International Conference on

Arithmetic Algebraic Geometry

Room 204, South Building of AMSS, May 11 - 15, 2015

Organizing Committee

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- ☐ Morningside Center of Mathematics (MCM), Chinese Academy of Sciences
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Schedule

	May 11	May 12	May 13	May 15
09:30-10:30	**G. Faltings**	**M. Kisin**	**H. Esnault**	**T. Saito**
10:30-11:00	*Tea Break*			
11:00-12:00	**E. Kowalski**	**F. Villegas**	**Z. Rudnick**	**C. Hall**
12:30-13:00	*Lunch*			
14:00-15:00	**A. Abbes**		**T. Shioda**	**B. Fu**
15:00-15:30	*Tea Break*			
15:30-16:30	**S. Sun**		**R. Liu**	
18:00-19:00	*Dinner*			

Opening Remark: 9:15-9:30, May 11, Room 204

Banquet: 18:30-20:00, May 13

Title & Abstract

Title: Norms of Weierstrass sections

Speaker: Gerd Faltings (Max Planck Institute for Mathematics)

Abstract: Weierstrass sections are important in arithmetic geometry as they define sections of powers of the dualising sheaf. In Arakelov theory we need bounds for their norms at infinite places. We give such a bound and discuss possible applications to diophantine equations.

Title: The shape of exponential sums

Speaker: Emmanuel Kowalski (ETH Zürich)

Abstract: We will discuss the statistical properties of the paths describing the partial sums of certain families of exponential sums, including Kloosterman sums and Birch sums. We will explain how information related to monodromy groups and estimates for short exponential sums combine to obtain, in some cases, limit theorems in the space of continuous functions, and we will describe some applications. (Joint work with W. Sawin).

Title: Remarks on the p-adic Hodge-Tate spectral sequence

Speaker: Ahmed Abbes (IHES)

Abstract: I will review the construction of the p-adic Hodge-Tate spectral sequence following Faltings' approach and I will show that it bears a certain analogy with the conjuguate spectral sequence in characteristic p (based on a joint work with Michel Gros).

Title: Symmetry of perverse sheaves

Speaker: Shenghao Sun (Tsinghua University)

Abstract: We will discuss the symmetry of self-dual perverse sheaves, and the stability under proper push-forwards. This is joint work with Weizhe Zheng.

Title: The Breuil-Mezard conjecture

Speaker: Mark Kisin (Harvard University)

Abstract: Breuil-Mezard made a remarkable conjecture about the multiplicities of certain local deformation rings. The conjecture is closely related to modularity lifting theorems, and hints at a connections with the - still largely conjectural - p-adic local Langlands correspondence. In this talk I will explain the conjecture, and what is known about it.

Title: Hypergeometric Motives

Speaker: Fernando Rodriguez Villegas (ICTP)

Abstract:

Title: Convergent isocrystals on simply connected varieties

Speaker: Hélène Esnault (Freie Universität Berlin)

Abstract: We show that under an additional assumption, if X is smooth projective simply connected over an algebraically closed field of characteristic $p>0$, then convergent isocrystals are trivial. This answers positively, under the additional assumption, a conjecture by Johan de Jong. (joint with Atsushi Shiho)

Title: Specialization and big monodromy

Speaker: Christopher James Hall (University of Wyoming)

Abstract: Let k be a number field and U/k be a smooth geometrically-connected curve. We consider a "compatible system" of lisse F_ell-sheaves on U and compare the monodromy G_{t,ell} of special fibers with the geometric monodromy G_ell^geom of the generic fiber. We explain how to show that "most" special fibers have "big" monodromy, e.g. that G_{t,ell} contains the derived subgroup of G_ell^geom.

Title: Mordell-Weil lattice of higher genus vibration on a Fermat surface

Speaker: Tetsuji Shioda (Rikkyo University)

Abstract: We study the MWL of axial fibration on a Fermat surface, whose generic fibre is an algebraic curve of higher genus (i.e. g >1) if the Fermat surface has degree m >4. For example, if m=5, we have. a genus three fibration such that the MW rank is 19 and the height determinant is equal to 5^12/2^21.

Title: Boundary of the eigencurve over the weight space

Speaker: Ruochuan Liu (Peking University)

Abstract: The eigencurves are introduced by Coleman and Mazur to study the p-adic variation of modular forms. While the arithmetic properties and the local geometry of the eigencurves were extensively studied, their global geometry seems to be a very intriguing and difficult topic. In this talk, I will explain a recent joint work with Daqing Wan and Liang Xiao concerning the geometry of the boundary of eigencurves in the case of definite quaternion algebras over Q. Precisely, we prove that: (a) over the boundary annuli of the weight space, the eigencurve is a disjoint union of (countably) infinitely many connected components each finite and flat over the weight annuli, (b) the Up-slopes of points on each fixed connected component are proportional to the p-adic valuations of the parameter on the weight space, and (c) the sequence of the slope ratios form a union of finitely many arithmetic progressions with the same common difference.

Title: The characteristic cycle and the singular support of an etale sheaf

Speaker: Takeshi Saito (Tokyo University)

Abstract: We define the characteristic cycle of an etale sheaf on a smooth variety of arbitrary dimension in positive characteristic assuming the existence of singular support satisfying certain local acyclicity conditions.It satisfies a Milnor formula for vanishing cycles and an index formula for the Euler-Poincare characteristic.

Title: Katz, equidistribution, and analytic number theory in function fields

Speaker: Zeev Rudnick (Tel-Aviv University)

Abstract: I will survey some of Katz's recent results on equidistribution and their applications to problems in analytic number theory in function fields.

Title: On special birational transformations

Speaker: Baohua FU (AMSS)

Abstract: A birational transformation f: P^n --> Z, where Z is a nonsingular variety of Picard number 1, is called a special birational transformation of type (a, b) if f is given by a linear system of degree a, its inverse is given by a linear system of degree b and the base locus S \subset P^n of f is irreducible and nonsingular.

I'll report a joint work with Jun-Muk Hwang on the classification of special birational transformations of type (2,1).