

Telescopic Homotopy Theory and Algebraic K-theory

Abstracts

Sanjana Agarwal (Indiana University)

Title: Localizing Invariants for Morava E -Theories

Abstract: Conjecturally, the localizing invariants (such as algebraic K -theory, (Topological) Hochschild Homology or Topological Cyclic Homology) of height n -ring spectra help construct height n or $n + 1$ ring spectra. These conjectures such as red-shift conjecture and blue-shift conjecture are now known to be true in particular cases but not fully understood explicitly.

In this talk, we show that for the second Morava E -theory, E_2 , the spectrum $T H H(E_2)$ can be explicitly understood in terms of localizations and suspensions of E_2 . In particular, we show that $T H H(E_2)$ has same height as E_2 . Further, we demonstrate why these calculations do not extend to E_n for higher n .

Recently, Efimov's work extends the theory of localizing invariants to dualizable presentable stable ∞ -categories. Under this extension, an invariant extends to its continuous analogue. For a Noetherian ring A , with ideal I , this means that you can define a new localizing invariant associated to A_I denoted as $K^{\text{cont}}(A_I)$ which is the inverse limit over n of $K(A/I^n)$. In the talk, we discuss these terminologies and demonstrate why these continuous localizing invariants might be easier to compute for E_n .

Agnès Beaudry (University of Colorado)

Title: The Chromatic Trace

Abstract: In this talk, we will see how to produce new periodic families in the stable homotopy groups of spheres using the recent developments in Galois theory and ambidexterity in chromatic homotopy theory. Any finite Galois extension of the $K(n)$ -local sphere gives rise to certain trace elements in the homotopy groups of the $K(n)$ -local sphere, and any such element lifts to the $T(n)$ -local sphere. At the prime $p=2$, we use this to show that $\eta \zeta_n$ in $\pi_{0S_{\{K(n)\}}}$ lifts at all heights n and to describe the ring $\pi_{0S_{\{K(2)\}}}$.

This talk is based on joint work with Alexander Lajeunesse and Tomer Schlank.

Mark Behrens (University of Notre Dame)

Title: Products of Beta elements and the Parabola Conjecture

Abstract: Mahowald-Ravenel-Shick's "Parabola Conjecture" proposed a pattern of differentials and a subsequent collapsing of the localized Adams spectral sequence for $Y(n)$ which would disprove the telescope conjecture. Subsequent work of Burklund-Carmeli-Hahn-Levy-Schlank-Yanovski shows that Mahowald-Ravenel-Shick's original Parabola Conjecture cannot be correct, as it would contradict a theorem of Burklund-Schlank-Yuan. I will discuss what the analog of the Parabola Conjecture would look like for $V(1)$ for $p > 3$, and explain how this cannot be correct as it would contradict classic results of Oka-Shimomura on the non-vanishing of products of beta elements. I will discuss prospects for finding parabolic families in the homotopy of $V(1)$. This work is joint with Juan Moreno.

Shay Ben-Moshe (Max Plank Institute)

Title: Algebraic K-theory and higher semiadditivity

Abstract: I'll explain a proof of the higher semiadditivity of $K(n)$ -local spectra by induction on height, using a variation on the higher descent theorem for chromatically localized K-theory. I will then explain the semiadditive redshift theorem. Finally, I will turn to semiadditive K-theory and its relation to chromatically localized K-theory. The talk is based on several projects, some joint with Carmeli, Neugebauer, Schlank, and Yanovski.

Shachar Carmeli (Weizmann Institute of Science)

Title: Higher semiadditive cardinalities in Chromatic Homotopy Theory.

Abstract: The theory of ambidexterity, also known as higher semiadditivity, allows one to extend the classical notion of cardinality from finite sets to spaces with finite total homotopy. These generalized cardinalities have been studied in joint work with Schlank and Yanovski as part of the proof of the telescopic ambidexterity, and are useful for other aspects of telescopic homotopy theory as well.

In this talk, I will survey the theory of higher semiadditive cardinalities, some of their applications, and what is known about the calculation of these “numbers.” In particular, I will describe their behavior at chromatic height 1 based on joint work with Yuan, their transchromatic behavior, and report on progress toward their calculation at higher chromatic heights from joint work with Dubey and Niemiro

Gijs Heuts

Title: A Beilinson fiber square for telescopically localized K-theory

Abstract: I will report on ongoing joint work with Devalapurkar and Schlank. We construct a telescopic analog of the Beilinson fiber square, providing a simple formula for the difference between the $T(n)$ -local K-theory of a ring spectrum R and that of its $T(n-1)$ -localization. There are many applications to our understanding of redshift, of which I will discuss some.

Mike Hopkins (Harvard University)

Title: Some ancient history of chromatic homotopy theory

Abstract: In the wake of the resolution of new solutions to old conjectures on chromatic homotopy, I will talk about the origin of these conjectures and some of the different phases through which the field has passed.

