Automorphic representations and p-adic aspects of the Langlands program
Représentations automorphes et aspects p-adiques du programme de Langlands
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PATRICK ALLEN, McGill University
Minimal R = T in the absence of minimal lifts

Wiles's famous theorem that all semistable elliptic curves over the rationals are modular follows from R = T theorems, which identify certain parameter rings for Galois representations with Hecke algebras. These R = T theorems are first proved in the so-called minimal case, by Taylor and Wiles, and this is used as an input for the general case. Necessary for the minimal case is the existence of minimal lifts of mod p modular forms, which follows from work of Carayol and Ribet, except for some particular cases that are excluded by the technical Taylor-Wiles hypothesis. We'll consider one of these excluded case and what one can say about minimal R = T theorems for this example, attempting to explain a link between some derived structure on the Galois side with the orbifold structure on the modular side. This is joint work in progress with Preston Wake.

ROMAIN BRANCHEREAU, McGill
Toroidal integrals of Kudla-Millson forms and diagonal restrictions of Hilbert modular forms

Let Y be the locally symmetric spaces of an orthogonal group of signature (p, q). It is a Riemannian manifold of dimension pq and examples of such spaces include modular curves, Hilbert modular surfaces, Bianchi manifolds or more generally hyperbolic manifolds. The Kudla-Millson theta serie Θ_{KM} is a closed differential q-form on Y valued in a space of modular forms of weight $\frac{p+q}{2}$. By integrating this form on q-cycles in Y, it realizes a theta correspondence between the homology $H_q(Y)$ and this space of modular forms, often referred to as the *Kudla-Millson theta lift*. One of its most interesting features is that the Fourier coefficients of this lift can be expressed in terms of certain intersections numbers in Y

A very natural family of cycles is obtained by attaching a cycle $C_{\mathbf{T}}$ in $H_q(Y)$ to an algebraic tori $\mathbf{T}$ of the orthogonal group. In this talk, I will discuss the Kudla-Millson theta lift of such cycles, and in particular explain how the image of $C_{\mathbf{T}}$ is the diagonal restriction of a Hilbert modular forms of parallel weight one for $\mathrm{SL}_2(F_{\mathbf{T}})$, where $F_{\mathbf{T}}$ is a totally real étale algebra attached to $\mathbf{T}$. In the case of signature $(2, 2)$, one can recover a result of Darmon-Pozzi-Vonk about the diagonal restriction of Eisenstein series, as well as a *trace identity* due to Darmon-Harris-Rotger-Venkatesh.

TING-HAN HUANG, Concordia University
Special values of triple product p-adic L-functions and p-adic Abel-Jacobi maps

In 2013, H. Darmon and V. Rotger proved a so-called p-adic Gross-Zagier formula, which relates the value of the triple product p-adic L-function attached to Hida families at a balanced classical triple, to the image of the generalized diagonal cycle under the p-adic Abel-Jacobi map, evaluated at a certain differential. In this talk, I will present a generalization of their result to finite slope families. We first introduce the construction of the triple product p-adic L-function by F. Andreatta and A. Iovita. Then we explain the Abel-Jacobi map, the explicit computation of which involves A. Besser's finite polynomial cohomology theory. In the end, we will show how to relate the two objects, and hence prove the p-adic Gross-Zagier formula. If time permits, we will also mention how the formula contributes to the equivariant BSD conjecture.

ERMAN ISIK, University of Ottawa
On anticyclotomic Iwasawa theory of Hecke characters for ordinary primes

Iwasawa theory is an area of Number Theory that was named after the fundamental work of Kenkichi Iwasawa in the late 1950s and onward. Classically, it is concerned with the growth of arithmetically interesting objects, such as class groups, Mordell-Weil and Tate-Shafarevich groups, or more generally Selmer groups, in $\mathbb{Z}_p$-power-extensions of a number field (or in modern days, any p-adic families, such as the ones constructed by Hida and Coleman).

In this talk, I will first introduce Nekovar's theory of Selmer complexes, which allows us to study the Selmer groups in the framework of derived categories. We then explore a consequence towards the anticyclotomic Iwasawa main conjecture for CM Hilbert modular forms using Nekovar's descent formalism of Selmer complexes (as a generalization of the main results of Agboola - Howard and T. Arnold on CM elliptic curves and self-dual CM modular forms, respectively).

MARTÍ ROSET JULIÀ, McGill University
Dihedral long root local A-packets of G_2 via theta correspondence

Let G be a split exceptional group of type G_2. Arthur's Conjecture describes the constituents of the square integrable automorphic representations of G. It decomposes this space as a direct sum of subspaces consisting of near equivalence classes of representations. These subspaces, called A-packets, are indexed by certain morphisms called A-parameters.

