

ABSTRACTS

Ashay Burungale

Title: \mathfrak{p} -rigidity and Iwasawa μ -invariants

Abstract: Let F be a totally real field with ring of integers O and p be an odd prime unramified in F . Let \mathfrak{p} be a prime above p . A mod p Hilbert modular form associated to F is determined by its restriction to the partial Serre-Tate deformation space $\widehat{G}_m \otimes O_{\mathfrak{p}}$. We give a brief overview of this \mathfrak{p} -rigidity and its application to the μ -invariant of certain anticyclotomic \mathfrak{p} -adic L-functions (joint work with Prof. H. Hida).

Francesc Castella

Title: Big Heegner points and anticyclotomic p -adic L-functions.

Abstract: We will explain the relation between the so-called big Heegner points introduced by Ben Howard and two different anticyclotomic p -adic L-functions: the first one, as appeared in the work of Perrin-Riou and Nekovar on a p -adic variant of the Gross-Zagier formula for Heegner points and cycles, respectively, and the second one, as considered in the more recent work of Bertolini-Darmon-Prasanna, Brakocevic and Hsieh.

Ralph Greenberg

Title: Iwasawa Theory for Artin Representations

Abstract: We will discuss the question of defining a p -adic L-function and formulating a main conjecture for an Artin representation. The case where the Artin representation is totally even (or totally odd) is classical. The corresponding main conjecture has been proven by Wiles. This talk will discuss the special case where the representation is 2-dimensional, but not totally even or odd. As we will explain, under certain assumptions, there are two p -adic L-functions, two Selmer groups, and two main conjectures. This talk is about joint work with Nike Vatsal.

Robert Guralnick

Title: Adequate Representations

Abstract: Thorne introduced the notion of adequate representations which is a weakening of the concept of a big representation used by Wiles and Taylor and also by Clozel, Harris and Taylor. Thorne showed that one can derive the same consequences with regard to automorphic representations. I will discuss some recent results showing that many reasonably small representations do satisfy the properties (this is joint work with Florian Herzig and Pham Tiep) extending earlier work with Herzig, Taylor and Thorne. I will also discuss

some cases where it fails and in particular will give a negative answer to a question of Taylor which depends on a rather strange condition on cosets in simple groups (which had been studied by John Thompson in 1966).

David Hansen

Title: Analytic p -adic L-functions for GL_2 .

Abstract: I'll describe a construction which associates a canonical p -adic L-function with a 'non-critically refined' cohomological cuspidal automorphic representation of $GL_2(\mathbb{A}_F)$ over an arbitrary number field F . These L-functions deform naturally into many-variable functions over eigenvarieties, and they satisfy good interpolation and growth properties; when F is totally real, these three requirements characterize our construction uniquely.

Chandrashekhara Khare

Title: Modularity of Galois representations via p -adic approximations.

Abstract: I will explain an approach to modularity lifting theorems of Wiles, Taylor-Wiles,.... In this approach starting with the assumption that the reduction mod p of a Galois representation is modular, one successively proves that mod p^n the representation is modular for $n = 1, 2, 3, \dots$. This again highlights the role that congruences between modular forms, and that there are lots of them, plays in proving modularity of Galois representations.

Kai-Wen Lan:

Title: Compactifications of PEL-type Shimura varieties and Kuga families with ordinary loci.

Abstract: I will report on the construction of p -integral models of various algebraic compactifications of PEL-type Shimura varieties and Kuga families, allowing ramification (including deep levels) at p , with good behaviors over the loci where certain (multiplicative) ordinary level structures are defined. (In such a construction we know almost nothing about the non-ordinary loci when p is ramified, but this theory is still useful for at least one important application to the construction of Galois representations as p -adic limits.) I will begin with motivations and qualitative descriptions that might (it is hoped) make things easier.

Michael Larsen

Title: Type A images of Galois representations and maximality

Abstract: I will talk about recent joint work with Chun Yin Hui, of which the following result is typical: Let ρ_l be a motivic compatible system of Galois representations of the Galois group G of a number field. If $\rho_l(G)$ is Zariski dense for some l , then for all sufficiently large l , $\rho_l(G)$ contains $SL_n(\mathbb{Z}_l)$.

Simon Marshall:

Title: Endoscopy and cohomology growth on $U(3)$

Abstract: We will use the endoscopic classification of automorphic forms on $U(3)$ to determine the asymptotic cohomology growth of families of complex-hyperbolic 2-manifolds.

George Schaeffer

Title: Some observations concerning weight 1 newforms mod p .

Abstract: The mod p representations arising from weight 1 newforms of level N deserve arithmetic attention for the following reason: Roughly speaking, those which do not lift to classical modular forms correspond to $\mathrm{PGL}(2, p^r)$ Galois representations unramified outside N (in particular, unramified at p).

Numerical evidence suggests that there are a great many more such newforms than perhaps was previously thought. In this talk, I will hint at an explanations for this phenomenon and some of its consequences (both conjectural and proven). I will also give a heuristic which, while possibly specious, predicts certain idiosyncrasies in the data. Much of what I will say is work in progress with Akshay Venkatesh.

Romyar Sharifi:

Title: Conjectures on cup products of units and modular symbols

Abstract: T. Fukaya and K. Kato have proven a conjecture of mine relating cup products of units and modular symbols modulo an Eisenstein ideal under mild hypotheses. After a short discussion of the conjecture, I intend to outline the proof of their main theorem. I also hope to very briefly mention joint work with Fukaya and Kato on generalizations.

Kevin Ventullo

Title: The Rank One Abelian Gross-Stark Conjecture

Abstract: Let χ be a totally odd character of a totally real number field F . In 1981, B. Gross formulated a p -adic analogue of a conjecture of Stark which expresses the leading term at $s = 0$ of the p -adic L-function attached to χ as a product of a regulator and an algebraic number. Recently, Dasgupta-Darmon-Pollack proved Gross' conjecture in the rank one case under two assumptions: that Leopoldt's conjecture holds for F and p , and a certain technical condition when there is a unique prime above p in F . After giving some background and outlining their proof, I will explain how to remove both conditions, thus giving an unconditional proof of the conjecture. If there is time, I will describe what can be done in the higher rank setting.

Preston Wake:

Title: Hecke algebras for Lambda-adic modular forms.

Abstract: There is a deep connection between the arithmetic of cyclotomic fields and modular forms. This was used by Mazur and Wiles in their proof of the Iwasawa main conjecture. More recently, Sharifi has conjectured an even stronger connection. I'll talk about another application of this connection: the

structure of Iwasawa modules is related to ring-theoretic properties of Hecke algebras. I will discuss connections with Sharifi's conjectures and Kato and Fukaya's work on them.

Bin Zhao

Title: Mumford-Tate conjecture for abelian fourfolds

Abstract: I will talk about an ongoing project toward the Mumford-Tate conjecture for abelian fourfolds. First I will introduce the notion of an abelian variety with Galois representation of Mumford's type. I will recall some properties of such an abelian variety due to R. Noot and use them to determine the Serre-Tate coordinates of the abelian variety at a place where it has good ordinary reduction. Then I will explain how to use this information to determine the Mumford-Tate group of the abelian variety.