

Titles & Abstracts

On the action of symplectic automorphisms of fibred surfaces of genus two on CH_0

Jiabin Du (Xiamen University)

Let S be a complex smooth projective surface with nonvanishing geometric genus. The Bloch conjecture predicts that the group of symplectic automorphisms of S acts trivially on the Albanese kernel of the 0-th Chow group. In this talk, we will talk about our recent results on the above conjecture for fibred surfaces of genus two, which is based on a joint work in progress with Wenfei Liu.

ACM bundles on isotropic Grassmannians

Xinyi Fang (Nanjing University)

In recent years, arithmetically Cohen-Macaulay (ACM, for short) bundles on projective varieties have been widely studied. In this talk, I will review the classification results of ACM bundles on projective spaces, quadrics and some other varieties. Furthermore, I will talk about homogenous ACM bundles on isotropic Grassmannians..

Rozansky—Witten theory and its applications to hyperkahler manifolds

Chen Jiang (Fudan University)

I will briefly review the Rozansky-Witten theory developed by Rozansky-Witten, Kapranov, and Kontsevich. This theory allows us to study the geometry of hyperkahler manifolds via knot theory, especially, I will explain ideas on how to apply this theory to study the Chern classes of hyperkahler manifolds, after Hitchin, Sawon, and Nieper-Wißkirchen.

Syzygies of higher dimensional Abelian varieties

Zhi Jiang (Fudan University)

We will report some recent progress on a question of Ito-Lozovanu on syzygies of abelian varieties.

Complete solutions of Toda equations and cyclic Higgs bundles over non-compact surfaces

Qionglin Li (Chern Institute of Mathematics)

On a Riemann surface with a holomorphic Sr -differential, one can naturally define a Toda equation and a cyclic Higgs bundle with a grading. A solution of the Toda equation is equivalent to a harmonic metric of the Higgs bundle for which the grading is orthogonal. In this talk, we focus on a general non-compact Riemann surface with an Sr -differential which is not necessarily meromorphic at infinity. We introduce the notion of complete solution of the Toda equation, and we prove the existence and uniqueness of a complete solution by using techniques for both Toda equations and harmonic bundles. Moreover, we show some quantitative estimates of the complete solution. This is joint work with Takuro Mochizuki (RIMS).

Twisted derived equivalence over positive characteristic fields

Zhiyuan Li (Fudan University)

Over complex numbers, the famous global Torelli theorem for K3 surfaces says that two integral Hodge isometric K3 surfaces are isomorphic. Recently, Huybrechts has shown that two rational Hodge isometric K3 surfaces are twisted derived equivalent. This is called the twisted derived Torelli theorem for K3. Natural questions arise for abelian varieties. In this talk, I will talk about the twisted derived equivalence for abelian surfaces and K3 surfaces over positive characteristic fields. Our goal is to prove the corresponding twisted Torelli theorem. This is a joint work with Haitao Zou.

Intersection Complex via Residue

Zijin Lin (University of Science and Technology of China)

A positive characteristic analogue of intersection cohomology for PVHS is established by

Sheng-Zhang in their recent paper. In their paper, they give an algebraic definition of intersection complex, but with the help of coordinates. In this talk, I will give an intrinsic definition via residue map.

A Noether type inequality for log canonical pairs of general type

Wenfei Liu (Xiamen University)

The classical Noether inequality asserts that $\text{vol}(K_S) \geq 2p_g(S) - 4$ for a smooth projective surface S of general type, where $\text{vol}(K_S)$ is the volume of the canonical divisor K_S and $p_g(S) = h^0(S, K_S)$ is the geometric genus of S . It plays an important role in the classification of surfaces of general type. A Noether type inequality of the form $\text{vol}(K_X) \geq a_n p_g(X) - b_n$ was later established by Meng Chen-Zhi Jiang for any smooth projective n -fold of general type, where a_n and b_n are positive constants depending only on the dimension n . In this talk, I will show the existence of a Noether type inequality of the form $\text{vol}(K_{X+\Delta}) \geq a_n(C) p_g(X, \Delta) - b_n(C)$ for any projective log canonical pair (X, Δ) of general type with the coefficients of Δ coming from a given DCC set $C \subset (0, 1]$, where $a_n(C)$ and $b_n(C)$ are positive constants depending only on n and C . This can be applied to prove the existence of a uniform bound of numerically trivial automorphisms of smooth projective threefolds of general type with a Gorenstein minimal model. In dimension two, I will present an optimal version of Noether type inequality. This talk is partially based on a joint work with Zhi Jiang and Hang Zhao.

Intersection de Rham complexes in positive characteristic

Mao Sheng (University of Science and Technology of China)

In this talk, I will introduce a positive characteristic analogue of intersection cohomology theory for variation of Hodge structure. This is a joint work with Zebao Zhang.

Tame Parahoric Non-abelian Hodge Correspondence

Hao Sun (South China University of Technology)

Simpson established the nonabelian Hodge correspondence for vector bundles on noncompact curves by introducing filtered (parabolic) structures. We generalize this correspondence to principal bundles by introducing parahoric objects. In this talk, we will explain why we have to choose parahoric objects to establish the correspondence, and give the description of the correspondence we established. This work is joint with Pengfei Huang, Georgios Kydonakis and Lutian Zhao.

Tensor product theorem for parabolic Higgs bundles in characteristic p

Jianping Wang (University of Science and Technology of China)

Let X be a smooth projective variety over an algebraically closed field k with $\text{char}(k)=p>0$. Then there is a correspondence between the Higgs bundles and the flat connections over X by the classical nonabelian Hodge theory. In this talk, I will talk about the nonabelian Hodge theory in positive characteristic for parabolic Higgs bundles. I will also show the existence of the semistable Higgs-de Rham flow for a parabolic semistable Higgs bundle of small rank and parabolic weight. As an application, I will prove that the tensor product of two parabolic semistable Higgs bundles of small rank and parabolic weight is still semistable. This is a joint work with Mao Sheng.