Some remarks on contact Calabi-Yau 7-manifolds

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Abstract:

In geometry and physics it has proved useful to relate G2 and Calabi-Yau geometry via circle bundles. Contact Calabi-Yau 7-manifolds are, in the simplest cases, such circle bundles over Calabi-Yau 3-orbifolds. These 7-manifolds provide testing grounds for the study of geometric flows which seek to find torsion-free G2-structures (and thus Ricci flat metrics with exceptional holonomy). They also give useful backgrounds to examine the heterotic G2 system (also known as the G2-Hull-Strominger system), which is a coupled set of PDEs arising from physics that involves the G2-structure and gauge theory on the 7-manifold. I will report on recent progress on both of these directions in the study of contact Calabi-Yau 7-manifolds, which is joint work with H. Sá Earp and J. Saavedra.