Frontier Forum
on Algebraic Geometry and Related Area
代数几何及相关领域前沿论坛

会议手册

2020 年 11 月 27 日–28 日

复旦大学·上海

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邀请报告人 Speakers

付保华（中国科学院数学与系统科学研究院）
李　骏（复旦大学）
刘建亚（山东大学）
刘文飞（厦门大学）
秦厚荣（南京大学）
田志宇（北京大学）
席南华（中国科学院数学与系统科学研究院）
徐　飞（首都师范大学）
张　磊（中国科学技术大学）
张　通（华东师范大学）
余　讯（天津大学）
左　康（Univ. Mainz)

组织委员会 Organizing Commitee

蔡金星（北京大学）
陈　猛（复旦大学）
江　辰（复旦大学）
孙笑涛（天津大学）
谈胜利（华东师范大学)

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复旦大学数学科学学院
上海数学中心

联系人 Contact

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日程安排 Schedule

地点：Pagoda 君亭设计酒店
Venue: Pagoda Junting Design Hotel

地址：上海市政学路 77 号
Address: 77 Zhengxue Road, Shanghai

	11 月 27 日	11 月 28 日
8:20 － 8:30	致　辞	
8:30 － 9:20	席南华	付保华*
9:20 － 9:40	合影，茶歇	茶　歇
9:40 － 10:30	李　骏	刘文飞
10:30 － 11:00	合影，茶歇	茶　歇
11:00 － 11:50	刘建亚	余　讯
	午　餐	午　餐
14:00 － 14:50	秦厚荣	田志宇
14:50 － 15:10	茶　歇	茶　歇
15:10 － 16:00	徐　飞	张　通
16:00 － 16:30	茶　歇	茶　歇
16:30 － 17:20	左　康*	张　磊
	晚　宴	晚　餐

*左康教授将通过 Zoom 在线上报告，Zoom 号为 62124038402，密码 462827
*付保华教授将通过腾讯会议在线上报告，会议号为 457842192

报告摘要 Abstracts

付保华（中国科学院数学与系统科学研究院）

题目：**Rigidity of wonderful group compactifications under Fano deformations**

摘要：For a complex connected semisimple linear algebraic group G of adjoint type and of rank n, De Concini and Procesi constructed its wonderful compactification \bar{G}, which is a smooth Fano G \times G-variety of Picard number n enjoying many interesting properties. In this talk, it is shown that the wonderful compactification \bar{G} is rigid under Fano deformations. Namely, for any family of smooth Fano varieties over a connected base, if one fiber is isomorphic to \bar{G}, then so are all other fibers. This is a joint work with Qifeng LI.

李　骏（复旦大学）

题目：**Toward an algebraic Donaldson-Floer theory**

摘要：We will review the idea of using degeneration to study Floer type theory; illustrate the successful theory of degeneration of GW invariants(AM. Li-Ruan, and Li), and the difficulty in getting a parallel theory for Donaldson polynomial invariants. In the end, we will outline current progress toward constructing an algebraic Donaldson-Floer theory.

刘建亚（山东大学）

题目: **Manin's Conjecture for Singular Hypersurfaces**

摘要: We get an asymptotic formula for the number of rational points of bounded height on singular cubic hypersurfaces S: $y^3 = Q(x\_1, ..., x\_n)z$ where Q is a positive definite quadratic form of n variables. This result is new in two aspects: first, it can be viewed as a modest start on the study of density of rational points on singular cubic hypersurfaces, which is not covered by the classical theorems of Davenport or Heath-Brown; second, it proves Manin's conjecture for these singular hypersurfaces.

刘文飞（厦门大学）

题目：**Topologically trivial automorphisms of Kähler surfaces**

摘要：A biholomorphic automorphism σ of a compact complex manifold X is said to be topologically trivial if there is an isotopy between σ and id_X, the identity map of X. Such automorphisms ought to be very special and there is an easy description in dimension 1: they are exactly those in the identity component Aut_0 (X) of the automorphism group. In this talk, I will present some interesting phenomena for surfaces: While the statement for curves can be extended to surfaces of Kodaira dimension 0, there do exist topologically trivial automorphisms of unbounded finite order on rational surfaces, which do not lie in the identity component. I will also discuss the unboundedness of automorphisms acting trivially on cohomology, in the case of surfaces with Kodaira dimension 1. This is a joint work in progress with Fabrizio Catanese.

