

Workshop in Arithmetic Geometry

September - ,
Capital Normal University
Teaching Building , Room

Schedule

Saturday, of September

| | |
|-------|--|
| : - : | Jilong Tong (Capital Normal University) |
| | Harder-Narasimhan stratification in p -adic Hodge theory |
| : - : | Bin Zhao (Capital Normal University) |
| | Re-fined spectral halo for eigencurves and p -adic slopes of crystabelline representations |
| : - : | Lunch |
| : - : | Yongqi Liang (University of Science and Technology of China) |
| | Hasse principle for odd genus hyperelliptic curves |
| : - : | Yang Cao (University of Science and Technology of China) |
| | Some new descent methods to weak approximation |
| : - : | Dasheng Wei (Chinese Academy of Sciences) |
| | Strong approximation of the singular Del Pezzo surface |

Sunday, of September

| | |
|-------|---|
| : - : | Yong Hu (Southern University of Science and Technology) |
| | Strong approximation and integral quadratic forms over affine curves |
| : - : | Fei Xu (Capital Normal University) |
| | Geometric Springer theorem for quadratic bundles over smooth affine curves under finite coverings of odd degree |
| : - : | Zhiyu Tian (Peking University) |
| | Local-global principle for zero cycles over global function fields |
| : - : | Lunch |
| : - : | Jinbo Ren (Xiamen University) |
| | Bounded Generation: a diophantine approximation approach |
| : - : | Zhizhong Huang (Chinese Academy of Sciences) |
| | Revisiting the Hilbert irreducibility theorem |
| : - : | Li Cai (Capital Normal University) |
| | On the Archimedean Arithmetic smooth matching |

List of Abstracts

Saturday 17th

Harder-Narasimhan stratification in p-adic Hodge theory

Jilong Tong

Capital Normal University

As a geometric variant of filtered isocrystals, we consider the notion of isocrystals equipped with a lattice. We show that there is a natural Harder-Narasimhan formalism for such objects, and the resulting Harder-Narasimhan filtration is compatible with tensor products. As an application, we will construct the Harder-Narasimhan stratification on the B_{dR}^+ -Grassmannian. This generalizes the work of Dat-Orlik-Rapoport, Cornut-Peche-Irissarry, Nguyen-Viehmann and Shen. This is a joint work in progress with Miaofen Chen.

Refined spectral halo for eigencurves and p-adic slopes of crystabelline representations

Bin Zhao

Capital Normal University

Coleman-Mazur-Buzzard-Kilford conjecture predicted that over the boundary of the weight space, the eigencurve is a disjoint union of rigid analytic spaces which are finite flat over the weight space. This conjecture has been proved by the work of Liu-Wan-Xiao and Diao-Yao. In this talk, I will report a joint work in progress with Yongquan Hu and Liang Xiao on a refinement of this conjecture and how it can be used to determine the p -adic slopes of all the crystabelline lifts of a reducible (local) mod p Galois representation. I will explain how to formulate the question under the context of p -adic local Langlands correspondence. The new ingredient is a universal principal series type theory that interpolates classical principal series types.

Hasse principle for odd genus hyperelliptic curves

Yongqi Liang

University of Science and Technology of China

Scharaschkin and Skorobogatov conjectured that the Brauer-Manin obstruction is the only obstruction to the Hasse principle for rational points on smooth projective curves defined over number fields. For any given number field and any given odd integer g , we explicitly construct infinitely many curves of genus g violating the Hasse principle explained by the Brauer-Manin obstruction. Our construction gives examples to support the conjecture. This is a joint work in progress with my PhD student Kai Huang.

Some new descent methods to weak approximation

Yang Cao

University of Science and Technology of China

The classical descent method, introduced by Colliot-Thélène and Sansuc, uses universal torsors to study the Hasse principle and weak approximation of algebraic varieties. Essentially, universal torsors are used to simplify the geometric structure (for example, its cohomology) of varieties. In this talk, I will try to find some new descent methods by using splitting varieties, which can simplify the geometric structure and also can study the weak approximation. I will only provide some abstract constructions, and hope it can apply to some examples in the future.

Strong approximation of the singular Del Pezzo surface

Dasheng Wei

Chinese Academy of Sciences

The rational points of singular Del Pezzo surface of degree ≥ 3 had widely studied by Skolen, Coray and Tsfasman. In this talk, we will give the strong approximation property of the smooth locus of singular Del Pezzo surface of degree ≥ 4 . It is a joint work with Yi Zhu.

Sunday 10th

Strong approximation and integral quadratic forms over affine curves

Yong Hu

Southern University of Science and Technology

In the classical arithmetic theory of quadratic forms over global fields, strong approximation and the Hasse principle play a very important role. In this talk, we discuss extensions of some results in this direction to function fields of curves defined over more general fields. In particular, we give examples where strong approximation and the Hasse principle for integral quadratic forms hold, and examples where they do not hold. This is based on a joint work in progress with Jing Liu and Yisheng Tian.

Geometric Springer theorem for quadratic bundles over smooth affine curves under finite coverings of odd degree

Fei Xu

Capital Normal University

The classical Springer theorem says a quadratic form f is represented by another g over a field k if and only if f is represented by g over a finite extension of odd degree. Arithmetic version of this kind result is also true for indefinite integral quadratic forms. In this talk, we will explain the geometric version of this kind results. More precisely, we show that a quadratic bundle F can be imbedded into another quadratic bundle G over a smooth curve C if and only if the pullback of F can be imbedded into the pullback of G over a finite covering of odd degree by assuming G is isotropic over generic point of C . This is a joint work in progress with Jing Liu.

Local-global principle for zero cycles over global function fields

Zhiyu Tian

Peking University

A conjecture due to Colliot-Thélène describes the Chow group of zero cycles on a smooth projective variety defined over a global field in terms of the corresponding group over local fields and a Brauer-Manin obstruction. I will report on some recent work on this problem for geometrically rational surfaces and some higher dimensional generalizations over global function fields. The approach is mostly geometric.

