

JOURNÉES ARITHMÉTIQUES À VILLETANEUSE

16-17 mars 2017

Université Paris 13

Institut Galilée

Jeudi 16 mars (Amphi A)

Orateurs: G. Böckle, S. Brochard, M. Harris

Vendredi 17 mars (Salle Darwin)

Orateurs: D. Disegni, D. Loeffler, E. Urban, S. Zerbes

Organisateurs: Farrell Brumley, Cédric Pépin, Alberto Vezzani



Programme du 16 mars

– AMPHI A –

- 10h Accueil / Café viennoiseries
- 10h30-12h **Gebhard Böckle** (Heidelberg): *Potential automorphy over global function fields I*
- 13h-14h30 **Michael Harris** (Columbia, Paris 7): *Potential automorphy over global function fields II*

Abstract: Let G be a split reductive group over a finite field \mathbf{F}_q and let K be a global function field over \mathbf{F}_q with adèle ring \mathbf{A}_K . By fundamental work of Vincent Lafforgue any cuspidal automorphic representation of $G(\mathbf{A}_K)$ gives rise to a compatible system of Galois representation of $\text{Gal}(K^{\text{sep}}/K)$ valued in the dual group \hat{G} of G . Suppose conversely that we are given an l -adic representation ρ of $\text{Gal}(K^{\text{sep}}/K)$ into \hat{G} . If ρ is potentially unramified and has Zariski dense image, then in joint work with C. Khare and J. Thorne we show that ρ is potentially automorphic, i.e., there is a finite extension K' of K , such that the restriction of ρ to $\text{Gal}(K^{\text{sep}}/K')$ arises from V . Lafforgue's construction over K' . The talk aims at explaining some of the ideas that go into the proof of the result and the main steps, and at suggesting some potential applications.

- 15h-16h **Sylvain Brochard** (Montpellier): *De Smit's conjecture: a new freeness criterion*

Abstract: Let $A \rightarrow B$ be a morphism of Artin local rings with the same embedding dimension (the embedding dimension of a local ring is the dimension of its tangent space over its residue field). Bart de Smit conjectured in 1997 that any A -flat B -module is automatically B -flat. We will first recall the context in which that conjecture arose, and how it allows to slightly simplify Wiles' proof of Fermat's Last Theorem. We will then explain the main lines of its proof. Finally we will discuss some possible continuations.

Programme du 17 mars

– SALLE DARWIN –

- 9h30 Accueil / Café viennoiseries
- 10h-11h **Eric Urban** (Columbia): *Euler systems and deformations of Galois representations*

Abstract: *The purpose of this talk is to present a new and general construction of Euler systems. In particular, I will discuss a case which can be solved completely and which gives the construction of an higher rank Euler system together with its relation to p -adic L -functions.*

- 11h-11h20 **Pause Café**
- 11h20-12h20 **Sarah Zerbes** (University College London): *An Euler system for Siegel modular forms*

Abstract: *I will outline the construction of an Euler system for the spin Galois representation attached to a genus two Siegel modular form. This is joint work with David Loeffler and Chris Skinner.*

- 13h45-14h45 **David Loeffler** (Warwick): *Iwasawa theory for the symmetric square of a modular form*

Abstract: *In this talk, I will describe some recent results (joint with Sarah Zerbes) on the arithmetic of the 3-dimensional symmetric square Galois representation attached to a modular form. We use the Euler system of Beilinson–Flach elements, introduced in our earlier works with Lei and with Kings, to prove an upper bound for the Selmer group of this Galois representation over the p -adic cyclotomic tower, in terms of a suitable p -adic L -function.*

- 15h-16h **Daniel Disegni** (Orsay): *The universal p -adic Gross-Zagier formula*

Abstract: *Following Howard and Fouquet, one can construct a ‘universal Heegner point’: it is a section of a sheaf of Selmer groups over the ordinary locus in the eigenvariety for $GL(2) \times U(1)$ over a totally real field. I will talk about a general formula for its height in terms of derivatives of p -adic L -functions. It has applications to the p -adic analogue of the Bloch-Kato conjecture and to Iwasawa theory of Hilbert modular forms.*

