Monday 9.3	Tuesday 10.3	Wednesday 11.3	Thursday 12.3	Friday 13.3
	Seppänen 8:45 -9:35 Asymptotics of branching laws and invariants by global quotients	Thiel 8:45 -9:35 Restricted Rational Cherednik Algebras	Cupit-Foutou 8:45 -9:35 Spherical varieties: interactions with representation theory and generalizations	Nikolaus 8:45 -9:35 T-Duality and Langlands Duality
	Coffee break	*Coffee break*	*Coffee break*	*Coffee break*
	Lanini 10:00 -10:50 Semi-infinite combinatorics in representation theory	Dudas 10:00 -10:50 Categorical actions on unipotent representations of finite classical groups	Pezzini 10:00 -10:50 Part II oft he above	Zellner 10:00 -10:50 Specifying smooth vectors for semibounded representations and applications
	Schlichtkrull 11:00 -11:50 Geometry and representation theory related to real spherical spaces	Malle 11:00 -11:50 Local-global conjectures in the representation theory of finite groups	Stroppel 11:00 -11:50	Alldridge 11:00 -11:50
Lunch 12:30	Lunch 12:30	Lunch 12:30	Lunch 12:30	Lunch 12:30
		SPP 1388 finals: reports, deadlines, money etc. **13:45 -14:00**		
Kalck 14:00 -14:50 Quasi-hereditary algebras and derived composition series	Kapranov 14:00 -14:50	Späth 14:00 -14:50 Reduction theorems for local-global conjectures - revisited	Ehrig 14:00 -14:50	
Coffee break	*Coffee break*	*Coffee break*	*Coffee break*	
Cerulli-Irelli 15:30 -16:20 Quiver Grass-mannians, Schubert varieties and degegenerate flag varieties	Ladkani 15:30 -16:20 From groups to clusters	Külshammer 15:30 -16:20 Representation type, boxes, and Schur algebras	Williamson 15:30 -16:20 The unstable range in Lusztig's character formula	
Fourier 17:00 -17:50 PBW and toric degenerated flag varieties	Reineke 17:00 -17:50 Counting representations of free groups	Danz 17:00 -17:50 Simple Specht Modules and Signed Young Modules	Sam 17:00 -17:50 Gröbner methods for representations of combinatorial categories	
Dinner 18:30	Dinner 18:30	Dinner 18:30	Conference Dinner 18:30	

Quasi-hereditary algebras and derived composition series
Martin Kalck

Abstract: We study derived composition series in the sense of Angeleri-Hügel, König and Liu for quasi-hereditary algebras. More precisely, we construct examples of finite dimensional algebras of global dimension 2 with many different derived composition series. Moreover, we show that algebras which admit a full exceptional sequence need not be derived equivalent to quasi-hereditary algebras.

Quiver Grassmannians, Schubert varieties and degenerate flag varieties
Giovanni Cerulli Irelli

Abstract: In this talk I will illustrate a connection between quiver Grassmannians, Schubert varieties and degenerate flag varieties of type A and C which come out from recent different joint projects with Evgeny Feigin, Markus Reineke, Martina Lanini and P. Littelmann. The starting point is a realization of degenerate flag varieties of type A and C in terms of linear algebra, due to work of Evgeny Feigin, Peter Littelmann, Ghislain Fourier and Michael Finkelberg. This realization has a natural interpretation in terms of quivers. This leads to a reinterpretaion of degenerate flag varieties of type A as very special quiver Grassmannians that we called "well-behaved". Putting a self-duality into the picture, one also gets degenerate flag varieties of type C as what I called "Isotropic quiver Grassmannians". This interpretation provides a new tool for the study of the geometry of degenerate flag varieties: namely the very rich representation theory of Dynkin quivers. From this, together with M. Lanini, we could prove that degenerate flag varieties of type A and C are actually Schubert varieties. This result led me and M. Reineke to consider special types of quiver Grassmannians of type A that we called "Schubert". In a very recent work in progress, we give a characterization of Schubert quiver Grassmannians in terms of AR-theory. Time permitting, I will also mention some very recent results of a joint project with M. Lanini and P. Littelmann.

PBW and toric degenerated flag varieties
Ghislain Fourier

Abstract: I will give an brief overview on recent developments on degenerated flag varieties. For this, I will recall the construction PBW degenerated flag variety and Feigin's description in terms of flags of subspaces. We will see how the surprising isomorphism of this degenerated flag variety with an ordinary Schubert variety simplifies the proofs of most

results in recent years on these flag varieties, such as the description of the torus fix points, desingularizations, etc. Turning to the toric degeneration via marked chain polytopes (aka via Dyck paths), we will see how this toric variety is related to previously studied toric degenerations coming from Gelfand-Tsetlin and string polytopes.

