

## Miniworkshop on

# DERIVED CATEGORIES AND MIRROR SYMMETRY

### PROGRAMME

10:00-11:00 Jacopo Stoppa  
11:30-12:30 Sebastian Opper  
lunch break  
14:00-15:00 Anna Barbieri  
15:15-16:15 Andreas Hochenegger

### WHEN AND WHERE

Wednesday, 2023 November 23<sup>rd</sup>  
Torre Archimede, room 2AB40  
Via Trieste 63, Padova  
Organizer: Anna Barbieri

### TITLES AND ABSTRACTS

#### **Mirror symmetry, K-stability, and complexified polarisations**

##### **Jacopo Stoppa (SISSA, Trieste)**

In general, mirror symmetry requires the consideration of arbitrary complexified polarisations (i.e. complexified Kähler classes), since these correspond to the possible complex structures on the mirror. In the Fano case, this motivates us to study the problem of extending the notion of K-stability to complexified polarisations, and to ask how this complexified K-stability notion interacts with mirror maps. I will offer an introduction to these questions, focusing on the case of del Pezzo surfaces. This is part of joint work with Carlo Scarpa (Université du Québec à Montréal).

#### **Categories associated to punctured surfaces and surface twist group actions on triangulated categories**

##### **Sebastian Opper (Prague)**

The talk is about a new class of  $A_\infty$ -categories which can be associated to punctured surfaces with suitable vector fields, or more general, line fields. They can be thought of as orbits of trivial extensions of partially wrapped Fukaya categories of surfaces in the sense of Haiden, Katzarkov and Kontsevich. For certain line fields they also include the class of Brauer graph algebras, which previously appeared in modular representation theory of finite groups. I aim to talk about their (currently conjectural) connection to surface braid group actions on triangulated categories and their interpretation as Fukaya categories. Parts of the talk are based on ongoing work with Wassilij Gnedin and Alexandra Zvonareva.

#### **Relations among P-twists**

##### **Andreas Hochenegger (Milano Politecnico)**

On a K3 surface, rational curves and line bundles give rise to interesting autoequivalences of its derived category, so-called spherical twists. It was shown by P. Seidel and R. Thomas, that these spherical twists are mirror-dual to Dehn twists in symplectic geometry. Moreover, they showed that given a chain of rational curves, the associated spherical twists satisfy braid relations. Generalising from K3 surfaces to

hyperkähler varieties, D. Huybrechts and R. Thomas showed that the corresponding generalisation of the spherical twists are  $P^n$ -twists.

In this talk, I will introduce these autoequivalences, and speak about the possible relations among them. This talk is about joint work with Andreas Krug.

### **Spaces of Bridgeland stability conditions and weighted marked surfaces**

**Anna Barbieri (Padova)**

Bridgeland stability conditions, introduced by T. Bridgeland in 2007, are defined for a triangulated category, and form a complex manifold that encodes some data of the underlying category. In some known examples, the stability manifold of a category provides a bridge with other moduli problems, for instance as in the case of Ginzburg categories due to T. Bridgeland and I. Smith. I will give an introduction to this topic and talk about a class of categories whose stability manifold is isomorphic to a moduli space of quadratic differentials on a Riemann surface. The talk is about joint work with M. Moeller, Y. Qiu, J. So.