ZURICH GRADUATE COLLOQUIUM

Tuesdays, 5:15 pm
Hermann Weyl Zimmer, ETH Zentrum
in alternation with the
Zurich Colloquium in Mathematics

Speaker: **Fred Rohrer (UniZh)**

Title: **Asymptotic Behavior of Local Cohomology**

Date: Tuesday, May 3rd

Local cohomology is sort of a translation of sheaf cohomology from algebraic geometry into commutative algebra. The objects of interest are the cohomology modules $H^i(X, \mathcal{F}(n))$ of the n-th twist of a sheaf $\mathcal{F}$ over a projective scheme X. It is known that these modules vanish for sufficiently large values of n. Moreover, a classical result of Severi-Enriques-Zariski-Serre states, that they also vanish for sufficiently small values of n, if i is smaller than the so-called subdepth of $\mathcal{F}$, an invariant defined by local information on $\mathcal{F}$ and X. For bigger values of i not much is known in general on the behaviour of these modules for $n \to -\infty$, but under certain assumptions on X or i we will show that they behave quite nice.

In the talk we will first give a little introduction in the geometric setting and the translation into algebra. Following this, we will explain – from a purely algebraic view – how local cohomology is defined and also review (most of) the definitions and facts concerning graded rings and modules and their invariants which are necessary to follow. Afterwards, we will present some results on the above mentioned asymptotic behaviour und relate them to some further fundamental questions on this theme, namely the problems of tameness and asymptotic stability of some sets of prime ideals.

`http://www.math.ethz.ch/graduate/colloquium`

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