

**Conference on Motives and Galois groups  
on the occasion of Uwe Jannsen's 60th birthday**

**University of Regensburg, March 10 – March 12, 2014**

**General Information:**

- The conference takes place in the lecture hall H 31 in the math building at the university of Regensburg.
- Registration is on Monday morning, March 10 from 8:00 – 9:00 am in room M 104.
- During the morning and afternoon breaks there will be coffee in the room M 104 opposite to the lecture hall.
- On Tuesday evening at 7:30 pm there is a conference dinner at the restaurant *Leerer Beutel* (Bertoldstraße 9, 93047 Regensburg) close to the old town. Registered participants are invited for the meal and a glass of wine, additional orders have to be paid individually. Participants can choose a menu during registration on Monday morning.

**Schedule:**

**Monday**

8:00–9:00	Registration in room M 104
9:00–9:15	Opening address by the president of the university, Prof. Dr. Udo Hebel
9:15–10:15	Spencer Bloch
10:30–11:30	John Coates
11:30–12:00	Coffee break
12:00–13:00	Peter Schneider
13:00–14:15	Lunch break
14:15–15:15	Bruno Kahn
15:15–15:45	Coffee break
15:45–16:45	Wieslawa Niziol

**Tuesday**

9:15–10:15	Alexander Beilinson
10:30–11:30	Christopher Deninger
11:30–12:00	Coffee break
12:00–13:00	Hélène Esnault
13:00–14:15	Lunch break
14:15–15:15	Vincent Cossart
15:15–15:45	Coffee break
15:45–16:45	Kay Wingberg
19:30	Conference dinner

**Wednesday**

- 9:15–10:15 Thomas Geisser  
 10:30–11:30 Jean-Louis Colliot-Thélène  
 11:30–12:00 Coffee break  
 12:00–13:00 Patrick Forré  
 13:00–14:00 Lunch break  
 14:00–15:00 Takeshi Saito  
 15:00–15:30 Coffee break  
 15:30–16:30 Jean-Marc Fontaine

**Abstracts:**

Beilinson: *The Radon transform and characteristic cycles*

Abstract: I will discuss some conjectures that arise in a Radon transform approach to the theory of characteristic cycles of constructible sheaves. Recently Takeshi Saito obtained a complete result in case of surfaces; our talks might overlap.

Bloch: *The infinitesimal Hodge Conjecture*

Abstract: (Joint with H. Esnault and M. Kerz) We study infinitesimal deformations of algebraic cycle classes in unramified mixed characteristic and in pure characteristic zero. We use Thomason's descent theorem for the K-theory of singular schemes to show that the cycle class lifts to all orders if and only if the crystalline class (or the horizontal lifting in char. 0 when the ground field is algebraic) is Hodge. When the ground field is the complex numbers, we need to assume in addition that the Kunneth projectors are algebraic. Time permitting, I will discuss this and also relations with Grothendieck's variational Hodge conjecture.

Coates: *On quadratic twists of elliptic curves*

Abstract: Our knowledge of the conjecture of Birch and Swinnerton-Dyer for the family of quadratic twists of an elliptic curve is still very limited. In my lecture, I will discuss joint work in this direction with Li, Tian and Zhai, which applies to quite an extensive class of elliptic curves defined over the rationals. The techniques go back to Birch and Heegner, but use a generalization of the new induction method discovered by Tian to study the quadratic twists of  $y^2 = x^3 - x$ .

Colliot-Thélène: *Unverzweigte Kohomologie, Nullzyklen und stabile Rationalität*

Abstract: Das Problem der Rationalität von kubischen und quartischen Hyperflächen der Dimension 3 wurde vor vierzig Jahren gelöst. Ich werde die stabile Rationalität von diesen Varietäten erörtern. Dies ist eine gemeinsame Arbeit mit A. Pirutka. Jüngste Ergebnisse von C. Voisin werden auch erwähnt.

Cossart: *Resolution of Singularities of Arithmetic Threefolds*

Abstract: In a joint work with Olivier Piltant, we have proved a Resolution of Singularities Theorem for arithmetic varieties of dimension three. Detailed abstract: [http://www.mathematik.uni-regensburg.de/kerz/ws13\\_14/cossart\\_ab.pdf](http://www.mathematik.uni-regensburg.de/kerz/ws13_14/cossart_ab.pdf)

Deninger: *Some remarks on Witt vectors*

Abstract: this is an elementary talk about joint work with Joachim Cuntz where we take another look at the theory of Witt vectors.

