

Speaker: Thomas Schick

Title: Poisson submanifolds prevent positive scalar curvature

Abstract:

The Gauss-Bonnet theorem implies that the sphere is the only compact oriented surface admitting a metric with positive scalar curvature. In higher dimensions, the role of the Gauss-Bonnet theorem is taken by various index-invariants of the Dirac operator.

A particularly intricate way to employ this goes back to Gromov and Lawson: they identify certain types of submanifolds whose existence prevents the existence of a metric of positive scalar curvature. We present this and a generalization (joint work with Hanke and Pape). Then we discuss recent constructions which put these obstructions into the wider context of higher index theory (relating this also to conjectures like the Baum-Connes isomorphism conjecture or the strong Novikov conjecture).

Finally (if time permits), on non-compact manifolds we will comment on the difference between the non-existence of complete metrics with positive scalar curvature versus "scalar curvature bounded below by a positive constant" (joint with Cecchini).