Kolloquium über Reine Mathematik

Einladung zu einem Vortrag

Dienstag, 19. Januar 2016

17 Uhr s.t., Geom H4

Prof. Dr. Johannes Ebert

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Moduli spaces of manifolds, index theory and positive scalar curvature

Abstract:

It has been known for a long time that the problem of finding a metric of positive scalar curvature on a closed manifold has a rich connection to abstract algebraic topology (in particular cobordism theory), through the Atiyah-Singer index theorem and a geometric result of Gromov-Lawson. This turns the problem whether a given manifold has a metric of positive scalar curvature essentially into a computational problem of algebraic topology. Stolz was able to solve this algebraic problem and thereby answered the existence question. After a brief survey in these classical results, we turn to more recent results.

Once a manifold M has a metric of positive scalar curvature, one can ask about the homotopy type of the space $R^+(M)$ of all metrics of positive scalar curvature metrics. No methods to compute topological invariants (such as homotopy or homology groups) of $R^+(M)$ directly are known.

However, refinements of the methods used to tackle the existence question can be employed to obtain lower bounds for the homotopy of $R^+(M)$.

We prove that a certain "secondary index invariant" is as nontrivial as one could possibly expect.
The main new ingredient is the recent work of Galatius and Randal-Williams on moduli spaces of high-dimensional manifolds.
(joint work with Botvinnik and Randal-Williams)

Vor dem Vortrag (ab 16.30 Uhr) stehen im Raum 327 Kaffee und Tee bereit.