

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00–9:30	Registration <i>in front of C 1</i>				
9:30–10:30	Jan Schröer <i>C 1</i>	Jan Štoviček <i>O 1</i>	Bernhard Keller <i>O 1</i>	Rosanna Laking <i>O 1</i>	Xiao-Wu Chen <i>O 1</i>
10:30–11:00	Coffee break	Coffee break	Coffee break	Conference picture Coffee break	Coffee break
11:00–12:00	Øyvind Solberg <i>O 1</i>	Gustavo Jasso <i>O 1</i>	Catharina Stroppel <i>O 1</i>	Chrysostomos Psaroudakis <i>O 1</i>	Julia Pevtsova <i>O 1</i>
12:00–14:00	Lunch break	Lunch break	Lunch break Excursion	Lunch break	Lunch break
14:00–15:00	Amnon Neeman <i>O 1</i>	Jesper Grodal <i>O 1</i>		Wassilij Gnedin <i>O 1</i>	Antoine Touzé <i>O 1</i>
15:00–15:15					Coffee break
15:15–15:30	John Greenlees <i>O 1</i>	Lidia Angeleri Hügel <i>O 1</i>		Tobias Barthel <i>O 1</i>	Paul Balmer <i>O 1</i>
15:30–16:15					
16:15–16:30	Coffee break	Coffee break		Coffee break	
16:30–16:45					
16:45–17:45	Greg Stevenson <i>O 1</i>	Nàtalia Castellana <i>O 1</i>		Sarah Witherspoon <i>O 1</i>	
17:45–18:00					
18:00–18:30				Bus transfer Conference dinner Ringelsbruch	
18:30–					

Jan Schröer (Bonn)

Monday 9:30–10:30

Some finiteness conditions for irreducible components of module varieties

Let A be a finite-dimensional algebra. For some time it was an open problem if there exists always a natural number b such that each finite-dimensional rigid A -module has at most b isomorphism classes of indecomposable direct summands. Then Herschend, Iyama and Oppermann found a class of algebras where such a bound b does not exist. We go into the other direction and look for classes which have a bound. We discuss this question in a slightly more general framework, namely for quasi-rigid irreducible components of module varieties. I apologize that there are no triangulated categories in my talk.

Øyvind Solberg (Trondheim)

Monday 11:00–12:00

Matrix factorizations

I will introduce matrix factorizations for quotients of path algebras and discuss them in connection with the Finitistic Dimension Conjecture for finite dimensional algebras.

Amnon Neeman (Canberra)

Monday 14:00–15:00

Two results, both developments of a 2015 article by Krause

In 2020 the pandemic hit, and all around the globe we went into lockdowns of various description. During the first lockdown I carefully read Krause's 2015 article "Deriving Auslander's formula".

In this talk I will outline how the ideas of Krause's paper underpin two articles written in 2020 in collaboration with Canonaco and Stellari. One is about the uniqueness of enhancements of large classes of triangulated categories, while the second offers a counterexample to certain vanishing conjectures in negative K-theory.

John Greenlees (Warwick)

Monday 15:15–16:15

Rational equivariant cohomology theories and spaces of subgroups of compact Lie groups

For a compact Lie group G , primes in the tensor-triangulated category of finite rational G -spectra are in bijection with the set $\text{Sub}(G)/G$ of conjugacy classes of closed subgroups of G (a lecture of Henning's gave me the key to proving this). With the Zariski topology $\text{Sub}(G)/G$ becomes a spectral space, and the talk will give several descriptions of it in more familiar terms. In particular, it is of dimension equal to the rank of G , and we will describe the height filtration for subgroups. The space is rather familiar when G is a torus and in general the space is Noetherian if and only if G is a product of a torus and a finite group. Using the height filtration gives a description of the category of rational G -spectra as an iterated recollement whose pure strata can be described in

algebraic terms. (The talk is based on joint work with Tobias Barthel and Scott Balchin).

Greg Stevenson (Aarhus)

Monday 16:45–17:45

The smashing spectrum of a big tt -category

Given a compactly generated triangulated category we do not know in general if there are a set of localizing subcategories - in principle there could be a proper class of them. If we restrict to smashing subcategories, i.e. those localizing subcategories whose inclusion admits a coproduct preserving right adjoint, then an important result of Henning Krause states that there are only a set of such. One might hope one could exploit this to control the situation for general localizing subcategories: I'll describe our progress, over roughly the last five years, on realizing this ambition in certain cases.

Jan Šťovíček (Prague)

Tuesday 9:30–10:30

The coderived category of a locally coherent dg category

The homotopy category of complexes of injective modules or injective quasi-coherent sheaves (aka the coderived category) received a lot of attention in the last two decades in connection with the Grothendieck duality in algebraic geometry, the Koszul duality or representation theory of finite groups. In the present joint work with Leonid Positselski, we define the coderived category of a locally coherent dg category, which generalizes coderived categories both for complexes over usual locally coherent abelian categories and for curved dg modules over curved dg rings. Moreover, we prove that the coderived category is always compactly generated in this setting and identify the compact objects.