Asymptotics of branching laws and invariants by global quotients
Henrik Seppänen

Abstract: It is well-known that the problem of decomposing a given irreducible finite-dimensional representation V of a complex semisimple Lie group G' into irreducible representations W of a semisimple subgroup G can be reformulated as the study of dimensions of section spaces of line bundles over certain GIT quotients of the flag variety $G/B \times G'/B'$. However, for each multiplicity $m_{W,V} = \mathrm{Hom}_G(W, V)$, one a priori has to use a quotient which depends on both V and W. We construct so-called global quotients, which work for all pairs (W, V). Moreover, we present some results on the geometry of these quotients. The talk is partly based on joint work with V. Tsanov.

Microlocal sheaves and quiver varieties
Mikhail Kapranov

Abstract: We relate the (multiplicative analogs of) Nakajima's quiver varieties with the problem of classification of perverse sheaves. More precisely, we consider microlocal sheaves (a certain generalization of perverse sheaves along the deformation quantization route) and express quiver varieties as moduli spaces of microlocal sheaves. The symplectic structure is then obtained from first principles (cohomological pairing) and is related to the symplectic structure on the moduli space of local systems on a Riemann surface. Joint work with R. Bezrukavnikov.

Semi-infinite combinatorics in representation theory
Martina Lanini

Abstract: Semi-infinite combinatorics occurs (or it is expected to occur) in representation theory of affine Kac-Moody algebras, Lie algebras in positive characteristic, quantum groups at a root of unity, ... In this talk I will discuss some of these appearances and propose a moment graph approach to the related problems. Partially based on ongoing joint projects with Peter Fiebig and with Tomoyuki Arakawa.

From groups to clusters
Sefi Ladkani

Abstract: I will present a new combinatorial construction of finite-dimensional algebras with some interesting representation theoretic properties: they are of tame representation type, symmetric and have periodic modules. The quivers we consider are dual to ribbon graphs and they naturally arise from triangulations of oriented surfaces with marked points. The class of algebras that we get contains in particular the algebras of quaternion type introduced and studied by Erdmann with relation to certain blocks of group algebras. On the other hand, it contains also the Jacobian algebras of the quivers with potentials associated by Fomin-Shapiro-Thurston and Labardini to triangulations of closed surfaces with punctures. Hence our construction may serve as a bridge between modular representation theory of finite groups and cluster algebras.

Counting representations of free groups)
Markus Reineke

Abstract: Using Hall algebras, we derive explict formulas for numbers of isomorphism classes of representations of free groups over finite fields. We discuss positivity properties, relations to the geometry of character varieties, and to subgroup growth.

Restricted Rational Cherednik Algebras
Ulrich Thiel

Abstract: For any finite group G acting as a reflection group on a finite-dimensional complex vector space V Etingof and Ginzburg defined a family of algebras, the so-called rational Cherednik algebras. They depend on a single complex parameter t and a further family c of complex parameters. In case t is non-zero these algebras deform the skew differential operator algebra $\mathcal{D}(V) \rtimes G$ and many connections to other objects like cyclotomic Hecke algebras have been revealed. In my talk I will concentrate on the case $t = 0$ and try to explain why this case is interesting, too. The spectrum of the center of a rational Cherednik algebra at $t = 0$, called a Calogero–Moser space, is a Poisson deformation of the symplectic singularity $(V \oplus V^*)/G$. The geometry of Calogero–Moser spaces is closely linked to the representation theory of rational Cherednik algebras at $t = 0$ and detects whether the singularity $(V \oplus V^*)/G$ admits a symplectic resolution. A certain finite-dimensional quotient of the rational Cherednik algebra at $t = 0$—the restricted rational Cherednik algebra—still sees a lot of the geometry of the Calogero–Moser space and seems to encode

further interesting information, also about Hecke algebras. I will give an overview of their representation theory and discuss some recent advances. This includes a highest weight category structure on their category of graded representations and a description of cuspidal Calogero–Moser families in type B. (This is joint work with G. Bellamy).

Categorical actions on unipotent representations of finite classical groups
Oliver Dudas

Abstract: I will report on a work in progress with Shan, Varagnolo and Vasserot, aiming at studying representations of finite classical groups from a categorical point of view. I will explain how the framework of categorical actions developed by Chuang-Rouquier to solve Broué 's abelian defect group conjecture for GL(n,q) can also be applied to classical groups such as GU(n,q) or Sp(2n,q). I will present two applications of this construction to the description of Harish-Chandra series (related to recent conjectures of Gerber-Hiss-Jacon) and to the construction of derived equivalences in the spirit of Broué's conjecture.

Local-global conjectures in the representation theory of finite groups
Gunter Malle

Abstract: Local-global conjectures, some of them going back to the work of Brauer more than 50 years ago, predict a close control of global arithmetic properties of characters of finite groups by those of their local subgroups. We present the most important of these conjectures in the representation theory of finite groups and give an overview of recent new approaches and on partial progress on proving these conjectures.

