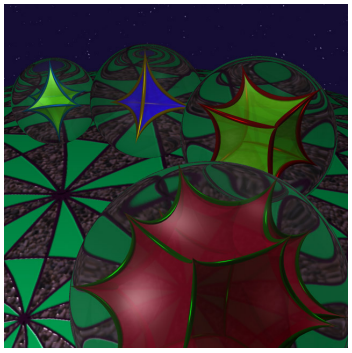
Oberseminar Geometrie
Department of Mathematics
University of Fribourg
Seminar room, Math II (Lonza)
Wednesday October 17, 2018, 10:20-12:00



ALEXANDER RAHM (University of Luxembourg)

Hyperbolic orbifolds and their twisted sectors

An especially nice family of hyperbolic orbifolds, which is of particular interest in number theory, are the Bianchi orbifolds, which arise from the action of the Bianchi groups - namely the SL_2 matrix groups over imaginary quadratic rings of integers - on hyperbolic 3-space (which is their associated symmetric space). The Bianchi groups are prototypical for groups of hyperbolic motions linking to number theory, because each non-cocompact arithmetic Kleinian group is commensurable with some Bianchi group.

When we complexify hyperbolic 3-space, we obtain complexified Bianchi orbifolds, whose Chen-Ruan orbifold cohomology ring was conjectured by Ruan to be isomorphic to the cohomology ring of a crepant resolution for the complexified orbifold, which makes it interesting for mathematical string theory. This conjecture has been proven by Fabio Perroni and the speaker.

In this talk, we will look into the computation of the sectors of the Chen-Ruan orbifold cohomology which made this proof possible. For its non-twisted sector, software has been developed which constructs fundamental domains for the action of the Bianchi groups, and hence determines the orbit space. And for its twisted sectors, there is a technique of the speaker, called Torsion Subcomplex Reduction, which allows to produce formulas for the cohomological torsion; we will look into how this allows to control the centralizer quotients which constitute the twisted sectors.