

Conformal Kähler geometry and non-vacuum gravitational instantons

mardi 2 avril 2024 11:00 (1 heure)

Gravitational instantons are four-dimensional Riemannian geometries introduced by Hawking for the study of quantum fields on curved backgrounds and Euclidean Quantum Gravity. Their complete classification is a challenging open problem in geometry. After briefly reviewing recent developments in the Ricci-flat case, we will give a framework based on complex geometry that leads to major simplifications in the study of non-Ricci-flat instantons. Applications include generalisations of the Chen-Teo geometry (a recent counterexample to the Euclidean black hole uniqueness conjecture).

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