Japanese-European Symposium on Symplectic Varieties and Moduli Spaces – Fifth Edition Online

- Date: 7th (Mon.) – 11th (Fri.) September 2020.
- Venue: Zoom
- Access: please ask the organizers

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Schedule

Monday (7th)
8:45(CEST)/15:45(JST) - Minicourse: Kondo I (90 mins)
10:15(CEST)/17:15(JST) - Coffee Break
10:30(CEST)/17:30(JST) - Menet (1 h)

Tuesday (8th)
8:45(CEST)/15:45(JST) - Kubota (1 h)
9:45(CEST)/16:45(JST) - Coffee Break
10:00(CEST)/17:00(JST) - Minicourse: Amerik I (90 mins)

Wednesday (9th)
8:45(CEST)/15:45(JST) - Konno (1h)
9:45(CEST)/16:45(JST) - Coffee Break
10:30(CEST)/17:30(JST) - Fatighenti (1 h)

Thursday (10th)
8:45(CEST)/15:45(JST) - Minicourse: Kondo II (90 min.)
10:15(CEST)/17:15(JST) - Coffee Break
10:30(CEST)/17:30(JST) - Brakkee (1 h)

Friday (11th)
8:45(CEST)/15:45(JST) - Okawa (1 h)
9:45(CEST)/16:45(JST) - Coffee Break
10:00(CEST)/17:00(JST) - Minicourse: Amerik II (90 mins)

<div align="center">**Short courses**</div>

Ekaterina Amerik (Univ. Paris-Sud/Lab. of Algebraic Geometry, HSE Moscow)

Title Characteristic foliation on smooth hypersurfaces in holomorphic symplectic manifolds

Abstract Let X be a holomorphic symplectic (or hyperkahler) manifold, and let D be a smooth hypersurface in X. The kernel F of the restriction of the holomorphic symplectic form to D is called the characteristic foliation. It was first studied by Hwang and Viehweg who proved that F is never algebraically integrable (that is, the general leaf of F is not a compact complex curve) when D is of general type. On the other hand this is quite obviously the case when D is uniruled. I shall explain our results with Frederic Campana from 2015 which classify the situations when F is algebraically integrable, our results with my former student Lyalya Guseva concerning the dimension of leaf closures for hyperkahler fourfolds, and finally hint at some recent work on leaf closures by my student Renat Abugaliev.

Shigeyuki Kondo (Nagoya University)

Title Enriques surfaces and Leech lattice

Abstract Let L be an even unimodular lattice of signature $(1, 25)$ which is unique up to isomorphisms. J.H. Conway found a fundamental domain C of the reflection group of L by using a theory of Leech lattice. If the Picard lattice of a K3 surface can be embedded in L primitively, then by restricting C to the positive cone of the K3 surface, we obtain a finite polyhedron under some assumption. This polyhedron is useful to study the automorphism group of the K3 surface. Recently S. Brandhorst and I. Shimada have classified all primitive embeddings of $E_{10}(2)$ into L, where $E_{10}(2)$ is the pullback of the Picard lattice of an Enriques surface to the covering K3 surface. There are exactly 17 embeddings, and thus we obtain 17 polyhedrons. In this talk I would like to discuss geometric meaning of these polyhedrons.

References:

I . Dolgachev, S. Kondo, Enriques surfaces II,

http://www.math.lsa.umich.edu/~idolga/EnriquesTwo.pdf

S . Kondo, K3 surfaces, Tracts in Math. 32 (2020), European Math. Soc.

Abstracts

Emma Brakkee (University of Amsterdam)

Title Moduli spaces of twisted K3 surfaces and cubic fourfolds

Abstract Motivated by the relation between (twisted) K3 surfaces and special cubic fourfolds, we construct moduli spaces of polarized twisted K3 surfaces of fixed degree and order. We do this by mimicking the construction of the moduli space of untwisted polarized K3 surfaces as a quotient of a bounded symmetric domain.

Enrico Fatighenti (Loughborough University)

Title Hodge structures of K3 type in Fano varieties

Abstract Subvarieties of Grassmannians (and especially Fano varieties) obtained from sections of homogeneous vector bundles are far from being classified. A case of particular interest is given by the Fano varieties of K3 type (FK3), for their deep links with hyperkhler geometry. In this talk we will present some examples of recently discovered FK3 varieties, and a general procedure that allows us to spread a (Hodge) K3 structure as a component of the Hodge structure of different varieties. This is in collaboration with Giovanni Mongardi and Marcello Bernardara–Laurent Manivel.

Hokuto Konno (University of Tokyo)

Title On the diffeomorphism and homeomorphism groups of a K3 surface

Abstract I will explain some results on comparison between the diffeomorphism group and the homeomorphism group of a K3 surface, obtained using gauge-theoretic technique. The first result I will explain is about what is called the Nielsen realization problem, which asks the existence of a lift from (a finite subgroup of) the mapping class group of a given manifold to the diffeomorphism or homeomorphism group. It turns out that a K3 surface gives the first example in dimension 4 for which there is a difference between the solvability of this problem for the diffeomorphism and the homeomorphism group. The second result I will explain is about homotopical comparison between the diffeomorphism group and the homeomorphism group of a K3 surface. It will be shown that a natural map from the fundamental group of the diffeomorphism group of a K3 surface to that of the homeomorphism group is not a surjection. This talk is based on joint work with David Baraglia in University of Adelaide.

Ayako Kubota (Waseda University)

Title On the G-Hilbert scheme of the closure of the regular nilpotent orbit of type A

Abstract We consider the invariant Hilbert scheme that corresponds to the Cox realization of a singularity and ask if the associated HilbertChow morphism is a resolution of singularities. As an example, we discuss in particular the case of the closure of the regular nilpotent orbit of type A, in which case we get a positive answer to this question.

Gregoire Menet (University of Grenoble)

Title On irreducible symplectic orbifolds

Abstract In this talk, I will give an overview of the recent progress in the framework of irreducible homomorphically symplectic (IHS) orbifolds. In particular, I will underline the important amount of possibilities for constructing examples of such orbifolds. I will also expose recent results, obtained in collaboration with Ulrike Riess, related to the Khler cone of (IHS) orbifolds. Finally, I will end the talk with several applications.

Shinnosuke Okawa (Osaka University)

Title Exceptional collections on the Hirzebruch surface of degree 2

Abstract Exceptional objects and exceptional collections of the bounded derived category of coherent sheaves on del Pezzo surfaces are very well understood by a work by Kuleshov and Orlov in 1994. On the contrary, those on weak del Pezzo surfaces are much more difficult to analyze due to the existence of the spherical twists. In this talk I give a set of conjectures on the structure of exceptional collections on weak del Pezzo surfaces and explain how to show them in the case of the Hirzebruch surface of degree 2, which is the simplest weak del Pezzo surface. This is based on a joint work with Akira Ishii and Hokuto Uehara.