

Dear colleagues,

we are organising an in-person school/workshop on ***Moduli Spaces and Stability Conditions*** to be held in Trento/Levico Terme, Italy, on 5-10 June, 2022 (with arrival on Sunday 5th before dinner and departure on Friday 10th after lunch), in the framework of the CIRM scientific program (<https://cirm.fbk.eu/>).

The mini-courses of the school will be scheduled from Monday June 6th to Thursday morning June 9th. Participants are expected to have a solid background in abstract Algebraic Geometry, but no previous exposure to Bridgeland stability conditions is required. Please find below the preliminary program of the school.

**Enrico Arbarello:** *Introduction to Bridgeland stability conditions.*

Abstract: Definitions and basic properties. The wall and chamber structure. Stability conditions on K3 surfaces. The  $(\alpha, \beta)$ -plane. Computation of walls and wall-crossing in specific examples. Applications to classical problems for curves and K3 surfaces.

**Emanuele Macrì:** *Bridgeland stability conditions on higher dimensional varieties and applications.*

Abstract: The construction of Bridgeland stability conditions on higher dimensional varieties is an open question, already in the threefold case. There are though many examples where such existence is known and this already turned out to have interesting applications, for example to Clifford-type bounds for vector bundles on curves and to counting invariants. We will review the basic framework to show existence of stability conditions, by using the notion of tilt-stability, state the main conjectural inequality which would imply the existence in the threefold case, and present examples where such inequality is proved, in particular the quintic threefold. Finally, we will discuss the applications.

**Laura Pertusi:** *Residual components for Fano threefolds and fourfolds.*

Abstract: As shown by Kuznetsov, the bounded derived category of a prime Fano variety admits a semiorthogonal decomposition whose non-trivial residual component encodes much information about the geometry of the variety. In this mini-course we will focus on the case of prime Fano threefolds of index 1 and 2, on cubic fourfolds and Gushel–Mukai fourfolds. We will discuss the construction of Bridgeland stability conditions on their residual components, the geometry of the associated moduli spaces and some applications.

**Giulia Saccà:** *Wall-crossing and local structure of moduli spaces on K3 surfaces.*

Abstract: In this course I will survey the theory of Bayer-Macrì describing wall-crossing on moduli spaces of Bridgeland stable objects on K3 surfaces and then focus on the local structure of singular moduli spaces that arise in this context.

The workshop will take place on Thursday afternoon June 9th and on Friday morning June 10th. The speakers will be **Soheyla Feyzbakhsh**, **Alexander Kuznetsov (to be confirmed)**, **Alexander Perry**, **Xiaolei Zhao**.

Due to Covid restrictions, there will be a maximum number of participants. If you are interested in attending the school/workshop, please send an email to [modulicir-m@gmail.com](mailto:modulicir-m@gmail.com) no later than February 28th, 2022. There are also a few grants available to cover full board (but not travel) expenses to young participants. If you wish to apply for a grant, please attach an updated scientific CV to your email. We will confirm your participation and provide you with all the details needed for reservation by writing back to you no later than March 15th, 2022.

Finally, we point out that in the following week (13-17 June, 2022) the CIRM conference **New Perspectives on Hyperkähler Manifolds. A Celebration of Dimitri Markushevich's 60+2nd Birthday** will take place in the same location. For further information please check the web page <https://indico.cs.dm.unipi.it/event/13/>.

Best regards,

The Scientific Committee  
Gilberto Bini and Claudio Fontanari