FEZA GÜRSEY CENTER FOR PHYSICS AND MATHEMATICS

Dual Perspectives Meetings

K-moduli of Fano threefolds in the family 3-10

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Abstract: Smooth Fano 3-folds are classified in 105 families (Iskovskikh, Mori, Mukai). For the description of these families, see https://www.fanography.info . We know which deformation families have K-polystable (Kahler-Einstein) members and which do not (Araujo, Castravet, Cheltsov, Fujita, Kaloghiros, Martinez-Garcia, Shramov, Suess, Viswanathan). Since K-polystable Fano threefolds form good moduli spaces, it would be interesting to describe K-moduli of smoothable Fano 3-folds (moduli that parametrize K-polystable smooth members of a given deformation family and their K-polystable limits). This is a very active area of research, but the problem has only been solved for the following 52 deformation families: zero-dimensional families (47 families), two one-dimensional families (families 2-24 and 2-25), cubic 3-folds (Liu, Xu), complete intersection of two quadrics (Spotti, Sun), quartic double solids (Ascher, DeVleming, Liu). In this talk, I will speak about K-moduli of Fano 3-folds in the family 3-10, see https://www.fanography.info/3-10 . This is a two-dimensional family whose smooth members can be obtained by blowing up a smooth quadric 3-fold along two disjoint conics. We know that a general member of this family is K-stable (Kahler-Einstein and finite automorphism groups), but some smooth members are not K-polystable (not Kahler-Einstein), and some members have infinite automorphism group (Cheltsov, Przyjalkowski, Shramov). In the talk, I will give explicit classification of all smooth members of the family 3-10 (normal forms), explain which smooth Fano 3-folds in this family are K-polystable and which are not (Araujo, Castravet, Cheltsov, Fujita, Kaloghiros, Martinez-Garcia, Shramov, Suess, Viswanathan), and describe all singular K-polystable members of this family (work in progress with Alan Thompson from Loughborough). If time permits, I will explain how to prove K-polystability of one singular and very symmetric member of this deformation family.

Date: Friday, April 14, 2023

Program: Morning session 10:30-12:00, Afternoon session 13:30-15:00

Location: Boğaziçi University, Kandilli Campus, Üsküdar-İstanbul