Michael Livesey (TU Kaiserslautern)

Broué's Perfect Isometry Conjecture Holds for the Double Covers of the Symmetric and Alternating Groups

Abstract: O. Brunat and J. Gramain recently proved that any two blocks of double covers of symmetric or alternating groups are Broué perfectly isometric provided they have the same weight and sign. They also proved "crossover" isometries when they have opposite signs. Using both the results and methods of Brunat and Gramain we prove that when the weight of a block of a double cover of a symmetric or alternating group is less than p then the block is Broué perfectly isometric to its Brauer correspondent. This means that Broué's perfect isometry conjecture holds for both these classes groups.

Jacques Thévenaz (EPFL Lausanne)

Torsion Endo-Trivial Modules

Abstract: Endo-trivial modules for a finite group G play an important role in p-modular representation theory. They appear in particular in block theory when G is a p-group. They have been classified in that case ten years ago. Since then, various results have been obtained about their classification for specific groups. Using a recent method due to Balmer, a final result has been proved for groups with an abelian Sylow p-subgroup. The fusion of p-subgroups plays a crucial role. This is a joint work with Jon Carlson.

Leo Margolis (Universität Stuttgart), joint work with Andreas Bächle

Representation Theory Applied to Torsion Units in Group Rings

Abstract: Let G be a finite group and $V(\mathbb{Z}G)$ the group of normalized units in the integral group ring of G. A long standing conjecture of H. J. Zassenhaus asks, whether for every torsion unit $u \in V(\mathbb{Z}G)$ there exists a unit in $\mathbb{Q}G$ conjugating u onto an element of G. A weaker form of the Zassenhaus Conjecture, the so called Primegraph Question, asks, whether it follows from $V(\mathbb{Z}G)$ having an element of order pq, that G also posseses an element of order pq, for every pair of different prime numbers p and q.
Until recently only one general method, which involves group characters, was known to attack this questions for non-solvable groups. I will introduce another method, which involves integral and modular representation theory, alongside with some examples of applications of this method, state some results obtainable using it and present some problems, which arise during its application.

Cosima Aquilino (Universität Bielefeld), joint work with Rebecca Reischuk

The Monoidal Structure of Modules over Schur Algebras

Abstract: The category of strict polynomial functors inherits an internal tensor product from the category of divided powers. This yields a monoidal structure for the category of modules over the Schur algebra $S_k(n; d)$. To investigate this monoidal structure, we consider the category of modules over the symmetric group algebra kS_d which admits a tensor product coming from its Hopf algebra structure. Based on work by Schur, there exists a functor F going from the category of modules over the Schur algebra to those over the symmetric group. We show that the tensor product coming from strict polynomial functors is mapped under F to the one in the category of modules over kS_d.

Ghislain Fourier (Universität Bonn)

Marked Poset Polytopes and Degenerations of Flag Varieties

Abstract: We will introduce marked posets and study two polytopes associated with each marked poset, the marked order and the marked chain polytope. We will present recent results on how the two polytopes are related, e.g. Ehrhart polynomials, unimodular equivalence, Minkowski sum decompositions. We present several examples of marked poset polytopes arising in representation theory of Lie algebras, the most famous example of a marked order polytope might be the Gelfand-Tsetlin polytope. The corresponding

marked chain polytope appeared recently in the framework of PBW degenerations of simple modules. This extends to symplectic Lie algebras as well as to certain Demazure modules etc. We give an application of the result on the relation between the two polytopes in terms of the induced toric degeneration of the simple modules and finish with open questions.

Ulrich Thiel (Universität Stuttgart)

Specialization Theory

Abstract: I will give a general overview of specialization theory. In geometric terms, this theory is concerned with the understanding of representation-theoretic objects (e.g., blocks, simple modules, etc.) of the special fibers of a quasi-coherent sheaf of algebras on an irreducible affine scheme. The idea is to find ways to relate the objects of the special fibers to the corresponding objects of the generic fiber and to understand for which special fibers they remain the same.

In down to earth terms, specialization theory provides a collection of techniques and results to systematically study algebras involving parameters like Hecke algebras and Cherednik algebras. The roots of this theory are classical results in modular representation theory of finite groups.

Benjamin Klopsch (Heinrich-Heine Universität Düsseldorf)

Zeta Functions Associated to Admissible Representations of Compact p-adic Lie Groups

Abstract: In my talk I will report on recent advances in an ongoing research project with Steffen Kionke. At the beginning I will introduce the representation zeta function of a compact p-adic Lie group G as the Dirichlet generating function enumerating (finite dimensional) irreducible complex representations of G. Subsequently I will survey some of the key results in the subject. After that I will move on to generalise the basic set-up, the idea being the following: we attach a zeta function to every 'suitable' (infinite-dimensional) representation of G. In this way the original zeta function turns out be essentially the zeta function associated to the regular representation of G. I will finish by presenting some results in the new setting and, time permitting, discuss possible applications.

Carolina Vallejo (Universitat de València)

p-Rational Characters and p-Decomposable Sylow Normalizers

Abstract: It has been conjectured by G. Navarro that if p is an odd prime, then a group G has a p-decomposable Sylow p-subgroup normalizer if the only p'-degree p-rational character in the principal block of G is the trivial one. Using a McKay type correspondence between characters in the principal blocks of G and $N_G(P)$, where P is a slow p-subgroup of G, we can prove half of this conjecture. (With G. Navarro and P. H. Tiep).

Thomas Gobet (TU Kaiserslautern)

Dual Braid Monoids and Bases of Temperley-Lieb Algebras

Abstract: The Temperley-Lieb algebra is a quotient of the Hecke algebra of type A, interesting for both representation theoretic and knot theoretic purposes. In 2002, Zinno showed that the images of the canonical factors of the braid group give a basis of it. On the other hand, there is a family of braid monoids called dual. Each of these monoids is a Garside monoid and hence contains a set of distinguished elements called simple. For one of these monoids, the simple elements coincide with the canonical factors. We will explain how to extend Zinno's theorem to arbitrary dual braid monoids (which are all isomorphic, but realized differently as submonoids of the braid group), and why there exists an upper triangular change of basis matrix between any of these bases and the canonical basis. This involves unexpected combinatorial structures on the sets of elements indexing the bases, which are respectively the noncrossing partitions and the fully commutative elements.