

**General Mathematics Seminar  
of the  
University of Luxembourg**

**In cooperation with the  
Luxembourg Mathematical Society**

**November 2010**

Tuesday, Nov 9, 2010, 17:00

Campus Kirchberg, room A02

**Ioannis Dokas**

(Department of Mathematics and Statistics, University of Cyprus, Nicosia, Cyprus)

**Structures in prime characteristic with additional operations**

First we will give elements of the theory of restricted Lie algebras. Then moving to the pre-Lie context we introduce and study the notion of restricted pre-Lie algebra which is the analogue of the notion of restricted Lie algebra in the Lie context.

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**Tuesday, November 16, 2010, at 17:00**

**Campus Kirchberg, room A02**

Prof. Sergiu I. Vacaru  
( University Al. I. Cuza, Iasi, Romania )

**Almost Kahler - Ricci Flows and Deformation Quantization of Gravity**

Abstract:

We show that the Einstein and Horava-Lifshitz gravity theories can be defined canonically in terms of almost Kaehler-Finsler geometric objects. This allows us to perform a (Fedosov type) deformation quantization of such gravity models. The constructions can be generalized to Ricci flows of classical and quantum gravity theories.

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**Tuesday, November 23, 2010, at 17:00**

**Campus Kirchberg, room A02**

Arthemy V. Kiselev  
( Utrecht, The Netherlands )

**Variational Lie algebroids and homological evolutionary vector fields**

Abstract:

The construction of Lie algebroids over smooth manifolds is important in differential geometry (particularly, in Poisson geometry) and appears in various models of mathematical physics (e.g., in Poisson sigma-models). We extend the classical definition of Lie algebroids over smooth manifolds [e.g., Vaintrob'1997] to the construction of variational Lie algebroids over infinite jet spaces. We define these structures in a standard way via vector bundles and also through homological vector fields  $Q^2 = 0$  on infinite jet super-bundles, then proving the equivalence. Our generalization of the classical construction manifestly respects the geometry which appears under mappings between smooth manifolds. For this reason, the variational picture, which we develop here, more fully grasps the geometry of strings in space-time [Alexandrov, Kontsevich, Zaboronsky, Schwarz'1997]. [This talk follows the paper joint with J.W. van de Leur: arXiv:math.DG/1006.4227v2 (October 31, 2010), 15p.]

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**November 2010**

**Tuesday, November 30, 2010, at 17:00**

**Campus Kirchberg, room A02**

Christian Pauly  
( University of Montpellier )

**On the monodromy of the Hitchin connection**

Abstract:

In this talk I will show that the monodromy representation of the projective Hitchin connection on the sheaf of generalized theta functions on the moduli space of vector bundles over a curve has an element of infinite order in its image. I will explain the link with conformal blocks and KZ equations and I will give some applications in the context of the Grothendieck conjectures on the  $p$ -curvatures of a local system.