

The Swiss Doctoral Program in Mathematics

Journée Georges de Rham

Wednesday, March 9, 2011, EPF Lausanne, lecture room CM1

15.30 **Mikhail Kapranov** (Yale University)
Formal loops and chiral differential operators

Abstract: The lecture will explain the construction of LX , the space of formal loops of an algebraic variety X , which is a certain algebro-geometric model for the space of free loops. It will also explain how natural sheaves of vertex algebras on X (chiral de Rham complex, chiral differential operators) can be interpreted in terms of LX .

16.30 **Coffee break**

17.00 **Don Zagier** (MPI Bonn / Collège de France)
From mock theta functions to black holes

Abstract: "Mock theta functions" was the name given by Ramanujan to a collection of functions he discovered shortly before his death that had beautiful combinatorial properties, but, for over 80 years, no clear mathematical definition. The situation has changed since 2002 with the work of S. Zwegers and his successors, and there is now a well defined theory of "mock modular forms" generalizing classical modular forms. This theory has already had a number of applications, notably to the phenomenon of "wall-crossing" in algebraic geometry (Donaldson invariants of moduli spaces) and physics, and there are also many beautiful special examples with Fourier coefficients related to, for instance, class numbers of imaginary quadratic fields or to irreducible representations of the Mathieu group M_{24} . The lecture will give a survey of the theory and an application to the quantum theory of black holes.

18.00 **Apéro**

19.15 **Repas** au Grand Café de Casino, Lausanne. Les personnes intéressées sont priées de s'inscrire jusqu'au 28 février auprès d'Anders Karlsson (anders.karlsson@unige.ch).

Organisation: Anders Karlsson (Université de Genève)

