Yves André ENS Paris

Semicontinuity of some Newton polygons

Pierre Berthelot Université de Rennes

D-perfect crystalline complexes

Let k be a perfect field of characteristic p, W its ring of Witt vectors, let X be a smooth k-scheme (or log scheme). I will explain how comparison theorems between cohomological operations on D-modules and on sheaves on the nilpotent crystalline site allow to attach canonically to X certain categories of complexes of $\mathcal{O}_{X/W}$-modules, called D-perfect crystalline complexes (or dual to these). For these complexes, one can extend and generalize to the relative case standard results of crystalline cohomology such as finiteness or Poincaré duality.

Hélène Esnault Universität Duisburg-Essen, Germany

Report on the Betti and de Rham epsilon lines

Based on Laumon's idea of constructing the epsilon factor in ℓ-adic theory via local Fourier transform, we constructed a de Rham epsilon line. Inside of its complexification, we constructed a Betti line by using solutions with rapid decay.

This work is joint with A. Beilinson, S. Bloch and P. Deligne. It was written in 2005, and then we stopped and left it unfinished. We will report on far we came at the time.

Laurent Fargues Université de Paris-Sud

Ramification of Lubin-Tate groups and the Bruhat-Tits building

Taking pullback of the simplicial structure coming from the Bruhat-Tits building on Drinfeld space, the isomorphism between Lubin-Tate and Drinfeld towers defines a simplicial structure on Lubin-Tate deformation spaces, an open ball. We study in details this structure, its link with ramification filtrations on the Tate module of a Lubin-Tate group and the Hodge-Tate map of such a group. We give applications to generalized canonical subgroups, fundamental domains for the action of spherical Hecke correspondences and the period morphism.

Kazuhiro Fujiwara Nagoya University

p-adic gauge theory in number theory: completion of the program

In 2002, at the ramification conference held at Paris-Nord, the author explained a program to relate Leopoldt's conjecture for totally real field to the control of Eisenstein ideals of Hida's nearly ordinary Hecke algebra for GL_2.

It is based on the analogy between Thurston's theory of deformation of hyperbolic cone 3-manifold and Wiles' theory of Galois deformations. The part missing at that time –the control of Eisenstein ideals (the main argument)– will be discussed in this lecture.

Ofer Gabber Institut Hautes Etudes Scientifiques

Comparison of oriented products and rigid toposes (tentative)

Shin Hattori Hokkaido University

Tame characters and ramification of finite flat group schemes

Let K be a complete discrete valuation field of mixed characterstic $(0, p)$ and $\mathcal{G}$ be a finite flat group scheme over $\mathcal{O}_K$. When $\mathcal{G}$ is monogenic, the tame characters appearing in the I_K-module $\mathcal{G}(\bar{K})$ are determined by the slopes of Newton polygon of a defining equation of $\mathcal{G}$. In this talk, we generalize this and show that the tame characeters of $\mathcal{G}(\bar{K})$ with $\mathcal{G}$ of any embedding dimension are determined by the ramification jumps of $\mathcal{G}$.

Luc Illusie Université de Paris-Sud

On Gabber's uniformization theorems : outline and applications to étale cohomology

Gabber has recently proven local uniformization theorems, which he used to solve basic problems in étale cohomology left open since Grothendieck's seminars SGA 4 and SGA 5, such as finiteness for higher direct images of constructible sheaves of torsion prime to the characteristics under finite type morphisms between noetherian quasi-excellent schemes. These uniformization theorems are of independent interest. We will outline their proofs, which rely on a partial algebraization result and refinements of de Jong's theorems involving techniques of log geometry, and sketch how they imply the finiteness theorem. We will also mention a few other applications to etale cohomology.

Tetsushi Ito Kyoto University

On the geometry of unitary Shimura varieties with Iwahori level structure

It is well-known that, in characteristic p, the modular curve $X_0(p)$ is reducible and has two irreducible components. Shimura varieties associated to the unitary group $U(1, n-1)$ with Iwahori level structure are considered as higher dimensional analogues of $X_0(p)$. These Shimura varieties are extensively studied by Taylor-Yoshida to establish the local-global compatibility of Langlands correspondences. In this talk, I will study the geometry of strata of them in characteristic p.

