HAUSDORFF RESEARCH INSTITUTE
FOR MATHEMATICS

UNIVERSITÄT BONN

Follow-Up-Workshop to TP

"Spectral Methods in Algebra, Geometry, and Topology"

August 24 - August 28, 2026

organized by

Paul Balmer (UCLA), Tobias Barthel (MPIM Bonn), John Greenlees (University of Warwick), Henning Krause (Universität Bielefeld), Julia Pevtsova (University of Washington)

Abstracts

Scott Balchin (Queen's University Belfast)

Algebraic models for tt-categories: The why, what and how.

Abstract: This talk will provide a general overview of the tools which are available to us when aiming to construct algebraic models for tt-categories in their various flavours and guises. I will then discuss some of the progress since the HIM workshop on particular examples of the machinery in action.

Dave Benson (University of Aberdeen)

The Balmer spectrum of the Schur algebra

Abstract: This is a preliminary report of work in progress, joint with Iyengar, Krause and Pevtsova. The aim is to classify the thick subcategories of the bounded derived category of the Schur algebra in prime characteristic. The methods involve translating through Schur-Weyl duality and adapting methods developed by Balmer and Gallauer in a closely related context. Their tensor induced complexes don't work in our context, and are replaced by Troesch complexes.

Martin Gallauer (Warwick University)

Survey on DPerm

Abstract: This talk is meant as introduction to and preparation for subsequent talks at this workshop on the derived category of permutation modules = modules over Bredon cohomology. I will survey the work joint with Paul Balmer on this subject, focusing on the developments since the trimester program.

Juan Omar Gomez (Bielefeld University)

A derived Chouinard's theorem for infinite groups

Abstract: In this talk, I will discuss an analogue of Chouinard's theorem for modules over the algebra of cochains on the classifying space of a large class of infinite groups. In fact, our approach allows us to consider commutative ring spectra as coefficients. If time permits, I will explain how this result can be used to address Noetherianity of the cohomology rings of these groups, as well as BIK-stratification for the corresponding module categories. This is joint work in progress with Natalia Castellana.

Jesper Grodal (University of Copenhagen)

TBA

Abstract: TBA

Drew Heard (NTNU Trondheim)

A non-spatial frame of smashing ideals

Abstract: The smashing tensor ideals of a rigidly-compactly generated tensor-triangulated category form a frame, but it has remained unclear whether this frame must be spatial. I will give a negative answer, already for the unbounded derived category of a (necessarily non-noetherian) commutative ring, via an embedding of the frame of idempotent ideals into the frame of smashing ideals. This is joint with Tobias Barthel.

Janina Letz (Paderborn University)

Regular sequences and Rouquier dimension

Abstract: In commutative algebra, regular sequences play an important role as they have nice homological properties. I will introduce a notion of regular sequences for triangulated categories. Using regular sequences I will give lower bounds for generation time and Rouquier dimension of a triangulated category. This can be applied to find the Rouquier dimension of the bounded derived category of a regular ring, and improve bounds for the Rouquier dimension of the stable module category of representations of a finite group and the bounded derived category of a complete intersection ring.

Jun Maillard (Charles University in Prague)

Tensor induction of graded and differential Mackey functors

Abstract: Given two finite groups $H < G$ and a representation M of H, one can form the tensor induced representation TInd(M) of M on G. The tensor induction functor TInd is a non-additive functor, compatible with tensor products and restrictions. A similar operation was defined by Bouc for Mackey functors and cohomological Mackey functors. I will explain how this definition generalizes to modules over an arbitrary commutative Green functor and present the slightly more complex graded and differential settings. If time allows, I will show how tensor induction helps computing the Balmer's spectrum of perfect complexes over a commutative Green functor.

Sam Miller (University of Georgia)

Some updates on permutation twisted cohomology

Abstract: Twisted cohomology for permutation modules, as first developed by Balmer—Gallauer then extended by the speaker, plays a crucial role in the tensor-triangualr geometry of the derived category of permutation modules. We give a few updates on the status of developing a twisted cohomology theory for all finite groups and showing that it completely recovers the Balmer spectrum of the category. We also say some words on orientability of invertible objects and representation spheres. Parts of this talk are joint work in progress with J. O. Gómez.

Tom Peirce (Warwick University)

Proxy-smallness and duality for geometric functors

Abstract: Proxy-smallness is a finiteness property for objects in (tensor-) triangulated categories, and I describe how we can use this property for geometric functors, giving associated torsion/complete subcategories of the domain in which monoidal properties are reflected. We describe how we recover a form of Grothendieck duality on certain subcategories, and how this setting provides a unifying approach to generalising the concept of Gorenstein ring spectra in the sense of 'DGI'. This is joint work with Jordan Williamson.

