# General Mathematics Seminar (GMS)

## —————— of the University of Luxembourg

in cooperation with the Luxembourg Mathematical Society

**Monday, 9th of July 2018, 4:30 pm**

**Campus Belval, Maison du Nombre, room MNO 1.050**

## Prof. Dr. Werner Müller (University of Bonn)

Werner Müller is Professor of Mathematics at the University of Bonn. His research interests encompass global analysis, harmonic analysis on locally symmetric spaces, and the theory of automorphic forms. He has received a Max-Planck research award and has been an invited speaker on the ICM in Warsaw and ECM in Paris. He is a member of the Academy of Sciences of Berlin-Brandenburg, of the German National Academy of Sciences "Leopoldina" and the Academia Europaea. He has held visiting positions at the IAS (Princeton), the IHES (near Paris), Max-Planck Institute of Mathematics (Bonn), MSRI (Berkeley), Stanford University.



### *Analytic torsion of locally symmetric spaces*
### *and torsion in the cohomology of arithmetic groups*

An arithmetic group is a discrete subgroup in a semisimple Lie group which is defined by arithmetic conditions such as matrices with integer entries which satisfy congruence conditions. The cohomology of such groups carry deep arithmetic information. For example, torsion cohomology classes which are eigenclasses of all Hecke operators are expected to correspond to Galois representations over finite fields. In this talk I will discuss various aspects of the growth of torsion in the cohomology of arithmetic groups with respect to sequences of congruence subgroups or modules of growing rank. I will start with explaining the work of Bergeron and Venkatesh on the cocompact case and then explain results concerning the extension to the case of groups of finite covolume. The method is analytic and is based on the study of the Ray-Singer analytic torsion of the associated locally symmetric spaces. The analytic techniques for probing torsion in the cohomology lead to independent problems in differential geometry and analysis which I also will discuss as time permits.

Coffee and cookies: 16:10 on the 6th floor of the MNO, in the kitchen corner of maximal distance to the elevator.

Time and place of the talk: 16:30 (4:30 p.m.) in the Maison du Nombre, MNO 1.050

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