TITLES AND ABSTRACTS FOR CLAP 2

Alexander Bertoloni Meli (Michigan), *Compatibility of the local Langlands correspondence for odd unitary groups*

I will speak on recent work with Linus Hamann and Kieu Hieu Nguyen on the compatibility of the Fargues–Scholze and Mok local Langlands correspondences for odd unramified unitary and unitary similitude groups. If time permits, I will discuss applications of this result to the cohomology of local shtuka spaces and Fargues's conjecture.

George Boxer (Paris), *Higher Hida theory*

The goal of higher Hida theory is to study the ordinary part of integral coherent cohomology of Shimura varieties. In this talk I will describe some results in the case of Siegel modular varieties. This is joint work in progress with V. Pilloni.

Juan Esteban Rodríguez Camargo (Lyon), *Locally analytic completed cohomology of Shimura varieties*

The goal of this talk is to relate the locally analytic vectors of the completed cohomology of a Shimura variety with the locally analytic structural sheaf at infinite level, generalizing the work of Lue Pan for the modular curve. As a consequence, one can deduce a rational version of the Calegari–Emerton conjectures. More precisely, we will sketch the construction of the geometric Sen operator of a rigid analytic space, and explain how it is used to calculate proétale cohomology. Then, we show that the geometric Sen operator of a Shimura variety is obtained as the pullback of a G-equivariant vector bundle of the flag variety via the Hodge–Tate period map. As a consequence, we will be able to compute (Hodge–Tate) proétale cohomology as Lie algebra cohomology of certain D-modules over the flag variety.

Miaofen Chen (Shanghai), *Newton stratification and weakly admissible locus in p-adic Hodge theory*

The p-adic period domain (also called the admissible locus) is the image of the p-adic period mapping inside the rigid analytic p-adic flag varieties. The weakly admissible locus is an approximation of the admissible locus in the sense that these two spaces have the same classical points. On the flag variety, we have the Newton stratification which has p-adic period domain as its unique open stratum. In this talk, we consider the condition that the weakly admissible locus is maximal (i.e. the weakly admissible locus is a union of Newton strata). This unifies the extreme cases when the weakly admissible locus equals to the admissible locus or the whole flag variety. We will give several equivalent criterions for the condition that the weakly admissible locus is maximal. Moreover, we give a criterion when a single

Newton stratum is contained in the weakly admissible locus. This is a joint work with Jilong Tong.

Ellen Eischen (Oregon), *p-adic aspects of L-functions, with a view toward the case of Spin L-functions for* GSp_6

I will introduce an approach to studying p-adic aspects of L-functions, with a view toward my joint work with G. Rosso and S. Shah on the case of Spin L-functions for GSp_6. The study of p-adic properties of values of L-functions dates back to Kummer's study of congruences between values of the Riemann zeta function at negative odd integers, as part of his attempt to understand class numbers of cyclotomic extensions. After Kummer's approach lay mostly dormant for over a half century, Iwasawa's conjectures about the meaning of p-adic L-functions led to renewed interest, and Serre's discovery of p-adic modular forms opened up a new approach to studying congruences between values of L-functions (and constructing p-adic L-functions), forming the foundation for continued developments today.

Many constructions of p-adic L-functions each rely on a similar-sounding recipe (which I will first summarize in the setting of modular forms, to help convey the story to audience members who are not necessarily familiar with constructions of p-adic L-functions). In practice, carrying out this recipe involves proving delicate technical results, which are sensitive to the cases under consideration. After providing an overview of this recipe, I will introduce current work of Rosso, Shah, and myself proving algebraicity and constructing p-adic Spin L-functions for GSp_6. Along the way, I will put it in the context of earlier work, including the constructions of Serre, Katz, Deligne–Ribet, Hida, E–Harris–Li–Skinner, and Liu.

Radhika Ganapathy (Bangalore), *On the Hecke algebra of a reductive p-adic group with respect to the Moy–Prasad filtration of an Iwahori subgroup.*

We will discuss two presentations of the Hecke algebra $\mathcal{H}(G(F), I_n), n \geq 1$, where F is a non-archimedean local field, G is a connected reductive group over F, I is an Iwahori subgroup of $G(F)$, and I_n is the n-th Moy-Prasad filtration of I.