Luca Pol (MPIM Bonn)

On the tt-geometry of global representations

Abstract: A global representation is a compatible collection of representations of the outer automorphism groups of the finite groups belonging to a family U. These arise in classical representation theory, in the study of representation stability, as well as in global homotopy theory. In this talk, I will discuss how to use tensor-triangular geometry to study the derived category of global representations over fields k of characteristic zero. In particular, I will present some calculations of Balmer spectra for various infinite families of finite groups. Depending on time I will also discuss the classification of localizing tensor ideals in global representation theory.

Beren Sanders (UC Santa Cruz)

An overview of the theory of stratification

Abstract: We will review the theory of stratification for classifying localizing ideals of tensor-triangulated categories and discuss how two complementary approaches together yield strong descent results. Time permitting, we will discuss recent results on the classification of homological and cohomological Bousfield classes.

Stefan Schwede (University of Bonn)

A Real-global equivariant Segal–Becker splitting, explicit Brauer induction, and global Adams operations

Abstract: I shall explain a splitting result in global equivariant homotopy theory that is a simultaneous refinement of the Segal–Becker splitting and its 'Real' and equivariant generalizations, and of the explicit Brauer induction of Boltje and Symonds. We show that the morphism of ultra-commutative

Real-global ring spectra from +BglU(1) to the Real-global K-theory spectrum that classifies the tautological Real U(1)-representation admits a section on underlying Real-global infinite loop spaces. We prove that this global Segal–Becker splitting induces the classical Segal–Becker splittings on equivariant cohomology theories, and that it induces the Boltje–Symonds explicit Brauer induction on equivariant homotopy groups. As an application we rigidify the unstable Adams operations in Real-equivariant K-theory to global self-maps of the Real-global space BUP.

Greg Stevenson (Aarhus University)

Peering through the lattice

Abstract: I'll give an overview of the lattice-theoretic approach to tensor triangular geometry. For essentially small tt-categories this seems to be just a rephrasing of the usual story (whose utility is perhaps a personal matter). However, if one looks a bit beyond this usual story, for instance by relaxing/removing the tensor product or passing to ind-completions, one can find a lot of inspiration by thinking in terms of lattices. I'll present some results and speculations to try to convey and share this inspiration.

Jan Stovicek (Charles University in Prague)

Torsion dualizable objects as a "Cauchy completion" torsion compact objects in tt-categories with a Noetherian ring action.

Abstract: Suppose that T is a rigidly compactly generated tensor triangulated category T with an action of a graded commutative Noetherian ring R, making (graded) homomorphism groups between compacts finitely generated R-modules. Given any homogeneous ideal a of R, the equivalent categories of a-torsion objects inside T and a-complete objects inside T are compactly generated, tensor triangulated and all compact objects are rigid, but the tensor unit is typically not compact.
In joint work with Jun Maillard (arXiv:2512.04818), we have shown that one can recover the category of torsion dualizable objects from the smaller category of torsion compact objects as a tensor triangulated category, using a form of "Cauchy completion" reminiscent of Neeman's metric completion. If, in addition, we assume that the category of compact objects of T is strongly generated (or equivalently, has finite Rouquier dimension), there are also Brown representability results providing a "perfect pairing" between the categories of torsion compact objects and torsion dualizable objects, which are formally very similar to Neeman's arXiv:1804.02240. Despite the formal similarity of the results, our techniques are completely different from Neeman's - we cannot use any t-structures or compactly supported objects as these may not be available in our setting, but we use the monoidal structure in an essential way.

Emmy van Rooy (UCLA)

Residual regularity for tt-categories

Abstract: In this talk, we introduce the new notion of 'residual regularity' for rigidly-compactly generated tt-categories, generalising the classical concept of regularity from algebraic geometry. The approach is based on the theory of homological residue fields, as developed by Balmer-Krause-Stevenson. Analysing residual regularity in the context of modular representation theory, we obtain a complete classification of finite groups G whose derived category of permutation kG-modules is residually regular. A core part of the proof is a technical result concerning finite separable extensions of tt-categories, which are generalisations of finite étale extensions in algebraic geometry. This technical result asserts

that, under some mild additional conditions, a finite separable extension preserves and reflects residual regularity.

Jordan Williamson (Charles University in Prague)

Purity in tt-geometry

Abstract: I will explain how the homological and Balmer spectrum of a rigid tt-category and its functoriality can be obtained from the pure structure of the tt-category through the Ziegler spectrum. Time permitting, I'll explain some connections with rank functions and potential future directions. This is based on joint work with Isaac Bird and Alexandra Zvonareva.
