

MATHEMATICS SEMINAR  
of the  
UNIVERSITY OF LUXEMBOURG  
in cooperation with the  
LUXEMBOURG MATHEMATICAL SOCIETY

**October 2009**

**6 October 2009, at 5 pm**

**Room 3.04 bs**

Pablo Ramacher  
University of Göttingen

**On the distribution of the spectrum of an invariant elliptic operator**

Abstract

The asymptotic distribution of eigenvalues of an elliptic operator has been the subject of mathematical research for many years. The first results were obtained by Weyl employing variational techniques. Later, Hörmander extended these results to elliptic pseudodifferential operators on a closed manifold  $M$  using the theory of Fourier integral operators, and showed that Weyl's law is satisfied in great generality. Let now  $G$  be a compact Lie group acting on  $M$  by isometries, and assume that  $Q$  commutes with the regular representation of  $G$  in  $L^2(M)$ . It is then natural to ask for the asymptotic distribution of the spectrum along the isotypic components in  $L^2(M)$ . While first order asymptotics can be obtained in the general case of effective group actions by using heat kernel methods, the derivation of remainder estimates within the framework of Fourier integral operators meets with serious difficulties when singular orbits are present. The reason for this is that in this case the corresponding wave front sets are no longer smooth manifolds. In this talk, we show how to circumvent this obstacle by making use of partial desingularization to obtain remainder estimates in the case of singular group actions.

**13 October 2009, at 5 pm**

**Room 3.04 bs**

Andrzej Zuk  
University Paris 7

### **Amenability**

Abstract

The notion of amenability was introduced by von Neumann in 1929 and became fundamental in the study of asymptotic properties of groups. We present new constructions of amenable groups.

**27 October 2009, at 5 pm**

**Room 3.04 bs**

Philippe Bonneau  
University Paul Verlaine, Metz

### **Universal deformation formulas and locally compact quantum groups**

Abstract

We recall the notion of (formal) Universal Deformation Formula of Giaquinto and Zhang and look at it in the framework of strict deformation quantization (“à la” Rieffel). We give examples coming from the quantization of symplectic symmetric spaces. From these examples, still by analogy with the formal setting, we try to construct locally compact quantum groups (LCQG). Then we discuss the different approaches of LCQG (Woronowicz, Vaes,...) and see how our examples fit in these frameworks.