

COURSE ANNOUNCEMENT, SPRING 2014
UNIVERSITY OF ZÜRICH, IRCHEL

- **Title:** Torsions.
- **Instructor:** Pavel Mnev.
- **Schedule:** Thursdays 10:15–12:00 at Y27H12 (IrcHEL). First lecture on 20.02.13.
- **Intended audience:** Master and PhD students.

For further details please contact Pavel Mnev at pmnev@pdmi.ras.ru.

Abstract: Historically, the torsion for cell complexes was first introduced in the works of Reidemeister, Franz and de Rham and was the first example of an invariant of topological spaces that is sharper than a homotopy invariant (i.e. which can distinguish homotopic but not homeomorphic spaces). We will discuss different notions of torsion arising in algebraic topology, in particular Reidemeister, Whitehead and Ray-Singer (analytic) torsions and, time permitting, Igusa-Klein's higher torsions. We will also discuss some applications of torsions, e.g. the classification of lens spaces up to homeomorphism and Witten's calculation of the symplectic volume of the moduli space of flat connections on a surface.

- **General area:** Algebraic topology.
- **Background requirements:** Standard courses in analysis, basics of algebraic topology and differential geometry.
- **References:**
 - J. Milnor, “Whitehead torsion”, Bull. Amer. Math. Soc. 72, 3 (1966) 358–426.
 - V. Turaev, “Introduction to combinatorial torsions”, Springer, 2001.
 - M. M. Cohen “A course in simple-homotopy theory”, Springer, 1973.