

# Deformation of nearly $G_2$ -instantons

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## **Abstract**

We study the deformation theory of  $G_2$ -instantons on nearly  $G_2$  manifolds. There is a one-to-one correspondence between nearly parallel  $G_2$  structures and real Killing spinors, thus the deformation theory can be formulated in terms of spinors and Dirac operators. We prove that the space of infinitesimal deformations of an instanton is isomorphic to the kernel of an elliptic operator. Using this formulation we prove that abelian instantons are rigid. Then we apply our results to describe the deformation space of the canonical connection on the four normal homogeneous nearly  $G_2$  manifolds.