The first is a presentation of $\mathcal{H}(G(F), I_n)$, generalizing the previous work of Iwahori–Matsumoto on affine Hecke algebras. For GL_n, Howe wrote down a presentation of the Hecke algebra $\mathcal{H}(\mathrm{GL}_n(F), I_n)$ and observed that the Hecke algebras $\mathcal{H}(\mathrm{GL}_n(F), I_n)$ and $\mathcal{H}(\mathrm{GL}_n(F'), I'_n)$ are isomorphic when F and F' are n-close local fields. We will discuss the question of generalizing this presentation of Howe to general connected reductive groups.

This talk is based on joint work with Xuhua He.

Miao (Pam) Gu (Duke), *A family of period integrals related to triple product L-functions*

Let F be a number field with ring of adeles $\mathbb{A}_F$. Let r_1, r_2, r_3 be a triple of positive integers and let $\pi := \otimes_{i=1}^{3} \pi_i$ where the π_i are all cuspidal automorphic representations of $\mathrm{GL}_{r_i}(\mathbb{A}_F)$. We denote by $L(s, \pi, \otimes 3) = L(s, \pi_1 \times \pi_2 \times \pi_3)$ the corresponding triple product L-function. It is the Langlands L-function defined by the tensor product representation $\otimes^3 :^L (\mathrm{GL}_{r_1} \times \mathrm{GL}_{r_2} \times \mathrm{GL}_{r_3}) \to \mathrm{GL}_{r_1 r_2 r_3}(\mathbb{C})$. In this talk I will present a family of Eulerian period integrals, which are holomorphic multiples of the triple product L-function in certain non-empty region. We expect that they satisfy a local multiplicity one statement and a local functional equation. This is joint work with Jayce Getz, Chun-Hsien Hsu and Spencer Leslie.

Alexander Ivanov (Bonn), *On p-adic Deligne–Lusztig spaces*

The classical Deligne–Lusztig theory allows a powerful geometric tool to construct and classify representations of finite groups of Lie-type. In this talk I would like to propose a general definition of Deligne–Lusztig spaces, attached to p-adic groups. This allows the study of representations of those groups (and related local (ℓ-adic) Langlands and Jacquet–Langlands correspondences) with techinques from the classical Deligne–Lusztig theory.

Tasho Kaletha (Michigan), *Covers of reductive groups and functoriality*

To a connected reductive group G over a local field F we define a compact topological group $\tilde{\pi}_1(G)$ and an extension $G(F)_\infty$ of $G(F)$ by $\tilde{\pi}_1(G)$. From any character x of $\tilde{\pi}_1(G)$ of order n we obtain an n-fold cover $G(F)_x$ of the topological group $G(F)$. We also define an L-group for $G(F)_x$, which is a usually non-split extension of the Galois group by the dual group of G, and deduce from the linear case a refined local Langlands correspondence between genuine representations of $G(F)_x$ and L-parameters valued in this L-group.

This construction is motivated by Langlands functoriality. We show that a subgroup of the L-group of G of a certain kind naturally lead to a smaller quasi-split group H and a double cover of $H(F)$. Genuine representations of this double cover are expected to be in functorial relationship with representations of $G(F)$. We will present two concrete applications of this, one that gives a characterization of the local Langlands correspondence for supercuspidal L-parameters when p is sufficiently large, and one to the theory of endoscopy.

Teruhisa Koshikawa (Kyoto), *On the cohomology of unitary Shimura varieties*

I will talk about vanishing theorems for the cohomology of unitary Shimura varieties, particularly for the generic part.

Judith Ludwig (Heidelberg), *Endoscopy on* SL(2)*-eigenvarieties*

A central question in the theory of p-adic automorphic forms is to determine when p-adic automorphic forms are classical. For overconvergent forms, an answer is provided by a famous (and by now vastly generalized) result of Coleman who showed that forms of small slope are classical. Going further one may ask the following question: Assume that f is an overconvergent Hecke eigenform of finite slope and assume that the system of Hecke eigenvalues of f is classical of classical algebraic weight. Is f itself then classical?

