

Arithmetic Geometry conference Warsaw, 14.07.2013 – 19.07.2013

Abstracts

Grzegorz Banaszak

Title: The algebraic Sato-Tate group for abelian varieties

Abstract:

Let l be a prime number, K be a number field and let A be an abelian variety over K . In an effort for proper setting of the Sato-Tate conjecture concerning the equidistribution of Frobenius elements in the representation of the Galois group G_K on the Tate module $T_l(A)$, one of attempts is the introduction of the algebraic Sato-Tate group $AST_K(A)$. Maximal compact subgroups of $AST_K(A)(\mathbb{C})$ are expected to be the key tool for the statement of the Sato-Tate conjecture for A . At the lecture, following an idea of J.-P. Serre (*Proc. Sym. in Pure Math.* **55**), I will present an explicit construction of $AST_K(A)$ based on P. Deligne's motivic category of absolute Hodge cycles (Lect. Notes in Math. 900) and discuss the arithmetic properties of $AST_K(A)$ along with explicit computations of $AST_K(A)$ for families of abelian varieties. This is a joint work with Kiran Kedlaya.

Alexander A. Beilinson

Title: Relative continuous K-theory and cyclic homology.

Abstract:

Suppose A is a p -adic associative algebra. We show that, under mild assumptions on A , the relative continuous K-theory pro-spectrum, defined as the projective limit of K-theory spectra $K(A/p^n, A/p)$, is naturally isogenous to the continuous cyclic homology. This is an attempt to understand a recent work of Bloch-Esnault-Kerz.

Bhargav Bhatt

Title: The pro-étale topology

Abstract:

I will discuss joint work with Peter Scholze on the pro-étale topology of schemes. After giving the basic definitions, the main result I will explain is the local contractibility of the pro-étale site of any scheme, and its homological consequences (such as compact generation of derived categories of sheaves, unbounded cohomological descent, and hypercompleteness for sheaves of spaces). I will also talk about why the formalism of constructible complexes of ℓ -adic sheaves takes on a simple form in the pro-étale setting: they are simply complexes of sheaves locally constant along a stratification.

Andre Chatzistamatiou

Title: De Rham-Witt cohomology

Abstract:

The de Rham-Witt complex for a variety over a perfect field of characteristic p was defined by Illusie relying on ideas of Bloch and Deligne. Its hypercohomology admits a comparison isomorphism to crystalline cohomology, which describes the latter more explicitly. The definition of the de Rham-Witt complex has been extended by Langer-Zink to a base scheme where p is nilpotent, and by work of Hesselholt-Madsen to a general base scheme.

For a suitable base scheme, we will show that the hypercohomology of the de Rham-Witt complex for a proper smooth scheme is as well-behaved as the de Rham cohomology.

Pierre Colmez

Title: Analytic representations and (φ, Γ) -modules.

Abstract:

We will explain the constructions of functors realizing some kind of p -adic local Langlands correspondance between locally analytic representations of $\mathrm{GL}(2)$ and (φ, Γ) -modules.

Gabriel Dospinescu

Title: Injectivity of the Montreal functor

Abstract:

In this joint work with P. Colmez and V. Paskunas we will sketch the proof of the following result: the Montreal functor is injective on absolutely irreducible, non ordinary unitary admissible Banach space representations of $\mathrm{GL}_2(Q_p)$. This plays a key role in extending the classification given by Paskunas to $p = 2$ and $p = 3$.

Hélène Esnault

Title: 0-cycles over local fields (joint with Olivier Wittenberg)

Abstract:

We report on results on the behavior of the Chow group of 0-cycles over local fields with finite or separably closed or algebraically closed residue fields (joint with Olivier Wittenberg). One such is: if the residue field k is finite, and X is a smooth projective surface, the Albanese of which has good reduction, then if the irreducible components of the special fibre satisfy the Tate conjecture, the cycle class map from the ℓ -adic completion of the Chow group of 0-cycles of X to étale cohomology is injective. It is still true if k is separably closed, if X has algebraic cohomology of is a semi-stable K3, but we give a counter-example in general.

Laurent Fargues

Title: Φ -modules and modifications of vector bundles

Abstract:

We develop an analog of Kisin's theory for perfectoid fields. Given such a field of characteristic p , we construct an equivalence of categories between a category of ϕ -modules and the category of effective admissible modifications of vector bundles on the fundamental curve of p -adic Hodge theory. As an application we give a classification of p -divisible groups over the ring of integers of an algebraically closed complete extension of \mathbb{Q}_p .

