MINI-WORKSHOP ON REPRESENTATION THEORY OF P-ADIC GROUPS

December 9-11, 2022

Zoom Meeting ID: 817 6000 3872, Password: 000000

Speakers

Rui Chen (Zhejiang University)

Zhe Chen (Shantou University)

Peiyi Cui (Universiy of East Anglia)

Hengfei Lu (Beihang University)

Emile Okada (National University of Singapore)

Chen Wan (Rutgers University)

Chuijia Wang (Technion- Israel Institute of Technology)

Zhicheng Wang (Soochow University)

Qing Zhang (Huazhong University of Science and Technology)

Jiandi Zou (Technion- Israel Institute of Technology)

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Mini-Workshop on
Representation Theory of p-adic Groups

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Rui Chen (Zhejiang University)

Title: On non-tempered Gan-Gross-Prasad conjecture

Abstract: In this talk we will discuss the non-tempered generalization of the Gan-Gross-Prasad conjecture, which is concerned about some branching problems for representations of Arthur type. We shall explain how to use derivatives to study this problem in certain case, and show that in this case the non-vanishing of the Hom-space implies the relevance of A-parameters. If time permits, we will also discuss the reverse direction. This is an ongoing joint work with Chuijia Wang.

Zhe Chen (Shantou University)

Title: Flags, orbits, and representations of profinite GL_n

Abstract: In this talk I would like to discuss some recent works on smooth representations of connected reductive groups over discrete valuation rings, with a focus on GL_n over F_q[[\pi]]. This concerns, in particular, a simple combinatorial generalisation of the finite ring version of Deligne--Lusztig constructions, which on the one hand mimics some flavour of the finite field case, and on the other hand recovers certain missing representations described by orbits.

Peiyi Cui (Universiy of East Anglia)

Title: Decompositions of the category of ℓ-modular representations of SL_n(F)

Abstract: Let F be a p-adic field, and k an algebraically closed field of characteristic ℓ different from p. In this talk, we will first give a category decomposition of $Rep_k(SL_n(F))$, the category of smooth k-representations of SL_n(F), with respect to the GL_n(F)-equivalent supercuspidal classes of SL_n(F), which is not always a block decomposition in general. We then give a block decomposition of the supercuspidal subcategory, by introducing a partition on each GL_n(F)-equivalent supercuspidal class through type theory, and we interpret this partition by the sense of ℓ-blocks of finite groups. We give an example where a block of Rep_k(SL_2(F)) is defined with respect to several SL_2(F)-equivalent supercuspidal classes, which is different from the case where ℓ is zero. We end this talk by giving a prediction on the block decomposition of Rep_k(A) for a general p-adic group A.

Hengfei Lu (Beihang University)

Title: The Prasad conjecture for PGL(2) in the modular setting

Abstract: Let F be a non-archimedean local field of characteristic zero. Let E be a quadratic extension of F. Then G(F) is a natural subgroup of G(E). For the complex representations, assuming the enhanced local Langlands correspondence for a quasi-split group G, Dipendra Prasad gave a conjectural identity for the multiplicity Hom_{G(F)}(\pi,\chi_G) for a smooth irreducible representation \pi of G(E), in terms of the enhanced parameter of \pi, where \chi_G is a quadratic character of G depending on the quadratic extension E/F. We are trying to verify the Prasad conjecture for G=PGL(2) in the modular setting under the local Langlands correspondence set up by Vigneras. It turns out that it fails. Then we propose another solution using non-nilpotent Weil-Deligne representations. This is joint work with Peiyi Cui and Thomas Lanard.

Emile Okada (National University of Singapore)

Title: Wavefront sets of representations of p-adic groups

Abstract: The wavefront set of a representation is an invariant which roughly speaking measures the direction of singularities of the character distribution near the origin. It is a powerful invariant, but is notoriously difficult to compute and there are a number of longstanding open questions about its general behaviour. In this talk I will discuss some recent advances on the theory of wavefront sets of depth-0 representations. I will demonstrate how this has led to a simple resolution of Waldspurger's conjecture in the case of supercuspidal depth-0 representations, and if time permits - discuss some recent work with Dan Ciubotaru and Lucas Mason-Brown on determining the wavefront set for unipotent representations.

Chen Wan (Rutgers University)

Title: Period integrals and multiplicities for some strongly tempered spherical varieties

Abstract: In this talk I will discuss the local and global conjectures for some strongly tempered spherical varieties. Both conjectures are very similar to the Gan-Gross-Prasad models. More specifically, globally the square of the period integrals should be related to the central value of some L-functions of symplectic type. Locally each tempered L-packet should contain a unique distinguished element with multiplicity one and the unique distinguished element should be determined by certain epsilon factors (i.e. epsilon dichotmy). I will also discuss the proof of the local conjecture in many cases. This is a joint work with Lei Zhang.

Chuijia Wang (Technion- Israel Institute of Technology)

Title: Distinction and quadratic base change for regular supercuspidal representations.

Abstract: In this talk, I will introduce a conjecture of Prasad classifying distinguished representations with respect to a quadratic character in terms of certain functorial property of their associated Langlands parameters when the corresponding homogeneous space is a Galois symmetric space. I will also talk about recent progress towards this conjecture and our work on this conjecture for regular supercuspidal representations based on the deep machinery developed by Kaletha and Hakim-Murnaghan.

Zhicheng Wang (Soochow University)

Title: Lusztig correspondence and the finite Gan-Gross-Prasad problem

Abstract The Gan-Gross-Prasad problem is to describe the restriction of representations of a classical group G to smaller groups H of the same kind. In previous work, we study the Gan-Gross-Prasad problem for unipotent representations of finite classical groups. In this talk, we solved the Gan-Gross-Prasad problem over finite fields completely. The main tools used are the Lusztig correspondence and a formula of Reeder for the pairings of Deligne-Lusztig characters. We give a reduction decomposition of Reeder's formula and reduce the Gan-Gross-Prasad problem for arbitrary representations to the unipotent representations by Lusztig correspondence.

Qing Zhang (Huazhong University of Science and Technology)

Title: on a geometric property of generic representations.

Abstract: In this talk, we describe a geometric property of L-parameters of generic representations of quasi-split p-adic groups and some consequences of it. This talk is based on joint work with Cunningham, Fiori, Moussaoui and with Hazeltine, Liu, Lo.

Jiandi Zou (Technion- Israel Institute of Technology)

Title: Classification of irreducible representations of a Kazhdan-Patterson covering group of GL(r)

Abstract: The local Langlands correspondence for a general linear group over a non-archimedean local field is known for a while, which gives a bijection between the set of equivalence classes of irreducible representations of GL(r) and the set of equivalence classes of r-dimensional Weil-Deligne representations. To establish such a bijection, we first need to do that for cuspidal representations, which is indeed the most crucial and difficult step. Then, the problem reduces to classifying all the irreducible representations of GL(r) via cuspidal ones, which is due to Bernstein-Zelevinsky and Zelevinsky. Their methods are also adapted and improved by others including Tadic, Lapid-Minguez, Minguez-Sécherre to classify irreducible representations of an inner form of GL(r). In this talk, I will focus on explaining some key points in the proof of Zelevinsky classification, then I will explain how to adapt it to classify all the irreducible representations of a certain covering group of GL(r), i.e. a Kazhdan-Patterson covering group. This is a joint work with Erez Lapid and Eyal Kaplan.