We will focus on the so-called dihedral long root A-parameters of G. We will explain that they factor through A-parameters for $\mathrm{PU}_3 \rtimes \mathbb{Z}/2\mathbb{Z}$. Motivated by this, we will use the exceptional theta correspondence between $\mathrm{PU}_3 \rtimes \mathbb{Z}/2\mathbb{Z}$ and G to propose a construction of the local representations of G that appear in the corresponding A-packets. This is joint work with Raúl Alonso, Qiao He, and Mishty Ray and is part of a larger project (involving other authors) that aims to prove Arthur's Conjecture for this type of A-parameters.

HENRY KIM, University of Toronto
Distribution of Hecke eigenvalues for holomorphic Siegel modular forms

We present two results on the distribution of Hecke eigenvalues of holomorphic Siegel modular forms. The first is the average Sato-Tate distribution, and the second is the Gaussian central limit theorem. The main tool is the vertical Sato-Tate theorem proved using Arthur's invariant trace formula. This is a joint work with S. Wakatsuki and T. Yamauchi.

PAUL MEZO, Carleton University
Arthur packets for real unitary groups

Mok, Moeglin and Renard have defined Arthur packets for unitary groups. Their definition follows Arthur's work on classical groups, and relies on harmonic analysis. For real groups an alternative definition of Arthur packets has been known since the early 90s. This approach, due to Adams-Barbasch-Vogan, relies on sheaf-theoretic techniques instead of harmonic analysis. In joint work with N. Arancibia, we prove that these two definitions are equivalent for real unitary groups.

MONICA NEVINS, University of Ottawa
Semisimple characters of fixed-point subgroups

Let G be a connected reductive group over a local nonarchimedean field of residual characteristic p and set $H = (G^\Gamma)^\circ$, where $\Gamma \subset Aut(G)$ is a finite group such that $\gcd(p, |\Gamma|) = 1$. The restriction of an Adler-Yu type (J, λ) to its pro-p radical is called a semisimple character in the setting of Bushnell-Kutzko-Stevens types. In this talk we show that the restriction of any Γ-stable datum defining a semisimple character for G gives that of a semisimple character for H and that all semisimple characters for H arise in this way. This offers new examples of endo-equivalence (as introduced by Bushnell-Henniart) with interpretations in the local Langlands correspondence. Part of this is joint work with Peter Latham.

MISHTY RAY, University of Calgary
Vogan's conjecture for p-adic GL_n

ABV-packets are proposed generalizations of local Arthur packets and this notion was developed for p-adic groups following the geometric perspective of Adams, Barbasch, and Vogan. When considering groups over p-adic fields, we call this Vogan's conjecture. In this talk, we discuss the proof of Vogan's conjecture for GL_n over a p-adic field. This is joint work with Clifton Cunningham.

GIOVANNI ROSSO, Concordia
Hirzebruch–Zagier cycles in p-adic families and adjoint L-values

Let E/F be a quadratic extension of totally real fields. The embedding of the Hilbert modular variety of F inside the Hilbert modular variety of E defines a cycle, called Hirzebruch–Zagier cycle. Thanks to work of Hida and Getz–Goresky, it is known that the integral of a Hilbert modular form g for E over this cycle detects if g is the base change of a Hilbert modular form for f, and in this case the value of the integral is related to the adjoint L-function of f. In this talk we shall present joint work with Antonio Cauchi and Marc-Hubert Nicole, where we show that the Hirzebruch–Zagier cycles vary in families when one considers deeper and deeper levels at p. We shall present applications to Λ-adic Hilbert modular forms and adjoint p-adic L-functions.

JAMES STEELE, University of Calgary
Koszul duality phenomenon in the p-adic local Langlands

In the 90s, David Vogan showed that the local Langlands correspondence for a connected, reductive, p-adic group G can be reformulated as a bijection between the irreducible representations of G, and its pure inner forms, and the simple objects of a category of equivariant perverse sheaves on a moduli space of Langlands parameters. In the case of generalised Steinberg representations for semisimple G, we show that this correspondence can be interpreted through the language of Koszul duality, and that a number of the categorical aspects of either side of the correspondence are reflected through this duality.

EKTA TIWARI, University of Ottawa
Irreducible supercuspidals of unramified $U(1,1)$

In this talk, I will give a brief summary about how to construct supercuspidal representations of unramified $U(1,1)$ and explain the branching rules for certain cases.