Oberseminar Geometrie und Topologie

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On the stability of homogeneous standard Einstein manifolds

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Abstract: The stability type of a compact Einstein manifold (as a critical point of the normalized total scalar curvature functional) reduces to a condition involving the first eigenvalue of the Lichnerowicz Laplacian restricted to TT-tensors (traceless and transversal symmetric 2-tensors).

Given G/K a compact homogeneous manifold, Jorge Lauret has recently defined the G-stability types of G-invariant Einstein metrics on G/K as critical points of the normalized scalar curvature functional restricted to G-invariant metrics. In analogy to the classical theory, the G-stability type reduces to a condition involving the first eigenvalue of the Lichnerowicz Laplacian restricted to (the finite-dimensional subspace of) G-invariant TT-tensors.

In this talk we determine the G-stability type of (almost) every standard homogeneous Einstein manifolds G/K with G simple, classified by Wang and Ziller in 1985. While most of cases were G-unstable (therefore unstable in the classical sense), we found several G-stable examples; in this case, the standard metric is a local maximum of the normalized scalar curvature functional among G-invariant metrics. Furthermore, these G-stable standard manifolds are candidates for being the first example of a compact non-symmetric stable Einstein manifold with positive scalar curvature.

This is joint work with Jorge Lauret.