

ATELIER SUR LES EDP GÉOMÉTRIQUES
23-27 AVRIL, 2012

WORKSHOP ON GEOMETRIC PDE
APRIL 23-27, 2012

The moduli space of asymptotically conical G_2 manifolds

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A theorem of Dominic Joyce says that the moduli space of compact G_2 manifolds is smooth of dimension equal to the 3rd Betti number of the manifold. We study the moduli space question for noncompact G_2 manifolds with one end, asymptotic to a metric cone of G_2 holonomy. This includes the explicit Bryant–Salamon manifolds as examples. We prove that this moduli space is smooth and unobstructed when the rate of convergence to the cone at infinity lies within a certain range. The dimension of this moduli space includes a component which is topological and a component which is analytic, arising from the existence of certain solutions to an eigenvalue equation on the link of the asymptotic cone. We also consider the moduli space question for compact G_2 manifolds with isolated conical singularities. In this case there are always analytic obstructions, and we describe these.

This is joint work with Jason Lotay of University College London.

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