Gustavo Jasso (Lunds)

Tuesday 11:00–12:00

The Derived Auslander-Iyama Correspondence

In joint work with David Benson and Stefan Schwede, Henning Krause investigated the problem of realising a graded module over the Tate cohomology of a finite group G as the cohomology of G with coefficients in some module over the group algebra of G . A canonical Hochschild class of bidegree $(3, -1)$ for the Tate cohomology of G , which we call the Universal Massey Product, played an important role in these investigations.

In this talk I will discuss a theorem that we call the “Derived Auslander-Iyama Correspondence” in which universal Massey products of bidegree $(d+2, -d)$ play a central role. This result provides us with a parameterization of certain DG algebras that, as observed by Keller, can be used in combination with results of August and Hua-Keller to settle the Donovan-Wemyss conjecture in the context of the Homological Minimal Model Program for threefolds. This is a report on joint work with Fernando Muro (Sevilla).

Jesper Grodal (Copenhagen)

Tuesday 14:00–15:00

The Picard group of the stable module category over integral group rings

The group of endotrivial modules, i.e., the Picard group of the stable module category of the group ring kG , has been a central object of study in modular representation theory since the 1970s. When G is a finite p -group and k is a field of characteristic p , it was completely calculated in seminal work of Carlson and Thevenaz from the early 2000s. There has recently been a lot of progress in understanding this group when G is a general finite group G , linking it to local-to-global questions, and infusing methods from homotopy theory. I'll review some of these developments, with special emphasis on the case where k is a Dedekind ring, which is also of geometric interest. This part is joint work in progress with Achim Krause.

Lidia Angeleri Hügel (Verona)

Tuesday 15:15–16:15

Wide coreflective subcategories and torsion pairs

A subcategory $\mathcal{X}$ of the module category $\text{Mod } A$ over a ring A is said to be reflective, respectively coreflective, if the inclusion functor $\mathcal{X} \hookrightarrow \text{Mod } A$ admits a left, respectively right, adjoint. A result of Gabriel and de la Peña characterizes the subcategories which are both reflective and coreflective as those which arise as module categories $\mathcal{X} = \text{Mod } B$ from some ring epimorphism $A \rightarrow B$. Much less is known when only one of the two conditions is satisfied, even when restricting to wide, i.e. exact abelian, subcategories of $\text{Mod } A$.

In my talk I will review a construction going back to work of Ingalls and Thomas which assigns to a torsion pair two wide subcategories in $\text{Mod } A$. These subcategories are often coreflective, and I will address the question of which wide coreflective subcategories can be obtained in this way. When A is the Kronecker algebra, this leads us to an open problem of Henning Krause and Greg Stevenson concerning the classification of localizing subcategories in the derived category of quasi-coherent sheaves on the projective line: are there more localizing subcategories beyond the ones constructed from our understanding of the compact objects?

The talk will be based on joint work with Francesco Sentieri.

Natàlia Castellana (Barcelona)

Tuesday 16:45–17:45

Costratification in tensor triangulated geometry

This is joint work with Tobias Barthel, Drew Heard and Beren Sanders. In this project, we develop the theory of costratification in the context of tensor triangular geometry. This systematic approach builds on previous work of Barthel-Heard-Sanders (where they develop a theory of stratification in tensor triangular geometry) and the costratification and cosupport theory of Benson-Iyengar-Krause for compactly generated triangulated categories with an action of a graded commutative ring. The main cosupport theory which is constructed

is related to the Balmer–Favi support. The goal of the theory is to classify colocalizing coideals in this context by the Balmer spectrum.

Bernhard Keller (Paris)

Wednesday 9:30–10:30

On exact dg categories, after Xiaofa Chen

This is a report on results from Xiaofa Chen’s ongoing Ph. D. thesis. His notion of an exact dg category is a simultaneous generalization of the notions of exact category in the sense of Quillen and of pretriangulated dg category in the sense of Bondal–Kapranov. We will give a definition in complete analogy with Quillen’s but where the category of kernel-cokernel pairs is replaced with a more sophisticated homotopy category. We will then present examples and a number of fundamental results concerning the dg nerve, the dg derived category, tensor products and functor categories with exact dg target. We will conclude with the existence of the greatest exact structure on a dg category with additive H^0 . This generalizes a Theorem of Rump for Quillen exact categories.

Catharina Stroppel (Bonn)

Wednesday 11:00–12:00

Firmality and weight structures

In this talk I will describe examples of algebras arising in geometric representation theory and formulate a formality statement using weight structures/co-t-structures.

Rosanna Laking (Verona)

Thursday 9:30–10:30

Injective-like objects in triangulated categories

Pure-injective objects in compactly generated triangulated categories, first studied by Henning Krause in 2000, correspond to the injective objects in a category of functors. In a similar vein, the cosilting objects (sometimes called injective or derived injective objects) associated to a (cosilting) t-structure correspond to the injective objects in the heart. In the intersection of these two settings, when a cosilting object is pure-injective, the two approaches line up and the heart of the t-structure turns out to be equivalent to a localisation of the functor category.

