

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

June 2008

3 June 2008, at 5 pm

Room 3.04 bs

Mathieu Stienon  
Penn State University, USA

**Gerbes, principal 2-group bundles and characteristic classes**

Abstract

It is well known that a principal  $G$ -bundle  $P$  over a manifold  $M$  determines a homotopy class of maps  $f$  from  $M$  to the classifying space  $BG$  of the group  $G$ . Pulling back the generators of  $H^*(BG)$  through  $f$ , one obtains characteristic classes of the principal bundle  $P$  over  $M$ . It is a classical theorem of Chern and many others that these characteristic classes coincide with those obtained from the Chern-Weil construction using connections and curvatures. Gerbes are higher order analogues of principal bundles. We will discuss an analogue of Chern's theorem for gerbes. The idea is to relate Gerbes to 2-group principal bundles, and to study characteristic classes of these principal 2-group bundles. Recently, physicists motivated by string theory have been increasingly interested in 2-group bundles.

10 June 2008, at 3.15 pm

Room 3.04 bs

Friedrich Wagemann  
University of Nantes

**Deformations of Lie algebras induced by families of curves**

Talk in the frame of the Mini-Workshop "Krichever-Novikov type algebras and related subjects"

Abstract

It is well-known that the moduli space  $M_{g,n}$  of projective curves of genus  $g$  with  $n$  marked points is an algebraic stack. We introduce another stack  $\text{Def}$ , the stack of deformations of Lie algebras, with the goal to formalise the construction of deformations of Lie algebras of vector field by families of curves as given by Fialowski and Schlichenmaier. This gives a morphism of stacks which is nearly a monomorphism. We develop the role of Kac-Moody algebras in this framework.

**10 June 2008, at 5 pm**

**Room 3.04 bs**

Nicolas Juillet  
Universities of Grenoble and Bonn

### **Synthetic Ricci curvature for the Heisenberg group**

Abstract

Lott and Villani and simultaneously Sturm recently introduced a property for geodesic metric measure spaces  $(X, d, m)$  that has to be understood as an uniform lower bound for Ricci curvature (which usually only make sense for Riemannian manifolds). This property called “curvature-dimension” involves mass transportation and especially the behaviour of entropy functionals on the space of probability measures of  $X$ . We will investigate what happens when  $X$  is the sub-Riemannian Heisenberg group. The property does not hold but surprisingly the weaker “measure contraction property” does.

**17 June 2008, at 5 pm**

**Room 3.04 bs**

Tom Schmitz  
MPI Leibniz

**Title: TBA**

**24 June 2008, at 5 pm**

**Room 3.04 bs**

Benjamin Enriquez  
University of Strasbourg

### **Quantization of quasi-Lie bialgebras**

Abstract

The classical limit of a quasi-Hopf algebra deforming an enveloping algebra is a quasi-Lie bialgebra (Drinfeld). The problem of inverting this map is called the quantization

problem of quasi-Lie bialgebras. We explain the solution of this problem, which we recently obtained with G. Halbout. It relies on the deformational approach to quantization problems (Gerstenhaber-Schack, Shnider-Sternberg), the study of a suitable prop, the vanishing of certain cohomology groups, and the existence of quantization functors for Lie bialgebras (Etingof-Kazhdan).