Mini-Workshop on Hyper-Kähler Geometry

Time: Fri.，Mar.20th，2026

Venue: Gu Lecture Hall，Shanghai Center for Mathematical Sciences

Lecture 1 9:45-10:45

Speaker: Salvatore Floccari Humboldt-Universität zu Berlin

Title: The Hodge conjecture for sixfolds of generalized Kummer type

Abstract: The Hodge conjecture is a central problem in complex algebraic geometry; it is notoriously difficult to attack and we still lack general evidence towards its validity. In my talk I will present a proof of the Hodge conjecture for all six-dimensional hyper-Kähler varieties of generalized Kummer type, i.e. those arising as deformations of Beauville's generalized Kummer sixfolds built from abelian surfaces. The result presented yields the first complete families of hyper-Kähler varieties of dimension larger than two for which the Hodge conjecture is verified. As I will explain, a key ingredient for the proof is the construction of a K3 surface naturally associated with a sixfold of generalized Kummer type.

Lecture 2 10:50-11:50

Speaker: Ruxuan Zhang Fudan University

Title: Derived categories of moduli spaces on K3 categories

Abstract: In this work, we investigate moduli spaces of stable objects in a class of K3 categories, including the derived categories of twisted K3 surfaces and the Kuznetsov components of cubic fourfolds. For a general K3 category in this class, we prove an equivalence between a canonical twisted derived category of the corresponding moduli space and the symmetric product of the underlying K3 category. This is ongoing work with Alex Perry.

Lecture 3 13:30-14:30

Speaker: Zelin Ye Fudan University

Title: The Picard group of the Baily-Borel compactification of the moduli space of quasi-polarized K3 surfaces and generalizations

Abstract: Let F_g be the moduli space of quasi-polarized K3 surfaces of genus g. By the global Torelli theorem, F_g can be realized as an orthogonal Shimura variety, and hence admits a natural Baily–Borel compactification $\overline{F}_g^{BB}$. It is known that the Picard group of F_g is generated by Noether–Lefschetz divisors and has large rank. A natural question is therefore which divisor classes on the open moduli space extend as Cartier divisors across the Baily–Borel boundary. In this talk, I will describe an obstruction space arising from modular forms, and explain why it is so large that the Hodge line bundle is the only divisor class that extends to the boundary. As a consequence, the Picard group of the Baily–Borel compactification $\overline{F}_g^{BB}$ has rank 1. This is joint work with Chenxin Huang, Zhiyuan Li, and Manuel K.-H. Müller.

Organizer

Zhiyuan Li