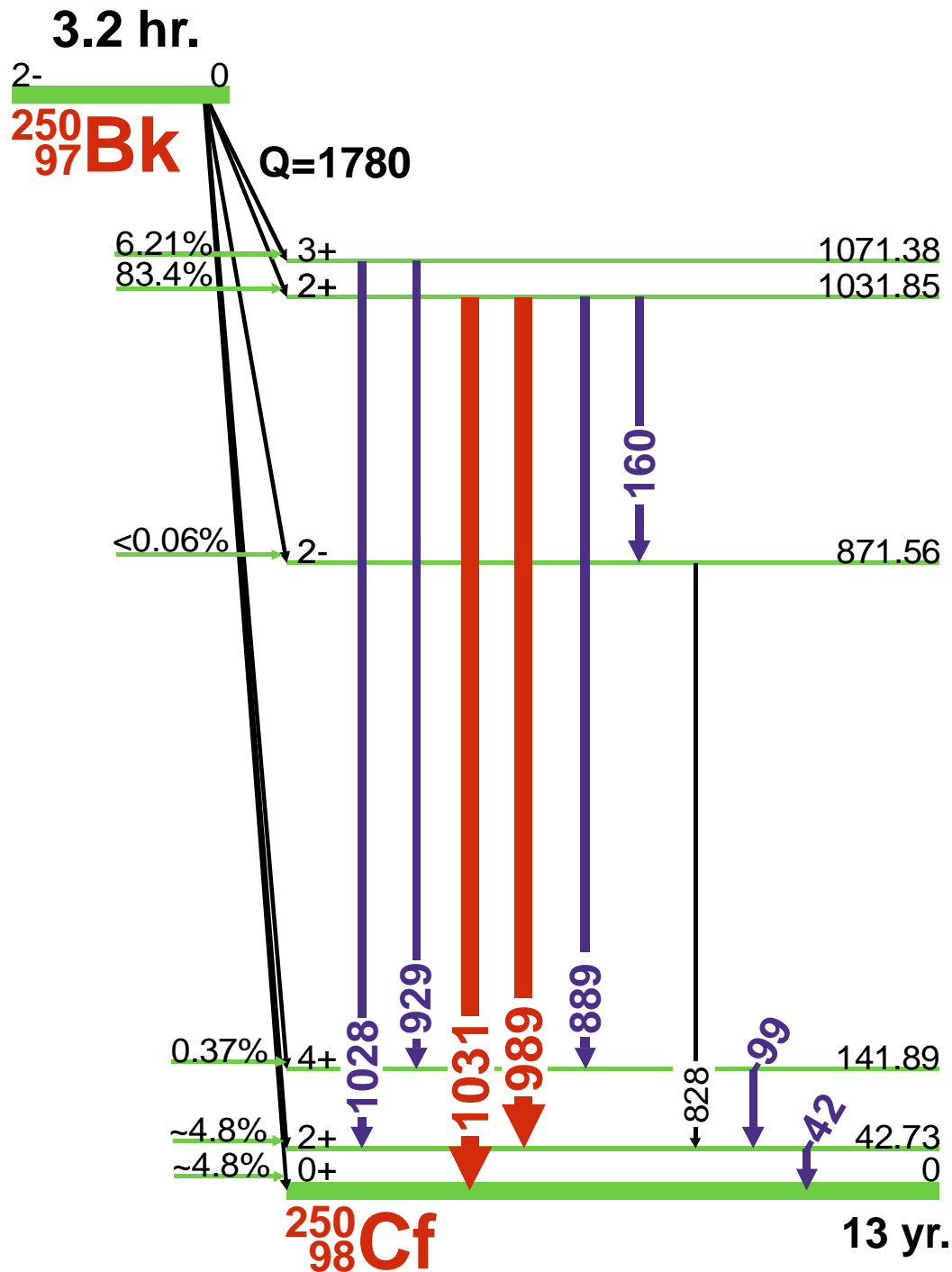
E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
780.7	0.2		0.00000025	0.00000005	4
782.2	0.5		0.00000015		4
786.00	0.15	0.00003	0.00000062		4
789.17	0.25		0.00000039	0.00000006	4
794.92	0.20		0.00000094		4
801.94	0.20		0.00000136	0.00000014	4
806.26	0.30		0.00000031		4
812.01	0.30		0.00000061	0.00000008	4
819.0	1.0		0.00000040	0.00000006	4
822.6			0.00000022	0.00000006	4
828.5			0.00000024	0.00000006	4
835.6	1.0		0.00000021		4
841.5	1.0		0.00000004	0.00000001	4
847.4	0.5		0.00000027	0.00000003	4

