

Boğaziçi MATH COLLOQUIUM

A new obstruction for Sasaki-extremal metrics

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Abstract: A Sasakian manifold is a metric contact manifold which is an odd dimensional version of a Kähler manifold. As with Kähler manifolds, an important problem is the existence of a canonical Sasakian metric, such as Einstein or constant scalar curvature. These are known not to exist in many cases. In particular, the Futaki invariant obstructs constant scalar curvature metrics. A Sasaki-extremal metric is a generalization of constant scalar curvature metrics on a Sasakian manifold, where the Futaki invariant is not assumed to be zero. In fact, a constant scalar curvature metric is precisely an extremal metric with vanishing Futaki invariant. Thus extremal metrics provide a more general "canonical" metric.

This talk will give a generalization of the Lichnerowicz obstruction of Sasaki-Einstein metrics, due to Gauntlett, Martelli, Sparks and Yau, to an obstruction of Sasaki-extremal metrics. Using this obstruction, we will give many examples of Sasakian manifolds for which there are no compatible Sasaki-extremal metrics for the entire cone of Reeb vector fields.

This is joint work with Charles P. Boyer.

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