Jean-Marc Fontaine

Title: Integral models for the fundamental curve of p -adic Hodge theory

Abstract:

I will recall the construction of the fundamental curve of p -adic Hodge theory as well as of some of its generalizations I made with Laurent Fargues. I'll describe how one can construct integral models for these curves and how they are related to rigid analytic structures.

Wojciech Gajda

Title: On abelian varieties and ℓ -adic representations.

Abstract:

We will discuss monodromies for abelian varieties defined over finitely generated fields of arbitrary characteristic, and an arithmetical property of families of geometric ℓ -adic representations. This will be a report on my recent joint works with S. Arias-de-Reyna, G. Boeckle and S. Petersen (cf. <http://gajda.faculty.wmi.amu.edu.pl/>).

Jochen Heinloth

Title: Finding GIT-like stability criteria on algebraic stacks.

Abstract:

To find stability conditions for moduli problems one often usually proceeds in two steps: first one makes an educated guess and second one proves that this guess coincides with a stability criterion coming from GIT. We would like to give a criterion that can help to avoid the guessing procedure and illustrate in examples how this can be used to find substacks of moduli problems that admit separated coarse moduli spaces. This was motivated by questions on variants of moduli spaces of principal bundles arising from arithmetic problems for function fields.

Lars Hesselholt

Title: The big de Rham-Witt complex

Abstract:

The cyclotomic trace map, introduced by Bökstedt-Hsiang-Madsen, is a map from algebraic K-theory to a theory called TR, and the big de Rham-Witt complex, introduced in joint work with Ib Madsen, bears the same relationship to TR-theory as Milnor K-theory bears to algebraic K-theory. In this talk, I will present a new and explicit construction of this complex based on a theory of modules and derivations over lambda-rings. A surprising outcome of this new construction is an interpretation of the big de Rham-Witt complex as the complex of differentials along the leaves of a foliation.

Mauritz Kerz

Title: Chow group of 0-cycles with modulus

Abstract:

We study Chow group of 0-cycles with modulus for varieties over finite fields and construct a reciprocity isomorphism (joint work with Shuji Saito).

Marc Levine

Title: Some connections between algebraic geometry and homotopy theory.

Abstract:

We will discuss a surprising connection between an analog, in the motivic stable homotopy category, of Grothendieck's coniveau filtration, and a basic construction in classical stable homotopy theory: the Adams-Novikov spectral sequence converging to the stable homotopy groups of spheres.

Jan Nekovář

Title: Plectic cohomology

Abstract:

I will discuss a new cohomology theory (and its arithmetic applications) for a certain class of algebraic varieties. This is a joint work with Tony Scholl.

Vincent Pilloni

Title: On the conjecture of Fontaine-Mazur in dimension 2 and weight 0.

Abstract:

Fontaine and Mazur conjectured that any odd, geometric, two-dimensional, p -adic representations of the Galois group of a totally real field arises from a Hilbert modular eigenform. When the Hodge-Tate weights of the representation are 0, the weight of the modular form should be 1 and the Galois representation should be an Artin representation (of finite image). We will give a partial proof of the conjecture in weight 0. This is joint work with B. Stroh.

Kay Rülling

Title: K-groups of Reciprocity functors

Abstract:

We introduce reciprocity functors. These are functors on points and curves with certain extra properties; examples are provided by smooth commutative algebraic groups, Kähler differentials and homotopy invariant Nisnevich sheaves with transfers. Then we will define the K-groups of a tuple of reciprocity functors in the spirit of Somekawa's K-groups and compute them in some cases. In particular we obtain a description of the absolute Kähler differentials of degree n of a characteristic zero field as the K-group attached to the tuple consisting of the additive group and n -times the multiplicative group. Also, the K-group of a tuple of homotopy invariant Nisnevich sheaves with transfers equals the reciprocity functor induced by their tensor product. This is joint work with Florian Ivorra.

Marie-France Vignéras

Title: Representations modulo p of reductive p -adic groups and of pro- p -Iwahori algebras

Abstract:

I will report on the classification of irreducible representations modulo p of reductive p -adic groups in terms of supersingular representations (joint work with Abe, Henniart, Herzig), and of supersingular representations of pro- p -Iwahori Hecke algebras.

Annette Werner

Title: Automorphism of Drinfeld half-spaces over a finite field

Abstract:

Drinfeld's upper half-spaces over non-archimedean local fields are the founding examples of the theory of period domains. In this talk we consider analogs of Drinfeld's upper half-spaces over finite fields. They are open subvarieties of a projective space. We show that their automorphism group is the group of automorphisms of the ambient projective space. This is a problem in birational geometry, which we solve using tools in non-archimedean analytic geometry.