Achim Krause (University of Oslo)

Title: Effective Spectra

Abstract: In this talk I want to report on ongoing work with Ben Antieau on a computer-algebraic approach to stable homotopy theory.

Lennart Meier (Utrecht University)

Title: The Tate diagonal from a chromatic point of view

Abstract: Generalizing Lin's theorem, Lunoe-Nilsen—Rognes and Nikolaus—Scholze proved that the Tate diagonal from X to the C_2 -Tate of its norm is an equivalence if X is connective. The analogous statement cannot be true if X is $K(n)$ -local instead (e.g. Morava E-theory) because of blueshift. I will report on joint work in progress with Heuts and Nikolaus investigating what one can still say about these norms.

If time remains, I will also comment on a hidden chromatic picture in the norm of HF_2 .

Niko Naumann (University of Regensburg)

Title: The Galois theory of genuine G spectra for finite G

Abstract: We review results on fracture squares with isotropy separation for G spectra as the leading example. We explain how this leads to the main result saying that the Galois theory of G spectra is algebraic. We finally discuss the ensuing exercise of computing the étale fundamental groupoid of the Burnside ring of a finite group.

Thomas Nikolaus (University of Münster)

Title: Reflexivity and Condensed Anderson Duality

Abstract: We study the notion of reflexivity in the category of spectra. Different dualities exhibit surprisingly different behaviour: using chromatic methods, we construct highly infinite spectra that are nevertheless Spanier–Whitehead reflexive. In contrast, we show that Anderson reflexivity is equivalent to finite generation of homotopy groups.

We then introduce a condensed refinement of Anderson duality, in which every discrete spectrum becomes reflexive once the natural condensed structure on its Anderson dual is taken into account. We study the stable subcategory generated by discrete spectra and their condensed Anderson duals, and describe it as a suitable completion of a Tate category. This is joint work with P. Pützstück.

Arpon Raksit (Northwestern University)

Title: Synthetic E-infinity rings

Abstract: The relationship between spectra and sheaves on the moduli stack of formal groups is encoded by a certain category of "synthetic spectra", introduced from different perspectives by Pstrągowski and Gheorghe–Isaksen–Krause–Ricka. This talk will describe yet another perspective, how this leads to an accompanying analogue for commutative ring spectra, and the

relevance of the latter to the motivic filtration on the topological cyclic homology of commutative ring spectra.

Based on joint work with Devalapurkar, Hahn, and Senger.

Maxime Ramzi (University of Münster)

Title: Chromatic noshift

Abstract: In this talk I will explain how to construct examples of rigid symmetric monoidal stable categories of chromatic height n whose $T(n+1)$ -local K -theory vanishes, witnessing the failure of the redshift phenomenon in this generality.

Andrew Senger (University of Maryland)

Title: Towards the chromatic splitting conjecture

Abstract: I will discuss recent progress towards the chromatic splitting conjecture, based on new results in perfectoid geometry. This is joint work with Barthel, Mann, Ray, Schlank, Weinstein, and Zhou.

Vladimir Sosnilo (RIKEN)

Title: c-categories

Abstract: A c-structure on a small stable category consists of a t-structure on its Ind-completion, satisfying certain compact approximability conditions.

The category of perfect modules over a connective ring spectrum admits a c-structure, and many general constructions available for connective ring spectra are available for categories endowed with a c-structure. There is a c-structure on the category of perfect complexes over qcqs spectral schemes, as well as many Artin stacks, on arbitrary -1 -connective ring spectra, and also on $R^{\wedge} G$ for R a connective ring spectrum and G a group of finite cohomological dimension.

We illustrate the formalism by explaining how the theorem of Dundas--Goodwillie--McCarthy holds in the setting.

Time permitting, we also discuss the ongoing work on the dualizable version of the notion.

Lior Yanovski (University of Melbourne)

Title: The sign of a function

Abstract: We show that there is a unique *functorial* way to write every function between finite sets of the form $\{0, 1, \dots, n\}$ as a signed sum of order-preserving maps, extending the tautological one on those which are already order-preserving. In fact, this holds even with coefficients in the sphere spectrum, as a consequence of a monoidal version of the stable Dold–Kan correspondence. We also give a combinatorial formula for these coefficients, from which it is manifest that they all lie in $\{-1, 0, 1\}$.

This is joint work with Nora Ganter, with assistance from GPT-5.6 Sol.

Allen Yuan (Northwestern University)

Title: Some S^1 -equivariant even spaces

Abstract: Wilson spaces -- p -local finite type spaces with even torsion-free homotopy and homology -- have come to play a central role in various aspects of homotopy theory. My goal for the talk will be to discuss some simple examples of even spaces in the equivariant setting, and ask some questions related to these. The material is drawn from joint work with David Lee, following some joint work with Devalapurkar, Hahn, and Raksit.