1 Emploi du temps

	Jeudi 19 mai	Vendredi 20 mai
9 :15-10 :15	**Pierre Baumann** *Salle 1 Tour IRMA*	**Sophie Morier-Genoud** *Salle 1 Tour IRMA*
10 :15-10 :45	Pause café *Hall Tour IRMA*	Pause café *Hall Tour IRMA*
10 :45-11 :45	**Alexandra Zvonareva** *Salle 1 Tour IRMA*	**Baptiste Rognerud** *Salle 1 Tour IRMA*
11 :45-12 :45	**Thibaut Delcroix** *Salle 1 Tour IRMA*	**Karin Baur** *Salle 1 Tour IRMA*
12 :45-15 :00	Buffet *Cafeteria IF*	Buffet *Cafeteria IF*
15 :00-16 :00	**Egor Yasinsky** *Salle 1 Tour IRMA*	
16 :00-16 :30	Pause *Hall Tour IRMA*	
16 :30-17 :30	**Colloquium** (Karim Adiprasito) *Amphi Chabauty IF*	
17 :45-18 :45	**Susanna Zimmermann** *Salle 1 Tour IRMA*	
18 :30-20 :30	Buffet *Cafeteria IF*	

2 Titres et résumés

Pierre Baumann : *Crystals and bases via the affine Grassmannian*

Irreducible representations of a complex connected reductive group G can be geometrically realized as the intersection homology of Schubert varieties in the affine Grassmannian of the Langlands dual of G : this is an aspect of the Geometric Satake Equivalence. A similar construction produces the tensor products of irreducible representations of G, from which one deduces bases of such representations. These bases enjoy some favorable properties such as the compatibility with the invariant subspace, and satisfy the combinatorics of Kashiwara's crystals. The talk is based on a joint work with S. Gaussent and P. Littelmann.

Karin Baur : *Module categories for Grassmannians*

The category of CM modules over a quotient of a preprojective algebra is known to give a cluster category associated to the coordinate ring of the Grassmmanian Gr(k,n). We study this category and links to associated root systems in particular in the tame cases. This is joint work with Bogdanic, Li and Garcia Elsener

Thibaut Delcroix : *Spherical varieties and the effective YTD conjecture*

The Yau-Tian-Donaldson conjecture in complex geometry links the existence of canonical Kähler metrics and the algebraic-geometric notion of K-stability. A strong version was proven for Kähler-Einstein metrics on Fano manifolds almost a decade ago, and it has considerably improved our understanding of Fano manifolds which admit Kähler-Einstein metrics. For more general canonical Kähler metrics, such as Calabi's extremal Kähler metrics, the YTD conjecture is still open and, perhaps more importantly, its usefulness for proving the existence of extremal Kähler metrics is much less clear. I will present a possible refinement of the YTD conjecture

supported by evidence in the literature, then partial results in this direction in the setting of spherical varieties.

Sophie Morier-Genoud : *Aspects combinatoires et analytiques d'analogues quantiques de nombres*

Dans un travail récent avec Valentin Ovsienko, nous avons introduit des q-analogues des nombres rationnels. Il s'agit de fractions rationnelles à coefficients entiers s'obtenant naturellement par une approche combinatoire. Un remarquable phénomène de stabilisation permet d'étendre la q-déformation à tout nombre réel menant à des séries formelles à coefficients entiers. Si à l'origine des q-rationnels on peut remonter à des calculs de polynômes de Jones pour des invariants de noeuds, les q-nombres dévoilent de remarquables propriétés permettant de revisiter des classiques de théorie des nombres (Fibonacci, Pell, Farey, Markov, Hurwitz,...). Nous discuterons divers aspects combinatoires et analytiques de ces q-nombres en présentant des résultats basés sur plusieurs collaborations avec L. Leclere, V. Ovsienko, et A. Veselov.

Baptiste Rognerud : *The derived category of the Tamari lattice is fractionally Calabi-Yau*

The Tamari lattice is an interesting partial order introduced by Dov Tamari in his Thesis in 1962. It occurs in many areas of mathematics and has at least two interpretations in representation theory : as poset of tilting modules or as poset of torsion classes of an equioriented quiver of type A.

In this talk, I will explain that it has an intriguing, somewhat hidden property. : its bounded derived category is fractionally Calabi-Yau.

Egor Yasinsky : *Birational involutions of projective planes*

Birational automorphisms of the projective plane (or, equivalently, automorphisms of the field of rational functions in two variables of order 2) were studied already by the Italian school of algebraic geometry — Bertini, Castelnuovo, and Enriques. However, their (more or less) complete understanding became possible only due to modern tools of birational geometry, e.g. the minimal model program, the Sarkisov program, etc. Birational automorphisms of the complex projective plane are pretty well understood today, but for planes over algebraically non-closed fields the situation is much more complicated. In the first part of the talk, I will review what is known about birational involutions of projective planes over various fields. In the second part, I will talk about the joint work with I. Cheltsov, F. Mangolte and S. Zimmermann, in which we classified birational involutions of the real projective plane.

Susanna Zimmermann : *Algebraic groups acting birationally on rational surfaces*

It is an old aim to classify algebraic groups acting birationally on varieties. For rational surfaces over algebraically closed fields the attack was started more than a century ago, over time several important advances were made and finally a classification was achieved about 13 years ago. Over non-closed fields, the classification is still only partial. In this talk I'd like to present the classification of infinite algebraic groups acting birationally on rational surfaces over arbitrary perfect fields. This is joint work with J. Schneider.

Alexandra Zvonareva : *Functorial approach to rank functions*

For a skeletally small triangulated category C Chuang and Lazarev recently introduced the notion of a rank function on C. For simplicity, by a rank function on C we will mean an assignment to each object of C of a non-negative real number such that certain natural conditions hold. Such functions are closely related to functors into simple triangulated categories. On the other hand, to each skeletally small additive category C one can associate its abelianisation mod-C. I will discuss the connection between rank functions on C and translation-invariant additive functions

on mod-C. This connection allows to use the machinery of additive functions on abelian categories to study rank functions on triangulated categories, to classify integer rank functions in terms of certain objects and to obtain nice decompositions. This is based on a joint work in progress with Teresa Conde, Mikhail Gorsky, and Frederik Marks.