Reduction theorems for local-global conjectures - revisited
Britta Späth

Abstract: A new approach to local-global conjectures in representation theory of finite groups has been established by so-called reduction theorems. They show that the conjectures are true if a list of so-called inductive conditions holds for all simple groups. Methods developed for reducing Dade's conjecture give a uniform way to formulate these inductive conditions. This also explains the key steps in the proofs of the reduction theorems in a way uniform.

Representation type, boxes, and Schur algebras
Julian Külshammer

Abstract: Algebras whose indecomposable modules can be classified using one-parameter families as in the Jordan normal form are called tame. The algebras where no classification is possible are called wild. In 1979, Drozd proved that every finite dimensional algebra is either tame or wild. His method to prove this result is to translate the representation theory of an algebra to the representation theory of a coalgebra over a path algebra of a quiver (called a box), and then reduce the problem to a finite list of boxes. In this talk we will describe this method and show how it can also be applied to determine the representation type of the subcategory of modules filtered by Weyl modules for a Schur algebra.

Simple Specht Modules and Signed Young Modules

Susanne Danz

Abstract: In this talk I shall report on joint work with Kay Jin Lim (NTU Singapore). Specht modules as well as (signed) Young modules are well known to be of central importance for the representation theory of the symmetric groups. By work of D. Hemmer, every simple Specht module of a finite symmetric group over a field of odd characteristic is a signed Young module. While Specht modules are parametrized by partitions, indecomposable signed Young modules are parametrized by pairs of partitions. In this talk we shall establish the signed Young module labels of simple Specht modules. As consequences we shall, in particular, obtain the Green vertices, Green correspondents, cohomological varieties, and complexities of simple Specht modules of symmetric groups over fields of positive characteristics.

Spherical varieties: interactions with representation theory and generalizations

Stéphanie Cupit-Foutou (Part I) and Guido Pezzini (Part II)

Abstract: This series of two talks presents an overview on spherical varieties, with particular emphasis on some recent developments and open problems in connection with geometric representation theory.
After having briefly recalled the standard theory of spherical varieties, we focus on the following topics:
-the moduli scheme of complex spherical affine varieties;
-generalizations of spherical varieties: real case, positive characteristic case, Kac-Moody case;
-further structure and applications: smoothness, B-orbits, automorphisms and related problems.

The unstable range in Lusztig's character formula
Geordie Williamson

Abstract: Lusztig's character formula is a formula for the characters of the simple highest weight modules of reductive algebraic groups in characteristic p. It is known to hold for primes $p >> 0$. The range where it does not hold is the 'unstable range'. Up until recently it was hoped that the unstable range was quite small (e.g. consist of primes less than the Coxeter number). In 2013 I used a formula I had discovered with Xuhua He to show that the unstable range is much larger than expected (e.g. contains a prime of the order of 10^9 for SL_{200}). Currently we have essentially no idea how big the range is, and it seems reasonable to look for upper and lower bounds. I will explain joint work with Kontorovich and McNamara where we show that it is bounded below by a function which is exponential in the Coxeter number.

Gröbner methods for representations of combinatorial categories
Steven Sam

Abstract: I'll explain some recent joint work with Andrew Putman and Andrew Snowden on using ideas from Gräbner bases to study module categories of interest in representation stability. I'll discuss applications to the homology of congruence subgroups of mapping class groups and arithmetic groups and a proof of the Lannes-Schwartz artinian conjecture in the 'generic representation theory of finite fields'.

T-Duality and Langlands Duality
Thomas Nikolaus

Abstract: We explain carefully the notion of topological T-duality, which is a relation between different topological spaces which are torus bundles over a common base. The main result we want to talk about is the result that a compact Lie group is T-dual to (the compact form of) its Langlands dual Lie group. This surprising result is rationally due to Daenzer van Erp and we discuss the integral refinement. It has interesting representation theoretic consequences. If time permits we will discuss implications and speculations related to that result.

Specifying smooth vectors for semibounded representations and applications
Christoph Zellner

Abstract: For a semibounded representation of a (possibly infinite-dimensional) Lie group we show that the space of smooth vectors is determined by one generator. Using results on smoothing operators by Neeb and Salmasian this entails direct integral decomposition of semibounded representations into irreducible ones. There are also applications to positive energy representations of certain Lie groups.

Symmetric superspaces: slices, radial parts, and invariants

Alexander Alldridge

Abstract: The polynomial or differential invariants on a reductive symmetric space are isomorphic to the algebra of polynomials invariant under the action of a finite reflection group, the Weyl group, by theorems of Chevalley and Harish-Chandra. For reductive symmetric superspaces, the situation is somewhat more complicated. In light of some recent advances in supergeometry, we reevaluate some results obtained a few years ago for the case of an even Cartan subspace and extend this to the case where it is not purely even. Here, the Weyl group is reductive of positive dimension. This work was done jointly with K. Coulembier, J. Hilgert, T. Wurzbacher, and M.R. Zirnbauer.