

Wednesday 22.03.

Sasha Efimov Kleiner Hörsaal Pharmazie, 9:00-10:00

Title: *Localizing motives*

I will explain some new results on the category of localizing motives – the target of the universal localizing invariant (of stable infinity-categories over some base ring k) commuting with filtered colimits. Quite surprisingly, this category turns out to be a rigid dualizable symmetric monoidal category.

I will also explain how to compute morphisms in this category, including the corepresentability of TR and TC (when restricted to connective E_1 rings). It turns out that TR is corepresented by the reduced motive of affine line and TC is corepresented by the unit object in the kernel of A^1 -localization. The kernel of A^1 -localization can be considered as a motivic version of the category of cyclotomic spectra.

Jeff Hicks Kleiner Hörsaal Pharmazie, 10:30-11:30

Title: *Generation of toric subvarieties by line bundles*

Given a toric subvariety Y of a smooth toric variety X , we construct a resolution of O_Y by line bundles on X . The resolution has length the codimension of Y , and the line bundles are chosen from a finite collection of line bundles on X which are direct summands of the pushforward of O_X under the map of toric Frobenius. As a consequence, we show that the Rouquier dimension of the derived category of a toric variety is equal to its Krull dimension. Joint work with Andrew Hanlon and Oleg Lazarev.

Nicolo Sibilla Kleiner Hörsaal Pharmazie, 12:00-13:00

Title: *Sketches of elliptic cohomology*

In this talk I will report on work on elliptic cohomology with Scherotzke and Tomasini. With Scherotzke we show that equivariant elliptic cohomology is not a derived invariant, thus confirming the heuristics that elliptic cohomology captures higher categorical information. This depends on a careful analysis of the equivariant elliptic cohomology of toric varieties. With Tomasini we give a new construction of equivariant elliptic cohomology in terms of a stack of maps out of the elliptic curve. This brings elliptic cohomology closer to well known constructions in algebraic geometry such as (secondary) Hochschild homology, and opens the way to possible non-commutative generalizations.

Ed Segal Kleiner Hörsaal Pharmazie, 15:00-16:00

Title: *Fukaya categories at singular values of the moment map*

Given a Hamiltonian torus action on a symplectic manifold, Fukaya and Teleman tell us that we can relate the equivariant Fukaya category to the Fukaya category of a symplectic reduction. Yanki Lekili and I have some conjectures that extend this story - in certain special examples - to singular values of the moment map.

I'll also explain the mirror symmetry picture that we use to support our conjectures, and how we interpret our claims in Teleman's framework of 'topological group actions' on categories.

Timothy Logvinenko Kleiner Hörsaal Pharmazie, 17:00-18:00

Title: *A-infinity structures in DG monoidal categories and strong homotopy unitality*

Traditionally, A-infinity algebras are defined as objects A in the monoidal category of graded modules over the base field or ring with a collection of operations $m_n : A^n \rightarrow A$, where the first operation m_1 gives a differential on A . We introduce more general notions of A-infinity algebras, coalgebras, modules, and comodules in an arbitrary DG monoidal category or, more generally, a DG bicategory. The operations now do not include the differential, instead our definition uses the language of unbounded twisted complexes which implicitly makes use of the intrinsic differential of each object as afforded by the Yoneda embedding. For A-infinity algebras and their modules, we introduce the notions of strong homotopy unitality and construct the Free-Forgetful homotopy adjunction, the Kleisli category and the derived category. Analogous constructions, with some subtleties, exist for A-infinity coalgebras and comodules. Finally, we define the notion of homotopy adjoint A-infinity coalgebra and algebra, and prove for these the derived comodule-module equivalence. One of the principal applications is to the DG bicategories of DG categories and of enhanced triangulated categories, giving rise to the notion of A-infinity monad/comonad and enhanced exact monad/comonad. Given an adjoint pair (F,R) of enhanced functors, we write down strictly associative but strong homotopy unital enhancements of adjunction monad RF and comonad FR . Given an adjoint triple (L,F,R) we show that enhanced comonad LF and enhanced monad RF are homotopy adjoint and hence derived comodule-module equivalent. This is joint work with Rina Anno (Kansas).

Thursday 23.03.

