Titles and Abstracts

Ashay Burungale (The University of Texas at Austin)

Zeta elements for elliptic curves and applications

The talk plans to outline the existence of certain zeta elements, and an application to special cases of the Birch and Swinnerton-Dyer conjecture. This is a joint work with C. Skinner, Y. Tian and X. Wan.

Pierre Colmez (Centre National de La Recherche Scientifique)

On the factorization of the system of Beilinson-Kato

I will explain how to factor the system of Beilinson-Kato elements as a product of two modular symbols (an algebraic avatar of the Rankin-Selberg formula). This is joint work with Shanwen Wang.

Hélène Esnault (Free University of Berlin)

Diophantine properties of the Betti moduli space

If the Betti moduli space of a smooth quasi-projective variety is non-empty and irreducible over the complex numbers, we prove that it admits an integral point. The statement is more general. The proof includes the use of de Jong conjecture (proven by Gaitsgory using the geometric Langlands correspondence) and the companions (using the arithmetic Langlands correspondence). Joint work with Johan de Jong, based in part on joint work with Michael Groechenig.

Laurent Fargues (Centre National de La Recherche Scientifique)

Laumon sheaf and the mod p local Langlands correspondence

Let E be a finite degree extension of Qp. Given a mod p représentation of the absolute Galois group of E we construct a sheaf on a punctured absolute Banach Colmez space that should give the first step in the construction of the mod p local Langlands correspondence as a représentation of GL_2(E). We will explain the construction of this sheaf and one of its key deep properties: it is holonomic.

Ziyang Gao (Leibniz University Hannover)

About algebraic relations between the periods of CM abelian varieties

Given a CM abelian variety A defined over $\overline{\mathbb{Q}}$, Grothendieck's period conjecture predicts that all the algebraic relations between its periods arise from Hodge cycles of powers of A (called " Hodge relations"). In this talk, I will start by explaining that these Hodge relations are essentially generated in degree 1 and 2, by introducing the "companions" of A. Next, I will propose a framework to study the quadratic relations between the holomorphic CM periods (the question of linear relations was solves by Wüstholz in the 80s), by introducing a bi-$\overline{\mathbb{Q}}$-structure on the tangent space of a Shimura variety at a CM point and by proposing a hyperbolic subspace conjecture which is the analogue of Wüstholz's theorem in the Shimura case. This is joint work with Emmanuel Ullmo and partially with Andrei Yafaev.

Dorian Goldfeld (Columbia University)

The functional equation of Langlands Eisenstein series

I shall present a simple explicit description of the general Langland's Eisenstein series for SL(n, Z). It can be shown that the functional equations of these Eisenstein series can be derived from the functional equations of certain divisor sums and Whittaker functions which appear in the Fourier coefficients of the Eisenstein series. We conjecture that these functional equations are unique assuming they take the form of a real affine transformation of the "s" variables defining the Eisenstein series. We can prove uniqueness in certain special cases. This is joint work with Eric Stade and Michael Woodbury.

Bingrong Huang (Shandong University)

Averages of arithmetic functions

In this talk, I will introduce some results on the averages of arithmetic functions, such as the Rankin--Selberg theorem and the Friedlander--Iwaniec theorem on Fourier coefficients of automorphic forms. Then I will sketch how to break the Rankin--Selberg barrier on the second moment of Fourier coefficients of a GL(2) automorphic form. If time permits, I will briefly introduce the GL(3) exponential sums.

Sian Nie (Academy of Mathematics and Systems Science, CAS)

On higher Deligne-Lusztig characters

It is well-known that Deligne-Lusztig characters play an essential role in the classification of irreducible representations of finite groups of Lie type. The higher Deligne-Lusztig characters, arising from cohomological inductions of higher/parahoric Deligne-Lusztig varieties, are natural analogues of Deligne-Lusztig characters. In this talk, I will discuss recent progresses in the study of higher Deligne-Lusztig characters, with an emphasis on their relations with supercuspidal representations of p-adic groups.

Lue Pan (Princeton University)

Some vanishing results for rational completed cohomology of Shimura varieties

Let p be a prime number. Emerton introduced the p-adically completed cohomology, which admits a representation of some p-adic group and can be thought of as some spaces of p-adic automorphic forms. In this talk, I want to explain that for Shimura varieties, sufficiently regular infinitesimal characters of the p-adic group can only show up in the middle degree of the completed cohomology. The proof is based on a very recent result of Bhatt on Kodaira vanishing in mixed characteristic and an old idea of using translation functors. This is joint work in progress with Kai-Wen Lan.

Peng Shan (Yau Mathematical Sciences Center, Tsinghua University)

Center of small quantum groups and diagonal coinvariants

I will explain a proof for an isomorphism between the center of the principal block of the small quantum group in type A and the ring of diagonal coinvariants, confirming a conjecture of Lachowska-Qi. This is based on joint work in progress with Roman Bezrukavnikov, Pablo Boixeda Alvarez and Eric Vasserot.

Junyi Xie (Beijing International Center for Mathematical Research)

Geometric Bombieri-Lang conjecture

The geometric Bombieri-Lang conjecture is an analogue of the Bombieri-Lang conjecture over function fields. With Yuan, we find a mechanism to realize Vojta's dictionary in a reasonably concrete way and proved the geometric Bombieri-Lang conjecture for varieties having a finite map to an abelian variety under mild conditions.

Shou-Wu Zhang (Princeton University)

Triple product L-series and Gross-Kudla-Schoen cycles

In this talk, we consider a conjecture by Gross and Kudla that relates the derivatives of triple product L-functions for three modular forms and the height pairing of the Gross-Schoen cycles on Shimura curves. Then, we sketch proof of a generalization of this conjecture. This is a report on the work in progress with Xinyi Yuan and Wei Zhang, with help from Yifeng Liu.