p-adic Hodge Theory and Applications
September 26-30, 2022
L4

Abstracts of Talks

Benjamin Antieau (Northwestern University)

Title: The nilpotency of v_1 in the K-theory of Z/p^n.

Abstract: Joint work with Achim Krause and Thomas Nikolaus establishes a new method for computing the K-groups of Z/p^n based on prismatic envelopes. I will explain how this works and how to use it to compute the degree of nilpotence of v_1 in the K-theory of Z/p^n.

Kestutis Česnavičius (Université Paris-Saclay)

Title: Adic continuity for flat cohomology

Abstract: I will discuss properties of flat cohomology of adically complete rings with coefficients in commutative, finite, locally free group schemes. The talk is based on joint works with Peter Scholze and with Akhil Mathew and Shubhodip Mondal.

Pierre Colmez (IMJ-PRG)

Title: On Emerton's factorisation of completed cohomology

Abstract: I will explain how to use p-adic Hodge theory to give a new proof of Emerton's factorisation of the completed cohomology of the tower of modular curves (joint work with Shanwen Wang).

Matthew Emerton (University of Chicago) and **Toby Gee** (Imperial College London)

Title: Moduli stacks of (phi,Gamma)-modules and the categorical p-adic Langlands correspondence

Abstract: We will give an overview of results about moduli stacks of (phi,Gamma)-modules, and use them to explain some conjectures about the p-adic Langlands correspondence.

Hélène Esnault (Freie Universität Berlin)

Title: Integrality properties of the Betti moduli space (work in progress with Johan de Jong, relying in part on earlier work with Michael Groechenig)

Abstract: We study them, in particular showing on a smooth complex quasi-projective variety the existence of ℓ-adic (which at this level is the same as p-adic…) absolutely irreducible local systems for all ℓ the moment there is a complex irreducible topological local system. The proof is purely arithmetic.

Laurent Fargues (IMJ-PRG)

Title: Some explicit compact generators for lisse complexes on Bun_G

Abstract: I will speak about an aspect of my joint work with Peter Scholze on the geometrization of the local Langlands correspondence. More precisely if G is a reductive p-adic group and Lambda a Zl-algebra with l different from p it is well known that the derived category of smooth representations of G(Qp) with coefficients in Lambda is compactly generated. A set of compact generators is given by the compact induction from a compact open pro-p subgroup of G(Qp) to G(Qp) of the trivial representation Lambda. I will explain how this generalizes to an explicit set of compact generators of the category D_{lis} (Bun_G,Lambda) where Bun_G is the stack of G-bundles on the curve. Those explicit set of compact generators are a key tool in our joint work with Scholze.

Ofer Gabber (IHES)

Title: Flattening for non noetherian formal schemes

Abstract: Let X'→X be an admissible blowup of formal schemes topologically of finite type over and adic* qcqs formal scheme S; then X→S becomes formall flat of finite presentation after and admissible blowup of S (and taking proper transform) if the same holds for X'→S. We discuss foundational approaches to the rigid etale site and some expected cohomology computations.

David Hansen (MPIM)

Title: Geometrization of the p-adic Langlands correspondence: first steps

Abstract: It is natural to wonder how much of the Fargues-Scholze geometrization program can be adapted to the setting of p-adic coefficients. In this talk, I will report on some first steps in this direction. In particular, I will define a "reasonable" category of mod-p sheaves on Bun_G, and discuss its relationship with admissible smooth mod-p representations of G(Q_p) and related groups. This is joint work in progress with Lucas Mann.

Lars Hesselholt (University of Copenhagen)

Title: Dirac geometry

Abstract: Whatever it is that animates anima and breathes life into higher algebra, this something gives the homotopy groups of a commutative algebra in spectra the structure of a commutative algebra in the symmetric monoidal category of *graded* abelian groups. Being commutative, these algebras form the affine building blocks of a geometry, which we call Dirac geometry. Informally, Dirac geometry constitutes a square root of equivariant geometry for the multiplicative group, and more concretely, the grading exhibits the hallmarks of spin in that it distinguishes symmetric and anti-symmetric behavior and provide the coherent cohomology of Dirac schemes and Dirac stacks with half-integer Serre twists. This is joint work with Piotr Pstragowski.

Arthur-César Le Bras (Strasbourg University)

Title: Relative Banach-Colmez spaces

Abstract: Banach-Colmez spaces are in some sense the rigid-analytic analogue of perfect commutative unipotent group schemes in characteristic p. I would like to explain first steps towards understanding a relative version of these objects. Joint work with J. Anschütz.

Linquan Ma (Purdue University)

Title: Perfectoid signature and an application to local fundamental groups

Abstract: In positive characteristic commutative algebra, the F-signature measures how close a strongly F-regular ring is from being nonsingular. Here strongly F-regular singularities are a positive characteristic analog of klt singularities. In this talk, using Bhatt-Scholze's perfectdoidization and Faltings' normalized length, we will introduce a mixed characteristic analog of F-signature. As an application, we show it can be used to provide an explicit upper bound on the size of the etale fundamental group of the regular locus of BCM-regular singularities (related to results of Xu and Carvajal-Rojas-Schwede-Tucker and others in zero and positive characteristic). This is joint work with Hanlin Cai, Seungsu Lee, Karl Schwede and Kevin Tucker.

Matthew Morrow (IMJ-PRG)

Title: Motivic cohomology through the looking-glass

Abstract: I will explain some of what we learn about various strains of motivic cohomology, both old and new, by looking at them through the lens of prismatic cohomology. Joint work with Elmanto and Bachmann—Elmanto.

Wieslalwa Niziol (IMJ-PRG)

Title: On compactly supported p-adic pro-etale cohomology of rigid analytic spaces

Abstract: I will discuss an ongoing work with Piotr Achinger, Pierre Colmez, and Sally Gilles in which we study properties of compactly supported pro-etale cohomology of rigid analytic spaces.

Xinwen Zhu (Caltech)

Title: The p-adic Borel hyperbolicity of A_g

Abstract: A theorem of Borel says that any holomorphic map from a smooth complex algebraic variety to a smooth arithmetic variety is automatically an algebraic map. The key ingredient is to show that any holomorphic map from the punctured disc to the arithmetic variety has no essential singularity. I will discuss some work towards a p-adic analogue of this theorem for Shimura varieties of Hodge type. Joint with Abhishek Oswal and Ananth Shankar.