

# Oberseminar zur Algebra

Lehrstühle A und D für Mathematik

## Vortragsankündigung

*Zeit und Ort:* **Donnerstag, 12. November 2009, 14.00 Uhr bis 15.30 Uhr** in Fo 6 (Kármán)

*Vortragender:* **Prof. Robert Wilson (University of London)**

*Titel:* **Octonions and the Leech lattice**

*Inhalt:* The Leech lattice is a very special mathematical object, with important connections to group theory, number theory, combinatorics, coding theory, and even theoretical physics. It lives in 24-dimensional real space, where it can be constructed using the famous Golay code, itself a very special object. Alternative constructions in 12-dimensional complex space and 6-dimensional quaternionic space have been known for decades, and are in some sense easier. But attempts to find a 3-dimensional octonionic version were less successful, largely because the failure of associativity means that there is no such thing as linear algebra over octonions (also known as Cayley numbers). Recently I have managed to overcome these obstacles, and describe the Leech lattice as a set of triples of octonions with the “obvious” norm, using the Coxeter-Dickson “integral Cayley numbers” to give a very simple definition. The automorphism group (the double cover of Conway’s group) can then be generated by some symmetries which are very easily described in terms of multiplication by octonion matrices (which are not the same as linear maps!). In particular, the so-called “Suzuki chain subgroups” are easily visible.

Wir laden alle Interessierten herzlich zu diesem Vortrag ein.