In this talk I will report on joint work with Lidia Angeleri Hügel, Jan Stovicek and Jorge Vitória in which we study a mutation relation between cosilting objects and how, in the pure-injective case, it relates to the localisation theory of both the heart and the ambient triangulated category.

Chrysostomos Psaroudakis (Thessaloniki)

Thursday 11:00–12:00

Partial Serre duality in triangulated categories

In a series of papers Benson–Iyengar–Krause–Pevtsova (BIKP) have initiated the study of local dualities in various contexts. For instance, they proved an

important duality theorem for the stable module category of representations of a finite group scheme. The latter phenomena are strongly related to the existence of a (partial) Serre functor in certain subcategories of triangulated categories. On the other hand, the theory of compactly generated triangulated categories has been proved to be very useful in the developments of BIKP and not only. For instance, it is well known that each set of compact objects gives rise to a t-structure in a natural way. Unfortunately, it does not make much sense to consider the naive dual of this setup; cocompact objects rarely appear in categories which occur naturally. Motivated by this we introduced a weaker version of cocompactness called 0-cocompactness, and showed that such objects cogenerate co-t-structures. In this talk, we will summarize our progress on this dual theory and explain its connection with duality type phenomena. We will show that the partial Serre dual of a compact object is always 0-cocompact and we will present examples of partial Serre functors in various contexts, for instance in singularity categories. This is joint work with Steffen Oppermann and Torkil Stai.

Wassilij Gnedin (Bochum)

Thursday 14:00–15:00

Lifting problems and tilting bijections

For a commutative complete local ring R and a perfect complex P of its quotient $R/(x)$ by a regular sequence, Yoshino gave an explicit resolution of P via projective R -modules. This description of the derived restriction is helpful in the study of obstructions to lift the complex P to a perfect complex of R -modules.

In my talk, I will extend Yoshino's results to a non-commutative context where the ring R may be replaced by any Noetherian R -algebra and present certain lifting results from a categorical point of view. The main goal of my talk is to show that the tilting theory of Brauer graph algebras, a class of mostly derived-wild algebras, is essentially the same as that of ribbon graph orders, certain infinite-dimensional derived-tame algebras. When combined with recent work by Oppermann and Zvonareva, the discussed results yield a derived equivalence classification of ribbon graph orders.

Tobias Barthel (Bonn)

Thursday 15:15–16:15

Representations in intermediate characteristics

Intermediate characteristics form a higher algebraic analogue of the usual prime characteristics, interpolating between them and characteristic 0. After reviewing their basic phenomenology, I will survey some recent developments in the representation theory of finite groups in intermediate characteristics. This is joint work in progress with Castellana, Gallauer, Heard, Naumann, Pol, and Sanders.

Sarah Witherspoon (College Station)

Thursday 16:45–17:45

Support varieties for finite tensor categories

Support varieties are important tools in representation theory, starting with representations of finite groups and finite group schemes. Much of the theory has been successfully adapted to many other settings, for example finite tensor categories, while much is still unknown. This talk will include a survey of some known results and some recent developments which are joint work with Petter Andreas Bergh and Julia Yael Plavnik.

Xiao-Wu Chen (Hefei)

Friday 9:30–10:30

The stabilization functor via the singular Yoneda dg category

In his seminal paper “The stable derived category of a noetherian scheme (2005)”, Henning Krause introduces a concrete compactly generated completion of the singularity category and the stabilization functor from the unbounded derived category to the completion. We will relate his stabilization functor to the singular Yoneda dg category. This is joint with Zhengfang Wang.

Julia Pevtsova (Seattle)

Friday 11:00–12:00

Local to global approach to support theories and categorical fibres

I’ll describe an approach to the support theory of a small quantum group via taking fibres of its representation theory at a family of categorical Borels parametrized by the usual flag variety.

Joint work with Cris Negron.

Antoine Touzé (Lille)

Friday 14:00–15:00

Recent advances on the structure of generic representations of general linear groups over a ring R

Let R be a ring, let k be a field, and let $F(R, k)$ be the category of all (i.e. non necessarily additive) functors from free R -modules of finite rank to k -vector spaces. Since the works of N. Kuhn, this category is called the category of generic representations of general linear groups over a ring R . The category $F(R, k)$ is studied because of its strong connections with the K-theory of R , and it is also interesting in itself because its structure is an intriguing mixture of (R, k) -bimodules, representations of classical Schur algebras, and representations of finite general linear groups in cross characteristic.

In this talk, we will explain some new structure results for objects of $F(R, k)$, in particular a tensor decomposition theorem in the spirit of the celebrated Steinberg tensor product theorem, and an application to the existence of FPN resolutions. (This is joint work with A. Djament and C. Vespa)

Paul Balmer (Los Angeles)

Friday 15:30–16:30

Modular fixed-points functors and Artin motives

This is based on joint work with Martin Gallauer. I shall explain the tools needed to prove our recent stratification results (presented in my Alesund talk, e.g.) on the derived category of permutation modules, a.k.a. the derived category of Artin motives.