E _γ (keV)	σE _γ	I _γ (rel)	I _γ (%)	σI _γ	S
851.6	1.0		0.00000038	0.00000006	4
854.7			0.00000020	0.00000004	4
860.7	0.5		0.00000008	0.00000003	4
862.7	0.5		0.00000053	0.00000006	4
870.7	0.3		0.00000046		4
887.3	0.3		0.00000022	0.00000005	4
898.4			0.00000007	0.00000003	4
902.5			0.00000030	0.00000005	4
912.4			0.00000025	0.00000005	4
921.5	0.3		0.00000019	0.00000004	4
928.8			0.00000006	0.00000003	4
945.7			0.00000006	0.00000003	4
955.7			0.00000058	0.00000006	4
1014.7	0.5		0.00000006	0.00000001	4





²⁵⁰Bk(3.2 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{250}Bk E_γ , σE_γ , I_γ , σI_γ - 1998 ENSDF Data

Half Life: 3.217(5) hr.

Detector: 50 cm³ coaxial Ge(Li)Method of Production: ^{254}Es decay

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
34.320	0.000				4
42.740	0.015	0.093	0.0378	0.0028	4
46.090	0.000				4
80.410	0.000				4
99.166	0.009	0.30	0.1283	0.0071	3
119.400	0.300		0.0007	0.0002	4
126.010	0.030		0.0063	0.0006	4
160.260	0.040	0.08	0.0284	0.0019	4
165.440	0.150		0.0014	0.0002	4
199.720	0.200		0.0011	0.0001	4
303.950	0.200				4
303.950	0.200		0.0023	0.0002	4
555.220	0.100		0.0063	0.0005	4
586.430	0.070		0.0063	0.0005	4
626.110	0.040		0.0234	0.0014	4
786.260	0.140		0.0050	0.0009	4
828.812	0.025		0.1170	0.0066	4
889.956	0.022	3.48	1.5300	0.0353	2
929.468	0.022	2.76	1.2330	0.0284	2
989.125	0.021	100.	45.0000	0.8000	1
1028.654	0.025	12.10	4.9050	0.1607	2
1031.852	0.021	79.26	35.5950	0.8319	1
1047.510	0.050		0.0023	0.0002	4
1068.270	0.170		0.0006	0.0001	4
1098.360	0.160		0.0005	0.0001	4
1102.610	0.000		0.0004	0.0001	4
1103.500	0.000		0.0005	0.0002	4

E_γ (keV)	σE_γ	I_γ (rel)	I_γ (%)	σI_γ	S
1111.500	0.100		0.0011	0.0001	4
1132.800	0.030		0.0193	0.0010	4
1146.670	0.030		0.0126	0.0007	4
1154.300	0.200				4
1154.770	0.030		0.0072	0.0004	4
1167.250	0.030		0.0275	0.0014	4
1175.500	0.000		0.0068	0.0014	4
1175.500	0.030		0.0351	0.0023	4
1201.790	0.030		0.0047	0.0003	4
1223.920	0.040		0.0028	0.0002	4
1244.420	0.070		0.0013	0.0001	4
1253.820	0.070		0.0017	0.0001	4
1266.600	0.200				4
1279.210	0.230		0.0008	0.0001	4
1296.540	0.130		0.0007	0.0001	4
1302.900	0.220		0.0004	0.0001	4
1312.950	0.060		0.0015	0.0001	4
1342.870	0.080		0.0019	0.0001	4
1368.610	0.050		0.0032	0.0002	4
1385.420	0.060		0.0020	0.0001	4
1411.600	0.400		0.0006	0.0001	4
1516.220	0.070		0.0012	0.0001	4
1553.370	0.180		0.0005	0.0001	4
1615.290	0.040		0.0459	0.0024	4
1633.180	0.240		0.0005	0.0001	4
1652.400	0.100		0.0010	0.0001	4
1658.000	0.040		0.0275	0.0014	4

