Abstract Week 3

Speaker: Charlie Cifarelli

Abstract: I will discuss some joint work with V. Apostolov from the past few years in which we produce a deformation of the Taub-NUT gravitational instanton to a family of so-called steady Kähler-Ricci solitons. We also obtain a version of this result in higher dimensions, which has the surprising consequence of producing generalizations of Taub-NUT (as a Ricci-flat Kähler metric) to Euclidean space of dimension 2n for all $n > 1$.

Speaker: Tristan Ozuch

Abstract: (Joint work with Yiqi Huang) We refine the regularity of noncollapsed limits of Einstein 5-manifolds. In particular, we show uniqueness of tangent cones on the full top stratum, show that the structure of the singular set lies in countable unions of Lipschitz curves and points. We finally prove real-analytic orbifold regularity along curves of singularities, which are also proven to be geodesics, and establish uniqueness of tangent cone at infinity under Euclidean volume growth with a line split. The proofs rely on new 4-dimensional gap/isolation theorems for spherical and hyperbolic Einstein orbifolds.

Speaker: Song Sun and Mingyang Li

Abstract: Gravitational instantons are by definition 4-dimensional complete Ricci-flat metrics with finite curvature energy. Previous studies mainly focused on gravitational instantons with special geometries, known as hyperkahler or conformally Kahler metrics. These special cases have been essentially classified in recent years.

In this series of two talks, we will explain a construction of an infinite family of new gravitational instantons, using axisymmetric harmonic maps from the 3-space into the hyper