Call for Applications

Post-doctoral position (18 months)
« Electromagnetic transitions as a probe of clustering in nuclei »

Position to be filled as of March 1st, 2014

This position is supported by the USIAS\(^1\) fellowship awarded to Dr D. Jenkins for 18 Months, but there is a possibility for extension.

Nuclear physics is presently undergoing a renaissance with the availability of intense radioactive beams. Allied to this are key developments in detector technology which promises a step change in what is achievable. The structure of the nucleus and how it behaves in different circumstances may be understood as a complex interplay between the individual, single-particle structure and collective structure where the nucleons act coherently. A further way of describing the nucleus is the so-called alpha cluster model, where nuclear states in some light nuclei are considered as built up from building blocks of alpha particles rather than individual protons and neutrons. Clustering in nuclei has traditionally been explored principally via nuclear reaction studies. This project will address some key issues associated with alpha clustering using a new approach based on searching for electromagnetic transitions connecting cluster states. The availability of the PARIS calorimeter, in which the nuclear physics group at IPHC in Strasbourg has played a leading role, promises to revolutionise our ability to study electromagnetic transitions. This calorimeter makes use of the novel scintillator material, lanthanum bromide, which has excellent energy resolution. Experiments are anticipated at IPN Orsay and at the iThemba laboratory in South Africa. This project will be carried out in close collaboration with the cluster group at the IPHC in Strasbourg. The project has the potential to open up new directions in nuclear physics and may have important applications to nuclear astrophysics – the origin of the chemical elements.

\(^1\) The University of Strasbourg Institute for Advanced Study (USIAS) aims to support innovative, original research, and to enable reflection and synthesis at the highest level. For more information see http://www.usias.fr

Role description
They will support the project:
- performing numerical simulations of physics cases associated with the project
- designing the corresponding experiments
- testing detectors and setting up electronics
- analysing the data
- publishing results in peer reviewed journals and international conferences

They will be based at IPHC (Institut Pluridisciplinaire Hubert Curien, Strasbourg, France) and supervised by Dr S. Courtin and Dr D. Jenkins (Reader at the University of York, UK, on secondment at IPHC as a USIAS Fellow).

Profile
The applicant should hold or be close to finishing a PhD in experimental nuclear Physics.

Essential skills:
- gamma-ray spectroscopy and/or charged particle spectroscopy,
- experience with analysing complex data sets,
- willingness to travel and participate in experiments at national and international facilities.

Desirable skills:
- Background in nuclear reaction studies,
- Simulations using GEANT4,
- C++ / Root,
- Ability to work in a team,
- Good communication skills.

**Procedure**
Applications (letter of motivation + CV + 2 letters of reference) are to be sent to Dr David Jenkins and Dr Sandrine Courtin not later than November 30th 2013. Interviews should take place in the week of January the 6th 2014.

Contact:
Dr David Jenkins: david.jenkins@york.ac.uk
Dr Sandrine Courtin: sandrine.courtin@iphc.cnrs.fr