

Canonical connections and the Lichnerowicz Laplacian

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Abstract

Nonintegrable geometries, such as nearly Kähler or nearly parallel G_2 manifolds, carry a canonical metric connection with torsion. In the compact homogeneous case this connection sometimes coincides with another canonical choice, sometimes called the Ambrose-Singer connection. I explain how this, together with harmonic analysis, helps with sorting out small eigenvalues of the Lichnerowicz Laplacian on some Einstein manifolds. The latter is instrumental in the study of stability and infinitesimal deformability of the Einstein metric at hand. If time permits I will also say a few words on the deformation theory of nearly Kähler, nearly parallel G_2 and Einstein manifold, and on integrability obstructions.