Kazuya Kato Kyoto University

On the parity of twisted Selmer groups

Consider the Selmer group $S(A, \rho)$ of an abelian variety A over a number field with twist by an orthogonal Galois representation ρ. As a weak version of Birch Swinnerto-Dyer conjecture, it is conjectured that the parity of the p-corank of $S(A, \rho)$ coincides with the twisted root number $w(A, \rho)$. Many people already contributed to this problem. I give one result assuming that A has some p-power isogeny of a certain type.

Mark Kisin University of Chicago

Integral models of Shimura varieties

I will explain how recent improvements in p-adic Hodge theory allow the construction of integral models of certain Shimura vartieties, and discuss possible applications to counting mod p points on these varieties.

Fabrice Orgogozo Ecole polytechniques

On Gabber's method of algebraization; application to p-cohomological dimension

In the course of his proof of local uniformization, Ofer Gabber uses an inductive method, relying on the following partial algebraization result: any complete noetherian local normal ring of dimension > 1, mixed characteristic $(0, p)$ $(p \neq \ell)$, is obtained, up to a prime-to-ℓ degree extension, by localization and completion from a finite type algebra over a complete noetherian local normal ring of dimension one less. We will outline the proof of this result, which is used in Luc Illusie's talk, and explain how Gabber and I used a somewhat weaker form to prove a formula computing the p-cohomological dimension of the fraction field of a henselian excellent integral ring of mixed characteristic $(0, p)$. This formula had been conjectured by Kazuya Kato and proven by him in the crucial case of a complete discrete valuation field.

Tomohide Terasoma University of Tokyo

Simplicial bar construction, polylogmap and Deligne complex

Yichao Tian Université de Paris 13

p-adic monodromy of the universal deformations of Barsotti-Tate groups

Let k be an algebraically closed field of characteristic $p > 0$, r, s be relatively prime integers such that $0 < s < r$, $\lambda = s/r$, G^λ be the Barsotti-Tate group over k whose Dieudonné module is generated by an element e satisfying the relation $(F^{r-s} - V^s)e = 0$. We denote by S^{univ} the "algebraized" local moduli in characteristic p of G^λ, and by G^{univ} the universal deformation over S^{univ} of G^λ. Let U^{univ} be the ordinary locus of G^{univ}. Then the étale part of G^{univ} over U^{univ} gives a representation ρ^λ of the fundamental group of U^{univ}. Inspired by a famous Igusa's theorem, We conjecture that ρ^λ is surjective.

We prove the conjecture for $\lambda = 1/3$, and we give also some partial results for general λ.

Takeshi Tsuji University of Tokyo

On purity for p-adic representations

Let A be a p-adic completion (or henselization) of a smooth ring over a complete discrete valuation ring of mixed characteristic $(0, p)$ with perfect residue field. In this talk, we discuss on the following question (an analogue of the purity of branch locus for p-adic representations): Is a p-adic representation of the fundamental group of the generic fiber of $\mathrm{Spec}(A)$ is Hodge-Tate (resp. de Rham, resp. crystalline) if so is its localization to the generic point of the special fiber?

Nobuo Tsuzuki Hiroshima University

On purity of overconvergent isocrystals

Let X be a separated scheme of finite type over a field of characteristic $p > 0$, U an open dense subscheme of X, and $Z = X \setminus U$. Kedlaya proved that the restriction functor $j^\dagger$ from the category of convergent isocrystals on X to that of isocrystals on U overconvergent along Z is an equivalence when X is smooth and $\mathrm{codim}(Z) \geq 2$. It is a p-adic analogue of Zariski-Nagata theorem. We will give another proof of it. We also apply our method to some special cases for locally complete intersection X with $\mathrm{codim}(Z) \geq 3$.

Isabelle Vidal Université de Paris 13

Swan conductors and torsion formula for epsilon factors

The central problem of this talk is a conductor formula, that computes the swan conductor of the cohomology of an ℓ-adic sheaf on a curve over a local field, in terms of differential invariants. Such a formula is analogous to the conductor formula of Bloch, but for non constant coefficients. As an application, we get, in some particular cases, a torsion formula for the epsilon factor of an ℓ-adic sheaf on a surface.

Teruyoshi Yoshida Harvard University/Cambridge University

On ℓ-adic vanishing cycles of semistable schemes

The complete local ring of an n-dimensional semistable scheme over local field can be considered as a deformation space of a 1-dimensional formal module of height n with Iwahori level structure. In the context of non-abelian Lubin-Tate theory, its ℓ-adic vanishing cycles realize certain representations of affine Iwahori Hecke algebra of $GL(n)$, which has been computed via global methods of Harris-Taylor and Boyer. We will look at this result "locally".