

Abstracts

Konstantin Ardakov

Title

The central sheaf of the category of smooth mod- p representations of $\mathrm{SL}_2(\mathbb{Q}_p)$

Abstract

This is work in progress with Peter Schneider. The Bernstein centre of a p -adic reductive group plays a fundamental role in the classical local Langlands correspondence. In the mod- p local Langlands program, the naive analogue of the Bernstein centre, namely the centre of the category $\mathrm{Mod}(G)$ of all smooth mod- p representations, turns out to be too small: it is for example trivial whenever the group in question has trivial centre. Instead, we consider the centres $Z(\mathrm{Mod}(G)/\mathcal{L})$ of the quotient categories $\mathrm{Mod}(G)/\mathcal{L}$, as \mathcal{L} runs over all localizing subcategories of $\mathrm{Mod}(G)$. We show that provided one restricts to the localizing subcategories that are stable under injective envelopes, this defines a sheaf with respect to finite coverings. In the case where $G = \mathrm{SL}_2(\mathbb{Q}_p)$ and $p \neq 2, 3$, we use recent results by Ollivier and Schneider on the structure of the pro- p Iwahori Ext-algebra to construct a certain projective variety X having the property that every Zariski open subset U of X gives rise to a stable localizing subcategory \mathcal{L}_U of $\mathrm{Mod}(G)$. This projective variety is a certain chain of projective lines, and is closely related to the recent work of Dotto, Emerton and Gee.

Laurent Berger

Title

Super-Hölder functions and vectors

Abstract

Locally analytic vectors in p -adic Banach representations of p -adic Lie groups were defined and studied by Schneider and Teitelbaum. Is there an analogue of these objects in representations over fields of characteristic p ? I will define super-Hölder functions, an analogue in characteristic p of locally analytic functions. I

will give examples of super-Hölder vectors in certain representations of arithmetic interest. Joint work with Sandra Rozensztajn.

Jessica Fintzen

Title

Representations of p -adic groups and Hecke algebras

Abstract

work in progress

Toby Gee

Title

Categorical p -adic local Langlands for $\mathrm{GL}_2(\mathbb{Q}_p)$

Abstract

I will discuss joint work in progress with Andrea Dotto and Matthew Emerton on the categorical p -adic local Langlands correspondence for $\mathrm{GL}_2(\mathbb{Q}_p)$.

Elmar Große Klönne

Title

(φ, Γ) -modules in characteristic p for unramified F/\mathbb{Q}_p

Abstract

Let F/\mathbb{Q}_p be an unramified field extension, let k be a finite extension field of the residue field of F . The category of finite-dimensional $(\mathrm{Gal}(F/\mathbb{Q}_p)$ -representations over k is equivalent with the category (φ, Γ) -modules over k . I want to report on attempts to explicitly construct and describe the latter.

David Kazhdan

Title

On the Langlands correspondence for curves over local fields

Abstract

Let C be a smooth complete curve over a local field F , G a split reductive group and G^\vee be the Langlands dual group. Let Bun be the stack of G -bundles on C .

I present a construction of the Schwartz space W of half-densities on the groupoid $\text{Bun}(F)$ and define a commutative Hecke algebra acting on W .

Let $S(C)$ be the corresponding spectrum. In the case when F is Archimedean I formulate a conjectural description of S in terms of G^\vee -opers on C . For non-Archimedean fields I outline an approach which could lead to an understanding of the structure of S .

Jan Kohlhaase

Title

Homotopy theory of smooth representations in characteristic p

Abstract

Let k be a field of characteristic $p > 0$ and let G be a topological group admitting an open pro- p subgroup I . If $H = k[I \backslash G / I]$ denotes the corresponding Hecke algebra then the functor of I -invariants provides an adjunction between the category of smooth k -linear G -representations and the category of H -modules. In the important case of a pro- p Iwahori-Hecke algebra this adjunction is not yet fully understood.

I will report on a homotopical approach to this problem relying on the construction of suitable model structures. This is ongoing and joint work with Nicolas Dupré.

Andreas Langer

Title

Motivic cohomology of semistable varieties

Abstract

For semistable varieties, we construct log-motivic complexes $Z_{\log(n)}$ that agree with the motivic complexes of Suslin-Voevodsky on the smooth locus. Then we prove the deformational part of a p -adic variational Hodge-conjecture for projective regular $W(k)$ -schemes with semistable reduction: In analogy to a result of Bloch-Esnault-Kerz who treat the good case we show that a rational log-motivic cohomology class in bidegree $(2n, n)$ on the closed fibre lifts to a continuous proclass if and only if its Hyodo-Kato class lies in the n -th Hodge filtration under the Hyodo-Kato isomorphism. The case $n = 1$ (logarithmic Picard group) was already treated by Yamashita. Along the way, we relate the n -th cohomology sheaf of $Z_{\log(n)}$ to a logarithmic Milnor K -sheaf and to the logarithmic Hyodo-Kato sheaf.

This is joint work with Oliver Gregory.