秦厚荣（南京大学）

题目：**K群，Ш群与同余数问题**

摘要：我们对权为3/2的模形式建立了一种志村提升方法，利用这个方法，证明了：如果n是一个奇的同余数，那么

$$\#\{(x,y,z) \in \mathbb{Z}^3 | n = x^2 + 2y^2 + 32z^2\} = \#\{(x,y,z) \in \mathbb{Z}^3 | n = 2x^2 + 4y^2 + 9z^2 - 4yz\};$$

如果n是一个偶的同余数，那么

$$\#\{(x,y,z) \in \mathbb{Z}^3 | \frac{n}{2} = x^2 + 4y^2 + 32z^2\} = \#\{(x,y,z) \in \mathbb{Z}^3 | \frac{n}{2} = 4x^2 + 4y^2 + 9z^2 - 4yz\}.$$

反之，如果假设Brich-Swinnerton-Dyer猜想成立，上面的等式也推出n是同余数。

利用上面的结果，我们建立了K群与同余数的联系。在我们的工作之前，所有关于非同余数的结果中，同余椭圆曲线的Ш群的偶部分的阶至多是4，我们的方法突破这个限制，建立了Ш群的偶部分的阶是16的结果。

田志宇（北京大学）

题目：**Kato homology and MMP**

摘要：I will explain a project to study the homology of a Gersten type complex defined by Kato and Bloch-Ogus, and some applications in arithmetic. The minimal model program (MMP) plays an essential role in the study, and this project also leads to questions about singularities in MMP.

席南华（中国科学院数学与系统科学研究院）

题目：**仿射外尔群的最低双边胞腔**

摘要：仿射外尔群的最低双边胞腔是比较简单的一个胞腔，但很多有趣的性质。本报告主要讲述这个胞腔的表示论方面的性质，包括它与 K 理论的联系。

徐 飞（首都师范大学）

题目：**Strong approximation with Brauer-Manin obstruction for a family of norm varieties**

摘要：

Weak approximation of smooth varieties

$$N_{L/k}(x) = \prod_{i=1}^{n} p_i(t)$$

has been studied extensively by various methods, where L/k is a finite extension of number fields and $p_i(t)$'s are distinct irreducible polynomials. For strong approximation of this equation the first non-trivial example was given by Derenthal and Wei where $[L:k] = 4$ and $n = 1$ and $p_1(t)$ has a root in K with $deg(p_1(t)) = 2$. In this talk, I will show this equation satisfies strong approximation with Brauer-Manin obstruction when L is contained in $k[t]/(p_i(t))$ for all $1 \le i \le n$. Under Schinzel's hypothesis, we can remove the restriction that L is contained in $k[t]/(p_i(t))$ for all $1 \le i \le n$ when L/k is cyclic. This is a joint work with Cao and Wei.

余 讯（天津大学）

题目：**Minimum positive entropy of complex Enriques surface automorphisms**

摘要：We determine the minimum positive entropy of complex Enriques surface automorphisms. This together with McMullen's work completes the determination of the minimum positive entropy of complex surface automorphisms in each class of Enriques-Kodaira classification of complex surfaces. As in McMullen's work, we finally reduce the problem to computer algebra. In this talk, after recalling known results and differences from Enriques case, I would like to explain how one can reduce this problem to finite computational problems which can be done by computer. This is a joint work with Professor Keiji Oguiso.

张　磊（中国科学技术大学）

题目: **Effectivity of pluricanonical systems in positive characteristic**

摘要: In this talk, we investigate effectivity of pluricanonical systems on varieties in characteristic p. It is known that the related results for surfaces in characteristic p are almost the same with those from the case in characteristic zero. We will first recall some methods from characteristic zero and discuss what essential difficulties happen when studying this problem in characteristic p, then we explain how to adapt some strategies from characteristic zero to characteristic p.

张　通（华东师范大学）

题目：一般型不规则三维复代数簇的 **Noether-Severi** 不等式和等式

摘要：在这个报告中，我将首先介绍关于一般型不规则三维复代数簇最佳的 Noether-Severi 不等式。对于那些满足 Noether-Severi 等式的一般型不规则三维复代数簇，我将介绍它们的双有理不变量以及拓扑不变量的取值，并最终给出这类代数簇详细的几何刻画。这是同胡勇一起完成的工作。

左　康（Univ. Mainz）

题目: **Abelian scheme of GL_2-type over the projective line with 4 bad reductions**

Abstract: Given the projective line $\mathbb{P}^1$ with 4 marked points $S := \{0, 1, \infty, \lambda\}$ over a field K and let $(E_\lambda, \circ$ denote the elliptic curve as the double cover of $\mathbb{P}^1$ ramified on S. We study abelian schemes $f : \mathcal{A} \to$ of GL_2-type over K and with bad reductions over S. We conjecture that by taking the zero locus of t Kodaira-Spencer map of f there exists a Galois-equivariant bijection between the set of isomorphism class of those abelian schemes and the set of torsion points on E_λ. Consequently, the fields of the multiplicatio are the maximal real sub fields of cyclotomic fields $\mathbb{Q}(\zeta_d)$, $d \geq 1$. The explicit computation of Higgs-Rham flow by R.R.Sun, J.B.Yang and K. Zuo relating to the multiplication-p map on E_λ (mod p) a the fascinating 26 examples of elliptic curves over $\mathbb{P}^1$ with 4 bad reductions (predicted by the conjectur constructed by J.Lu and X.Lu support the conjecture. In this talk I shall report on the recent progre on constructing infinitely many those abelian schemes using p-adic nonabelian Hodge theory, the glob Langlands correspondence over function field of characteristic p by Drinfeld and the conjecture on p to companions by Deligne solved by Abe. This is a joint project with R.Krishnamoorthy and J.B.Yang.