Mini-workshop in Osnabrück

Monday 16th

13:30hs **Martin Frankland** - Enriched model categories and the Dold-Kan correspondence

14:30hs **Markus Sptizweck** - Towards motivic cohomology over $\mathbb{F}_1$

Small break (no cookies planned :( )

16:00hs **Thor Wittich** - The Motivic Alexander Module

Tuesday 17th

10:00hs **Marco Giustetto** - An internal characterization of Segal Θ_n-spaces

11:00hs **Paula Verdugo** - Double categorical equivalences

LUNCH

13:30hs **Oliver Röndigs** - Vector bundles on SL_3

Abstracts

Monday

13:30 hs - Martin Frankland

Enriched model categories and the Dold-Kan correspondence

If we start with a model category enriched in simplicial abelian groups and we normalize each hom complex, what kind of structure do we obtain? In joint work with Arnaud Ngopnang Ngompé, we show that changing the enrichment along a weak monoidal Quillen pair results in a "weak" enriched model category. The main issue is that we lose the tensoring and cotensoring, but we retain a weak form thereof.

14:30 hs - Markus Spitzweck

Towards motivic cohomology over $\mathbb{F}_1$

Using Arndt's framework for abstract motivic homotopy theory we present versions of (stable) motivic homotopy categories over $\mathbb{F}_1$. We compare the slice filtration and the Goodwillie tower for the S^1-stable theory. We apply the filtration to K-theory. This is work in progress joint with Hadrian Heine.

16:00hs - Thor Wittich

The Motivic Alexander Module

When studying knot theory, the Alexander module (or the Alexander polynomial) is one of the first knot invariants one encounters with which one may distinguish quite some knots. Using motivic homotopy theory, we define such invariants for a notion of "algebraic knots" and explain how this relates to several central problems of affine algebraic geometry. This is joint work with Matthias Wendt.

Tuesday

10:00hs - Marco Giustetto

An internal characterization of Segal Θ_n-spaces
(joint with Lyne Moser and Jonathan Weinberger)

A lemma of Joyal says that a simplicial presheaf of spaces is Segal, i.e. is externally local with respect to all spine inclusions, if and only if it is internally local with respect to the single spine inclusion $Sp[2] \to \Delta[2]$. This statement has been used by Riehl and Shulman to define synthetic $(\infty, 1)$-categories in homotopy type theory, where the fact that we have to check locality with respect to a finite set of spine inclusions has various technical advantages. Therefore, it is natural to ask oneself if there is a generalization of this lemma for presheaves of spaces over the categories Θ_n, for $n > 1$, which would allow to model (∞, n)-categories in homotopy type

theory. In particular: is there a finite class F of spine inclusions such that internally F-local objects are Segal Θ_n-spaces?

Surprisingly, the answer is no. The moral reason for this is that the Cartesian product of n-categories is infamously "not free", i.e. it involves non-trivial identifications between higher cells: therefore, maps out of a Cartesian product of n-categories come in relatively short supply. We do, however, produce an interesting map out of the product of certain very symmetrical n-categories, which allows us to describe a "best approximation" to a class F as above.

11:00hs - Paula Verdugo

Double categorical equivalences
(joint with Lyne Moser and Maru Sarazola)

In this talk we will discuss the difficulties that arise when trying to decide on a canonical notion of "equivalence" for double categories. We will use model categorical techniques to support Campbell's gregarious equivalences as the candidates to consider. In doing this, we will see how to construct many model structures on the category of double categories, including recovering existing ones.

13:30hs - Oliver Röndigs

Vector bundles on SL_3

Consider the special linear group SL_n over a field. Murthy proved that every vector bundle over SL_2 is trivial. Swan constructed a nontrivial vector bundle of rank two over SL_4 for the field of complex numbers. This led Nakamoto and Torii to investigate vector bundles over SL_3, and to conjecture that they are all trivial. The talk will discuss this conjecture using unstable $\mathbb{A}^1$-homotopy theory.