Špela Špenko Kleiner Hörsaal Pharmazie, 9:00-10:00

Title: *HMS symmetries of toric boundary divisors*

Let X be a complex manifold. By homological mirror symmetry one expects an action of the fundamental group of the "moduli space of Kähler structures" of X on the derived category of X . If X is a crepant resolution of a Gorenstein affine toric variety we obtain an action on the derived category of the toric boundary divisor of X which leads to an action on the Grothendieck group of X . This is a joint work with Michel Van den Bergh.

Tashi Walde Kleiner Hörsaal Pharmazie, 10:30-11:30

Title: *Lax additivity*

Aiming towards a general theory of categorified homological algebra, we introduce the notion of a lax additive (infinity,2)-category; the main example is the (infinity,2)-category of stable infinity-categories. We explain how in this lax additive context one can categorify key constructions from homological algebra such as mapping complexes and mapping cones. This talk is based on joint work with M. Christ and T. Dyckerhoff.

Merlin Christ Kleiner Hörsaal Pharmazie, 12:00-13:00

Title: *Spherical categorical complexes*

A complex of stable infinity-categories is a categorification of a chain complex, meaning a sequence of stable infinity-categories together with a differential that squares to the zero functor. To produce such a complex, one can start with a commuting cube of stable infinity-categories, and then totalize. Interesting examples arise from normal crossing divisors: the derived categories of the components and their intersections organize into such a cube, whose totalization we call the categorical intersection complex.

We will then speak about generalizations of spherical functors, which can be seen as 2-term complexes, to spherical complexes and their relation with higher dimensional categorified perverse

sheaves. We also show that the categorical intersection complex is spherical. This talk is based on joint work with T. Dyckerhoff and T. Walde.

Fabian Haiden Kleiner Hörsaal Pharmazie, 15:00-16:00

Title: *Knots, categories, and counting*

For any Legendrian knot one can consider its augmentation dg-category, which is relative 2-Calabi-Yau over the category of local systems on the knot. By an intriguing result of Ng-Rutherford-Shende-Sivek relates the homotopy cardinality of this category to a well-known Legendrian knot polynomial. To understand this result, it is useful to generalize everything to Legendrian tangles. In doing so, one encounters 3-step complexes of dg-categories, giving examples of the very general theory recently developed by Christ-Dyckerhoff-Walde. Partly based on arXiv:1910.04182.

Friday 24.03

Markus Land H1 Geomatikum, 9:00-10:00

Title: *On the K-theory of pushouts*

I will report on joint work with Tamme. In the first part of the talk, I will recall an earlier theorem of Tamme and mine about (the failure of) excision in K-theory, and some of its applications. I will then come to our new result which is a perfect mirror of our earlier result and which deals with pushouts rather than pullbacks. I will explain how this is related to our earlier work and finish with a number of sample applications.

Walker Stern H1 Geomatikum, 10:30-11:30

Title: *Higher Grothendieck constructions*

In this talk I will discuss generalizations of the Grothendieck construction to the $(\infty, 2)$ -categorical setting. Time permitting, I will survey connections to lax functors, lax (co)limits, and higher operads.

Gustavo Jasso H1 Geomatikum, 12:00-13:00

Title: *The Donovan-Wemyss Conjecture via the Derived Auslander-Iyama Correspondence*

The Donovan-Wemyss Conjecture predicts that the isomorphism type of an isolated compound Du Val singularity R that admits a crepant resolution is completely determined by the derived-equivalence class of any of its contraction algebras. Crucial results of August and Hua-Keller reduced the conjecture to the question of whether the singularity category of R admits a unique DG enhancement. I will explain, based on an observation by Bernhard Keller, how the conjecture follows from a recent theorem of Fernando Muro and myself that we call the Derived Auslander-Iyama Correspondence.

Thomas Nikolaus H1 Geomatikum, 15:00-16:00

Title: *Maps between spherical group algebras*

I will speak about a central question in higher algebra (aka brave new algebra), namely which rings admit 'higher models', that is lifts to the sphere spectrum. This question is in some sense very classical, but there are many open questions. These questions are closely related to questions about higher versions of prismatic cohomology (asked e.g. by Scholze and Lurie) and delta-rings.

Concretely we will consider the case of group algebras and explain how to understand maps between lifts of group algebras to the sphere spectrum.