

**BRIDGELAND MODULI SPACE FOR GUSHEL-MUKAI
THREEFOLD AND KUZNETSOV'S FANO THREEFOLD
CONJECTURES**

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Time: Mon, Jan. 25th, 15:20-16:20

Venue: Room 102, Shanghai Center for Mathematical Sciences

Abstract: It is conjectured that the non-trivial components, known as Kuznetsov components of derived category of coherent sheaves on quartic double solid is equivalent to that of Gushel-Mukai threefolds. I will introduce special Gushel-Mukai threefold X and its Fano scheme of twisted cubics on it and prove it is a smooth irreducible projective threefold when X is general and describe its singularity when X is not general. We will show that it is an irreducible component of Bridgeland moduli space of stable objects of a (-2) -class in the Kuznetsov components of the special GM threefolds. I will show that an irreducible component of Bridgeland moduli space of stable objects of a (-1) -class in the Kuznetsov component of an ordinary GM threefold is the minimal model of Fano surface of conics. As a result, we show the Kuznetsov's Fano threefold conjecture is not true. If time allows, I will talk about our recent work on birationally categorical Torelli for GM threefold.