Title & Abstract

Hamilton-Tian Conjecture for the Sasaki-Ricci Flow on Fano Sasakian Manifolds of Dimension Five

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In this talk, we first conform the Hamilton-Tian conjecture for the Sasaki-Ricci flow in a compact transverse Fano quasi-regular Sasakian 5-manifold. Secondly, we derive the compactness theorem of such Sasaki-Ricci solitons on transverse Fano quasi-regular Sasakian 5-manifolds. Then, by the second Sasakian structure theorem, we confirm the Hamilton-Tian conjecture for the Sasaki-Ricci flow in a compact transverse Fano Sasakian 5-manifold. With its application, we show that the gradient Sasaki-Ricci soliton orbifold metric in a compact Sasakian 5-manifold is a Sasaki-Einstein if M is transverse K-stable.

Asymptotic geometry of gradient Ricci solitons

Pak-Yeung Chan
National Tsing Hua University

Ricci flow deforms the Riemannian structure of a manifold in the direction of its Ricci curvature and tends to regularize the metric. Ricci solitons are special solutions to the Ricci flow and arise naturally in the singularity analysis of the flow. We shall talk about a dimension reduction property for four dimensional steady Ricci solitons with nonnegative sectional curvature. In the second part of the talk, we shall discuss some constructions of expanding Ricci solitons with special curvature decay rates. This talk is based on some joint works with Zilu Ma and Yongjia Zhang, and with Man-Chun Lee.

CR Paneitz operator and its application in CR geometry

Pak-Tung Ho
Tamkang University

In this talk, I will talk about the CR Paneitz operator and some of its properties. I will then talk about some related results in CR geometry, including the CR positive mass theorem and the convergence of the CR Yamabe flow. Finally, I will mention some of the very recent results about the spectrum of the CR Paneitz operator in the non-embeddable case, which is a joint work with Yuya Takeuchi.

Spherical metric with evenly distributed conical singularities on flat tori

Ting-Jung Kuo
National Taiwan Normal University

Let $\tau \in \mathbb{H}$ and let E_τ be the flat torus defined by $\mathbb{C}/(\mathbb{Z} + \tau\mathbb{Z})$. In the framework established by Chai, Lin, and Wang, it has been shown that any blow-up family of spherical metrics with a single conical singularity of angle $2\pi(1+2n)$ at the origin must be symmetric. Furthermore, the existence of such families crucially depends on the modular parameter τ.

In this talk, we focus on the structure of spherical metrics on E_τ with three conical singularities, having cone angle $2\pi(1+2n)$ at the origin and angle 4π at $\pm p$ where $p \in E_\tau \setminus \{\text{2-torsion points}\}$. Unlike the single singularity case, the present configuration involves three conical points that are evenly distributed across the torus. Interestingly, the structure of the associated blow-up families becomes significantly richer, exhibiting both symmetric and non-symmetric configurations depending on the parameter τ.

The primary goal of this talk is to analyze how the geometry of the underlying torus, particularly its modular parameter τ, influences the structure of these two distinct types of blow-up families. We aim to provide a complete classification of these families through their relation to the Painlevé VI equation and the corresponding monodromy data.

On the Sasaki-Ricci Solitons

Chien Lin
National Taiwan Normal University

Sasakian manifolds are often viewed as the odd-dimensional counterparts of Kähler manifolds in the literature. Specifically, the Kähler cone of a Sasaki–Einstein 5-manifold is a Calabi–Yau 3-fold, and its Reeb foliation carries a transverse Kähler–Einstein structure. Motivated by the work of Yu Li and Bing Wang on the classification of Kähler–Ricci shrinker surfaces, this talk mainly focuses on the classification problem of five-dimensional Sasaki–Ricci solitons. As a first step toward this objective, I will present some fundamental estimates and introduce two criteria concerning transverse rigidity and their applications. This is joint work with Prof. Shu-Cheng Chang, Fengjiang Li and Hongbing Qiu.

Geometry and topology of gradient shrinking Sasaki-Ricci solitons

Chin-Tung Wu
National Pingtung University

We will talk about the geometry and topology of complete gradient shrinking Sasaki-Ricci solitons. First, they must be connected at infinity. This is a Sasaki analogue of gradient shrinking Kähler-Ricci solitons. Secondly, with the positive sectional curvature, they must be compact. All results are served as a generalization of Perelman in dimension three, of Naber in dimension four, and of Munteanu-Wang in all dimensions, respectively. This is a joint work with Shu-Cheng Chang and Yingbo Han.