Leonor Godinho (IST Lisboa)

Time: Thursday 30/6 at 9h15

Title: *Reflexive polytopes and moduli spaces of parabolic bundles over the Riemann sphere*

Abstract: Introduced by Batyrev in 1993, reflexive polytopes have been extensively studied due to their fascinating combinatorial properties and their relation to mirror symmetry through the corresponding toric Fano varieties. In the context of moduli spaces of rank-2 stable parabolic bundles with trivial determinant over the Riemann sphere, we will see which of these spaces are Fano. As an application, we give a complete classification in (complex) dimension <= 4 and, in the toric case, we describe the accompanying reflexive polytopes. These spaces are particularly interesting since they carry actions of symmetric groups. (This is ongoing work with Ricardo Rodrigues).

Sergey Mozgovoy (Trinity College Dublin)

Time: Thursday 30/6 at 10h30

Title: *DT invariants of some 3CY quotients*

Abstract: Crepant resolutions of quotients of C^3 by finite groups can be interpreted using the corresponding McKay quiver and the canonical potential over it. I will discuss refined Donaldson-Thomas invariants of the induced Jacobian algebra in the cases of finite subgroups of SL2 and SO3, where the quotient singularity admits a small crepant resolution and the McKay quiver is symmetric.

Ben Davison (Edimburgh)

Time: Thursday 30/6 at 12h

Title: *Nonabelian Hodge isomorphism for moduli stacks*

Abstract: The nonabelian Hodge isomorphism provides a homeomorphism between coarse moduli spaces of degree zero Higgs bundles on a smooth projective curve of genus g, and the coarse moduli space of representations of the fundamental group of the underlying Riemann surface. In particular, the singular cohomology, Borel-Moore homology and intersection cohomology of these varieties are isomorphic. In this talk I will explain how to produce an analogous isomorphism between the BM homologies of the respective stacks, and various applications to chi-independence phenomena, equivalence of P=W conjectures, and integrality conjectures. This is joint work with Lucien Hennecart and Sebastian Schlegel-Mejia.

Mario García Fernández (UAM Madrid)

Time: Thursday 30/6 at 14h30

Title: *(0,2) mirror symmetry on homogeneous Hopf surfaces*

Abstract: I will present recent joint work with Luis Álvarez-Cónsul and Andoni De Arriba de La Hera in arXiv:2012.01851, where we find first examples of (0, 2) mirror symmetry on compact non-Kähler complex manifolds. For this we follow Borisov's approach to mirror symmetry using vertex algebras and the chiral de Rham complex. Our examples of (0,2) mirrors are given by pairs of Hopf surfaces endowed with a Bismut-flat pluriclosed metric. Requiring that the geometry is homogeneous, we reduce the problem to the study of Killing spinors on a quadratic Lie algebra and the construction of associated $N = 2$ superconformal structures on the superaffine vertex algebra, combined with topological T-duality.

Luis Diogo (Uppsala)

Time: Thursday 30/6 at 16h

Title: *The Floer cohomology of Lagrangian tori in the cotangent bundle of the 2-sphere*

Abstract: Valuable information about a symplectic manifold is obtained through the study of its Lagrangian submanifolds, and a lot of this information is encoded in the Fukaya category. In this talk we will see that, from the point of view of the Fukaya category, all Lagrangian tori in the cotangent bundle of the 2-sphere behave in a manner similar to the classical Entov-Polterovich tori.

Lino Amorim (Kansas)

Time: Friday 1/7 at 9h15

Title: *Enumerative invariants from Calabi-Yau categories*

Abstract: Kontsevich suggested that enumerative predictions of Mirror Symmetry should follow directly from Homological Mirror Symmetry. This requires a natural construction of analogues of Gromov-Witten invariants associated to any dg or A-infinity Calabi-Yau category (with some extra choices). I will survey two approaches to this construction: 1) categorical primitive forms, a non-commutative version of Saito's theory of primitive forms for singularities, which gives only genus zero invariants; 2) Costello's enumerative invariants which conjecturally give invariants in all genera.

Filipo Viviani (Roma Tre)

Time: Friday 1/7 at 10h30

Title: *The Picard group of the universal moduli stack of principal bundles on pointed curves*

Abstract: I will report on a joint work with R. Fringuelli in which we determine the Picard group of the universal moduli stack of G-bundles over the moduli stack of pointed curves, for any connected linear algebraic group G.

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Xenia de la Ossa (Oxford)

Time: Friday 1/7 at 12h

Title: *Mirror symmetry, arithmetic and black holes*

Abstract: The main goal of this talk is to explore whether there are questions of common interest, in the context of the arithmetic of Calabi Yau 3-folds, to physicists, number theorists and geometers.
The main quantities of interest in the arithmetic context are the numbers of points of the manifold considered as a variety over a finite field. We are interested in the computation of these numbers and their dependence on the moduli of the variety. The surprise for a physicist is that the numbers of points over a finite field are also given by expressions that involve the periods of a manifold. The number of points are encoded in the local zeta function, about which much is known in virtue of the Weil conjectures. In these talks we discuss a number of interesting topics related to the zeta function, mirror symmetry and the appearance of modularity for one parameter families of Calabi-Yau manifolds. In particular, we describe the relation between the zeta functions of a Calabi-Yau and its mirror.
Time permitting, I will report on an example for which the quartic numerator of the zeta function factorises into two quadrics at special values of the parameter which satisfy an algebraic equation with coefficients in Q (so independent of any particular prime), and for which the underlying manifold is smooth. We note that these factorisations are due to a splitting of the Hodge structure and that these special values of the parameter are rank two black hole attractor points in the sense of type IIB supergravity. Modular groups and modular forms arise in relation to these attractor points. To our knowledge, the rank two attractor points that were found by the application of these number theoretic techniques, provide the first explicit examples of such points for Calabi-Yau manifolds of full SU(3) holonomy. We will describe this scenario also for the mirror manifold in type IIA supergravity.

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