

International Japanese-Russian Conference
“Categorical and Analytic Invariants in
Algebraic Geometry VIII”

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Organizers

Steklov Mathematical Institute of Russian Academy of Sciences, Moscow

Moscow Institute of Physics and Technology (State University),

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Steklov International Mathematical Center, Moscow

Kavli Institute for the Physics and Mathematics of the Universe, Japan

Faculty of Mathematics, Osaka University, Japan

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On the motivic Adams conjecture

Alexey Ananyevskiy

In the motivic homotopy theory one associates to a scheme X the so-called motivic stable homotopy category $\mathrm{SH}(X)$ that is a tensor triangulated category and is a universal source of cohomological invariants that are A^1 -invariant and satisfy descent in the Nisnevich topology. Motivic Adams conjecture provides a partial information on the Picard group of $\mathrm{SH}(X)$. Every vector bundle over X gives rise to an element in the Picard group of $\mathrm{SH}(X)$ via the Thom spectrum construction and this yields a homomorphism from the Grothendieck group of vector bundles over X to the Picard group of $\mathrm{SH}(X)$. Motivic Adams conjecture claims that the difference between the Thom space of a vector bundle and the Thom space of the value of the k -th Adams operation on the vector bundle in $\mathrm{Pic}(\mathrm{SH}(X))$ is k -torsion. In my talk I will introduce all this notions and give an outline of the proof for this conjecture. The talk is based on the work in progress joint with Elden Elmanto, Oliver Roendigs and Maria Yakerson.

Categorical measures for varieties with finite group actions

Sergey Gorchinskiy

The talk is based on a common work with D. Bergh, M. Larsen, and V. Lunts. Given a variety with a finite group action, we compare categorical measures of the corresponding quotient stack and the extended quotient. Using weak factorization for orbifolds, we show that for a wide range of cases, these two measures coincide. This implies, in particular, a conjecture of Galkin and Shinder on categorical and motivic zeta-functions of varieties. We provide examples showing that, in general, these two measures are not equal.

On the Derived Category of the Cayley Grassmannian

Lyalya Guseva

We will describe a full exceptional collection of vector bundles in the bounded derived category of coherent sheaves on the Cayley Grassmannian, that parametrizes four-dimensional subalgebras of the complexified octonions.

Prime thick subcategories on elliptic curves

Yuki Hirano

Recently Matsui introduced the notion of prime thick subcategories in triangulated categories, and prove that the set of prime thick subcategories in a tensor triangulated category has a natural topology and contains the Balmer spectrum of the tensor triangulated category. In this talk, we discuss prime thick subcategories in derived categories of projective varieties. In particular, we determine the topological space of prime thick subcategories in derived categories of elliptic curves. This is a joint work with Genki Ouchi.

Frobenius manifolds for l -Kronecker quivers

Akishi Ikeda

For finite or affine root systems, there is a construction of Frobenius manifolds associated with the invariant theory of their Weyl groups. On the other hand, for indefinite type root systems, it is not known whether there is a natural construction of Frobenius manifolds associated with them. In this talk, as a partial answer for the question, we give a construction for the simplest case, which is the indefinite root system of rank two arising from the l -Kronecker quiver. This is a joint work with T. Otani, Y. Shiraishi, and A. Takahashi.

Faithful ADE braid group actions on triangulated categories

Anna Nordskova

I will speak about my joint work with Yury Volkov where we prove that the action of a generalised braid group on an enhanced triangulated category via spherical twists along an ADE-configuration of n -spherical objects is faithful for any integer n not equal to 1. Although various results on the faithfulness of this action have been obtained over the years (e.g. for type A or $n = 2$, and in some other cases), the approach we present allows us to establish the faithfulness for any ADE diagram, any enhanced triangulated category, and any n not equal to 1 almost simultaneously.

Tropical varieties and integral affine manifolds with singularities

Yuto Yamamoto

There are two types of spaces which we study in tropical geometry. One is tropical varieties which appear as the tropicalizations of algebraic varieties over a valuation field. The other one is integral affine manifolds with singularities which arise as the dual intersection complexes of toric degenerations in the Gross–Siebert program. In the talk, we discuss relations between these two different types of tropical spaces. We construct contraction maps from tropical Calabi–Yau varieties to corresponding integral affine manifolds with singularities, and show that they preserve tropical (co)homology groups and the invariants of tropical structures called eigenwaves/radiance obstructions.