

Copenhagen Masterclass 9–13 April 2018

Rigidity and algebraic models in stable homotopy theory

Titles and abstracts

David Barnes: Rational S^1 Equivariant Ring Spectra.

Abstract: I will explain how the classification of rational S^1 -spectra in terms of the algebraic model has the structure of a zig-zag of monoidal Quillen equivalences. A major component is to construct a monoidal model structure on the algebraic model, as the naturally occurring injective model structure is not monoidal. With this monoidal classification, we can classify ring spectra and modules over them in terms of the algebraic model. However, the case of commutative ring spectra requires additional work. I will describe recent work towards this case.

If time permits, I will also discuss the classifications of $O(2)$ -spectra and $SO(3)$ -spectra in terms of Quillen equivalences. These two groups each introduce a new complication that must be understood before we can approach the case of general a compact Lie group.

Magdalena Kedziorek: The story for a finite group.

Abstract: In this talk I will present various approaches to obtaining an algebraic model for rational G -spectra, where G is a finite group. I will concentrate on the zig-zag of monoidal Quillen equivalences leading to the algebraic model and introduce various model-categorical techniques used along the way.

Irakli Patchkoria: On equivariant rigidity.

Abstract: This talk will survey some results on equivariant rigidity. We will first review the result which says that the 2-local genuine G -spectra are equivariantly rigid for G a finite group. Then we will show that for p a prime which does not divide the order of a finite group G , the p -local G -spectra are also rigid. This will use the notion of p -order. As a combination we get an integral equivariant rigidity for all finite 2-groups. After this we will talk about equivariant rigidity in the K -local context. This is joint work with C. Roitzheim. We show that K -local genuine G -spectra are rigid at the prime 2 for any finite group G . If p is odd and does not divide the order of G , we provide an exotic algebraic model for $K_{(p)}$ -local G -spectra. This exotic model is a Mackey version of Franke's category. At the end we will make some conjectures.

Constanze Roitzheim: K -local rigidity.

Abstract: Like the stable homotopy category $\mathrm{Ho}(\mathrm{Sp})$ itself, the K -local stable homotopy category is rigid at the prime 2, i.e. the entire higher homotopy information of K -local spectra is encoded in the triangulated structure of their homotopy category.

While the K -local stable homotopy category enjoys some properties similar to those of $\mathrm{Ho}(\mathrm{Sp})$, the actual practicalities of the proof throw up some different challenges and

methods. We will provide an overview of this and also give a survey of the equivariant situation.

Neil Strickland: Chromatic cohomology of finite general linear groups.

Abstract: I will describe a calculation of the Morava E-theory of the classifying spaces of general linear groups of finite fields, where the characteristic is different from the prime attached to the Morava E-theory. There was already a presentation of these Morava E-theory groups due to Tanabe, but that presentation was hard to digest explicitly; in particular, it does not give a basis. I will describe a different approach that does give a basis and fits into an interesting circle of related ideas.

This is joint work with Sam Hutchinson and Sam Marsh.