

Topological properties of positively curved manifolds with symmetry

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Manifolds admitting metrics of positive sectional curvature are conjectured to have a very rigid topological structure and, in particular, comparatively small Euler characteristics. However, this structure is still highly speculative and best results in this direction are known under the assumption of large isometric torus actions. In this talk I shall present joint work with Lee Kennard on new upper bounds on the Euler characteristic of a closed manifold which admits a metric of positive curvature and an isometric torus action. The results permit to find obstructions for symmetric spaces, manifold products and connected sums to admit positively curved metrics with symmetry, thus providing evidence for a conjecture of Hopf. I shall discuss how the additional assumption of rational ellipticity comes in naturally to yield further results like, for example, a confirmation of the Halperin conjecture in this setting. Furthermore, vanishing properties of the elliptic genus of positively curved manifolds with symmetry will be derived.