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 G_2 structures and the Strominger system in dimension 7

We consider G_2 structures with torsion coupled with G_2 -instantons, on a compact 7-dimensional manifold. The coupling is via an equation for 4-forms which appears in supergravity and generalized geometry, known as the Bianchi identity. The resulting system of partial differential equations can be regarded as an analogue of the Strominger system in 7-dimensions. We initiate the study of the moduli space of solutions and show that it is finite dimensional using elliptic operator theory.