GOETHE UNIVERSITÄT FRANKFURT AM MAIN

Frankfurter Seminar

Kolloquium des Instituts für Mathematik

Sommersemester 2024

Frankfurter Seminar, 10. Juli 2024

Peter Teichner (Max-Planck-Institut für Mathematik, Bonn)

Topological Phases, Field Theories and Manifold Invariants

After recalling the Atiyah-Segal-Witten formalism for topological field theories (TFTs), we will discuss computations of Freed-Hopkins in the case of positive invertible TFTs. Their tables magically agree with computations made in condensed matter physics of gapped systems, namely for symmetry protected topological phases. In both approaches, the input is the space-time dimension d, together with a symmetry group H, and the output is an abelian group TP(d,H) of topological phases. It remains an open question why these groups can be computed in two completely different ways. For fixed dimension d, there is a 10-fold way in which the groups H arise, and we will show how they are related to the 8+2 super division algebras.

We will prove that invertible TFTs are classified by their partition function, an invariant of closed d-manifolds with structure group H.

Finally, we will characterize such manifold invariants in terms of a 4-term cut-and-paste relation.

The last part is current joint work with Matthias Kreck and Stephan Stolz.

Tee ab 16:15 Uhr

Robert-Mayer-Straße 10 | Raum 711

Ginkgo-Seminar 15:15 - 16:00 Uhr

Thorger Geiß Eine Einführung in topologische Feldtheorien nach Atiyah, Segal und Witten

Tee 16:15 - 16:45 Uhr

Teilnahme nur für Studierende, Promovierende und Postdocs

www.math.uni-frankfurt.de/frankfurter-seminar