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Homological branching law for general linear p -adic groups

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ABSTRACT

In this talk, I will discuss the homological behavior of representations under branching law with focus on the pair $(\mathrm{GL}(n+1, F), \mathrm{GL}(n, F))$. This is based on some problems and ideas of D. Prasad. In particular, I will talk about (1) the higher vanishing Ext groups for generic representations, which confirms a conjecture of D. Prasad and (2) the projectivity of an irreducible representation when restricted from $\mathrm{GL}(n+1, F)$ to $\mathrm{GL}(n, F)$. The main tool of Bernstein-Zelevinsky derivatives and affine Hecke algebras will also be reviewed. This is a joint work of Gordan Savin.

The arithmetic fundamental Lemma and fine Deligne-Lusztig varieties

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ABSTRACT

The arithmetic Gan-Gross-Prasad conjecture generalizes the Gross-Zagier formula to Shimura varieties associated to unitary or orthogonal groups. The arithmetic fundamental lemma (AFL), formulated by Wei Zhang in the unitary case, is a key local ingredient in the relative trace formula approach towards arithmetic GGP. We will discuss a recent proof of the AFL in the minuscule case, which relies on an explicit character formula for certain fine Deligne-Lusztig varieties. This is joint work with Xuhua He and Yihang Zhu.

A weak form of beyond endoscopic decomposition for the stable trace formula of odd orthogonal groups

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ABSTRACT

We show that the cuspidal component of the stable trace formula of a split special odd orthogonal group over a number field, satisfies a weak form of beyond endoscopic decomposition. We also study the r -stable trace formula, when r is the standard or the second fundamental representation of the dual group, and show that they satisfy a similar kind of beyond endoscopic decomposition. The results are consequences of Arthur's works (2013) on endoscopic classification of automorphic representations, together with known results concerning a class of Langlands L -functions for special odd orthogonal groups.

On the Hitchin fibration for algebraic surfaces

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ABSTRACT

Hitchin construct an abelian fibration on the moduli space of Higgs bundles on an algebraic curves. We explore a possible generalization of this construction in higher dimensional case, in particular for Higgs bundles over algebraic surfaces.

Arthur's packets for classical real groups

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ABSTRACT

We will give an overview on our joint work with Colette Moeglin on Arthur's packets for real and classical groups. We will show how they can be constructed starting from unipotent packets using cohomological and parabolic induction.

Counting ℓ -adic local systems using Arthur's trace formula

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ABSTRACT

Drinfeld calculated in 1981 the number of rank 2 irreducible ℓ -adic local systems over a curve over a finite field. He did that by passing to automorphic side and then calculated explicitly every term of a trace formula. In this talk, I will show how to generalize his result to general rank case by calculating an Arthur's trace formula. For geometric part, one relates it to the number of some Higgs bundles which has been calculated by Schiffmann. For spectral part, one calculates every term explicitly.