

## Modular forms and Calabi-Yau varieties

2014 - 07 - 07 (Mon.)

13:30 - 15:00

R440, Astronomy and Mathematics Building

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Classical modular forms and in general automorphic forms enjoy  $q$ -expansions with fruitful applications in different branches of mathematics. From another side we have  $q$ -expansions coming from the B-model computations of mirror symmetry which, in general, are believed to be new functions. In this series of talks I will present a common algebro-geometric framework for all these  $q$ -expansions. This is based on the moduli of varieties with a fixed topological data and enhanced with a basis of the algebraic de Rham cohomology, compatible with the Hodge filtration and with a constant intersection matrix. In our way, we will also enlarge the algebra of automorphic forms to a bigger algebra which is closed under canonical derivations. I will mainly discuss two examples: 1. Elliptic curves and classical modular forms, 2. Mirror quintic Calabi-Yau varieties, Yukawa coupling and topological partition functions. The talks are based on the following articles available in arxiv: H. Movasati, Modular-type functions attached to mirror quintic Calabi-Yau varieties, H. Movasati, Quasi-modular forms attached to elliptic curves I, *Annales Mathématique Blaise Pascal*, v. 19, p. 307-377, 2012.