For GL(2) over $\mathbb{Q}$ the answer is yes. In this talk we study this question for SL(2) over a totally real field. We show that due to endoscopy the answer in this case is no. Furthermore we explicitly describe the local geometry of SL(2)-eigenvarieties at classical points and show that at endoscopic points it often fails to be Gorenstein. This is joint work with C. Johansson.

James Newton (Oxford), *Modularity and local-global compatibility for automorphic Galois representations*

I will discuss joint work with Ana Caraiani on local-global compatibility for automorphic Galois representations, and applications to modularity (e.g. of elliptic curves over CM fields).

Lue Pan (Princeton), *Regular de Rham Galois representations in the completed cohomology of modular curves*

Let p be a prime. I want to explain how to use the geometry of modular curves at infinite level and Hodge–Tate period map to study p-adic regular de Rham Galois representations appearing in the p-adically completed cohomology of modular curves. We will show that these representations up to twists come from modular forms and give a geometric description of the locally analytic representations of $\mathrm{GL}_2(\mathbb{Q}_p)$ associated to them. These results were previously known by totally different methods.

Naomi Sweeting (Harvard), *Kolyvagin's Conjecture and Higher Congruences of Modular Forms*

Given an elliptic curve E, Kolyvagin used CM points on modular curves to construct a system of classes valued in the Galois cohomology of the torsion points of E. Under the conjecture that not all of these classes vanish, he deduced remarkable consequences for the Selmer rank of E. For example, his results, combined with work of Gross–Zagier, implied that a curve with analytic rank one also has algebraic rank one; a partial converse follows from his conjecture. In this talk, I will report on recent work proving several new cases of Kolyvagin's conjecture. The methods follow in the footsteps of Wei Zhang, who used congruences between modular forms to prove Kolyvagin's conjecture under some technical hypotheses. By considering congruences modulo higher powers of p, we remove many of those hypotheses. The talk will provide an introduction to Kolyvagin's conjecture and its applications, explain an analog of the conjecture in an opposite parity regime, and give an overview of the proofs, including the difficulties associated with higher congruences of modular forms and how they can be overcome via deformation theory.

Eva Viehmann (Münster), *Harder–Narasimhan strata on the B_{dR}^+-Grassmannian*

We establish a Harder–Narasimhan formalism for modifications of G-bundles on the Fargues–Fontaine curve. The semi-stable stratum of the associated stratification of the B_{dR}^{+}-Grassmannian coincides with the weakly admissible locus. When restricted to minuscule affine Schubert cells, it corresponds to a Harder–Narasimhan stratification of Dat, Orlik and Rapoport. I will also explain the relation to the Newton stratification as well as some geometric properties of the strata. This is joint work with K.H. Nguyen.

Yujie Xu (Harvard), *Removing normalization from the construction of integral models of Shimura varieties of Hodge (abelian) type*

Shimura varieties are moduli spaces of abelian varieties with extra structures. Over the decades, various mathematicians (e.g. Rapoport, Kottwitz, etc.) have constructed nice integral models of Shimura varieties. In this talk, I will discuss some motivic aspects of integral models of Hodge type constructed by Kisin (resp. Kisin–Pappas). I will talk about my recent work on removing the normalization step in the construction of such integral models, which gives closed embeddings of Hodge type integral models into Siegel integral models. I will also mention an application to toroidal compactifications of such integral models.

Mingjia Zhang (Bonn), *On p-adic Shimura varieties and the Hodge–Tate period map*

I would like to talk about a conjecture by Peter Scholze on descending the Hodge–Tate period map on infinite p-level Shimura varieties to a map over Bun_G and possible applications. To verify the conjecture is a work in progress.

Xinwen Zhu (Caltech), *Isolation of cuspidal spectrum and the Bernstein center of real groups*

We discuss a recent new technique for isolating cupsidal components on the spectral side of the trace formula. The main point is to understand the correct notion (in my opinion) of the Bernstein center of real groups. This is a joint work of Raphaël Beuzart-Plessis, Yifeng Liu and Wei Zhang.