Esnault: *Stratifications and fundamental group*

Abstract: Over the field of complex numbers, the étale fundamental group controls complex linear local systems, thus regular singular connections, that is regular singular stratifications. Over a characteristic  $p > 0$  field, stratifications over a smooth projective variety (Gieseker conjecture, proven by E-Mehta) are still controlled by the étale fundamental group. We study the case for which the smooth variety has a normal compactification with boundary of codimension  $\geq 2$  over the algebraic closure of a finite field and give a complete answer. This also raises natural questions about Lefschetz and specialization theorems. (Joint with V. Srinivas).

Fontaine: *Gauges, zips and de Rham cohomology of smooth schemes of characteristic  $p$*

Abstract: Let  $X \rightarrow S$  a smooth morphism in characteristic  $p$ . One can endow the de Rham complex and the de Rham cohomology of  $X/S$  with the structure of a  $\varphi$ -gauge. We'll introduce these  $\varphi$ -gauges and explain how they also can be obtained by computing the cohomology of "the universal  $\varphi$ -gauge over  $S$ " with respect to a suitable topology. In particular, we'll get a new proof of Berthelot's comparison theorem between de Rham and crystalline cohomology. This is a part of a joint work with Uwe Jannsen.

Forré: *Cohomological Hasse principle of varieties over higher local fields and application to higher dimensional class field theory*

Abstract: This talk is about a generalization of K. Kato's conjecture on a Cohomological Hasse principle of regular proper flat schemes over complete discrete valuation rings with finite residue field (which was proven by M. Kerz, S. Saito and U. Jannsen) to the similar situations with higher local fields as residue fields. First results are shown and some implications to higher dimensional class field theory of varieties over higher local fields are drawn.

Geisser: *Class field theory of singular schemes*

Abstract: We show that, for any variety over a finite field, the geometric part of the tame abelianized enlarged fundamental group of SGA 3 is a finitely generated group, and that it is related to a modified version of Suslin homology (generalizing results of Schmidt-Spiess in the smooth case).

Kahn: *Reciprocity sheaves*

Abstract: I will outline a joint work with Shuji Saito and Takao Yamazaki, in which the Chow groups of 0-cycles with moduli of Kerz-Saito are upgraded to presheaves with transfers (PST) in the sense of Voevodsky. This leads to a notion of "reciprocity presheaf with transfers", which generalises homotopy invariance and includes PST represented by commutative algebraic groups (e.g. the additive group). We are able to extend some of Voevodsky's cohomological theory of presheaves with transfers from homotopy invariant to reciprocity PST, thus obtaining the degree 0 part of Gersten's conjecture for such PST. For example, if  $F$  is a reciprocity PST, then  $F(U) \rightarrow F(V)$  is injective for any dense open immersion  $V \subset U$  of smooth semi-local schemes over the base field.

Niziol: *Syntomic cohomology*

Abstract: Recently Beilinson and Bhatt have developed a new approach to comparison theorems of  $p$ -adic Hodge Theory. I will show how it can be used to construct well-behaved syntomic cohomology - a  $p$ -adic analog of Deligne cohomology - for

varieties over local fields of mixed characteristic. This is a joint work with Jan Nekovar.

Saito: *Characteristic cycle and the Euler number of a constructible sheaf on a surface*

Abstract: We define the characteristic cycle of a constructible sheaf on a smooth surface in the cotangent bundle. The intersection number with the 0-section equals the Euler number and the total dimension of vanishing cycles at an isolated characteristic point is also computed as an intersection number.

Schneider: *Rigid character groups, Lubin-Tate theory, and  $(\phi, \Gamma)$ -modules*

Abstract: The talk will describe work in progress with L. Berger and B. Xie in which we build, for a finite extension  $L$  of  $\mathbb{Q}_p$ , a new theory of  $(\phi, \Gamma)$ -modules whose coefficient ring is the ring of holomorphic functions on the rigid character variety of the additive group  $\mathcal{O}_L$ , resp. a “Robba” version of it.

Wingberg: *Uwe Jannsen – The Lost Truth*

Abstract: The whole truth.