Judith Ludwig

Title

Endoscopy on $SL(2)$ -eigenvarieties

Abstract

A central question in the theory of p -adic automorphic forms is the question of classicality, i.e. to determine which 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 the eigenvarieties often fail to be Gorenstein. This is joint work with C. Johansson.

Vytautas Paskunas

Title

Local Galois deformation rings: reductive groups

Abstract

I will report on an ongoing joint work with Julian Quast on deformation rings of Galois representations of p -adic fields valued in reductive groups.

Norbert Schappacher

Title

News from Kurt Heegner

Abstract

Reporting on the state of our book project about Heegner with S.J. Patterson, this talk will first recall the major peculiarities of Heegner's life (1893 - 1965) and mathematics, and then focus on the way in which Heegner's personal research programme was viewed by leading number theorists of his time. André Weil's role turns out to be especially interesting in this respect.

Sarah Scherotzke

Title

Cotangent complexes of moduli spaces

Abstract

We explain how shifted symplectic structures on derived stacks are connected to Calabi-Yau structures on differential graded categories. More concretely, we will show that the cotangent complex to the moduli stack of a differential graded

category \mathcal{A} is isomorphic to the moduli stack of the “Calabi-Yau completion” of A , answering a conjecture of Keller-Yeung.

Tobias Schmidt

Title

Modular Hecke algebras and Galois representations

Abstract

Let F be a p -adic local field and let G be a connected split reductive group over F . Let H be the pro- p Iwahori-Hecke algebra of the p -adic group $G(F)$, with coefficients in an algebraically closed field k of characteristic p . The module theory over H (or a certain derived version thereof) is of considerable interest in the so called mod p Langlands program for $G(F)$, whose aim is to relate the smooth modular representation theory of $G(F)$ to modular representations of the absolute Galois group $\text{Gal}(\bar{F}/F)$ of F .

In this talk we explain a possible construction of a certain moduli space for semisimple $\text{Gal}(\bar{F}/F)$ -representations into the dual group of G over k . We then relate this space to the geometry of H . This is work in progress with C. P  pin.

Peter Scholze

Title

6-Functor-Formalisms

Benjamin Schraen

Title

Multivariable (ϕ, Γ) -modules and mod p Langlands for GL_2

Abstract

Let p be a prime number and K a finite unramified extension of \mathbb{Q}_p . We associate a multivariable (ϕ, Γ) -module to some smooth admissible mod p representations of $\text{GL}_2(K)$ and to mod p representations of the absolute Galois group of K . We

check that these two constructions satisfy a local-global compatibility relation with respect to the completed cohomology of Shimura curves.

Claus Sørensen

Title

Duality, admissibility, and tensor products in $D(G)$

Abstract

The derived category of smooth mod p representations of a p -adic Lie group G has a closed monoidal structure. In this talk we will focus on duals and tensor products, and what they look like on the dg -side of Schneider's equivalence. At the end, as an application of the duality functor, we will say a bit about to what extent a reflexive complex of G -representations must have admissible cohomology in every degree. This is based on joint work, partially in progress, with Peter Schneider.

Matthias Strauch

Title

Duality and resolutions for locally analytic representations

Abstract

In the first part we consider the duality theory for locally analytic representations of Schneider and Teitelbaum, and we show how the duality functor D of loc. cit. interacts with the functor F_P^G on the BGG category \mathcal{O} and its extension closure. This is joint work with C. Kurkoglu and T. Schmidt.

In the second part we explain ongoing joint work with S. Agrawal on resolutions for locally analytic representations. Following the groundbreaking work of Schneider and Stuhler we construct complexes by means of analytic vectors for a family of compact-open subgroups indexed by the simplices of the Bruhat-Tits building. The exactness of these complexes depends on an analogue of the Bernstein-Borel-Matsumoto theorem for locally analytic representations which is

currently still conjectural. In order to have available a good homological framework, we work in the category of solid locally analytic representations as developed by Rodrigues Jacinto and Rodriguez Camargo. Our work has also been inspired by J. Kohlhaase's paper on the cohomology of locally analytic representations.

Otmar Venjakob

Title

Explicit Reciprocity Laws in Number Theory

Abstract

The quadratic Reciprocity Law for the Legendre or Jacobi-Symbol forms the starting point of all Reciprocity Laws as well as of class field theory. It is closely related to the product formula of the quadratic Hilbert-Symbol over local fields. Various mathematicians have established higher explicit formulae to compute higher Hilbert-Symbols. Analogs were found for formal (Lubin-Tate) groups. Eventually Perrin-Riou has formulated a Reciprocity Law, which allows the explicit computation of local cup product pairings by means of Iwasawa- and p -adic Hodge Theory. In this talk I shall try to give an overview of these topics, at the end I will explain recent developments in this regard.

Annette Werner

Title

The Corlette-Simpson correspondence on abeloid varieties

Abstract

We explain a p -adic version of the Corlette-Simpson correspondence on an abeloid variety A , which amounts to an equivalence between finite-dimensional continuous representations of the Tate module and a certain subcategory of Higgs bundles on A . The study of vector bundles for the v -topology on the diamond associated to A plays an important role in the proof. We also discuss analogs of this result for principal bundles.