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# $G_2$-manifolds from Diophantine equations

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I will argue that perturbatively flat vacua of type IIB string theory are dual to M-theory compactifications on $G_2$-manifolds without four-form flux. As a consequence, one can, implicitly, construct enormous numbers of $G_2$-manifolds by solving Diophantine equations in type IIB flux quanta. This duality can be used to compute warping corrections to the Kähler potential and Kähler coordinates on the type IIB side via a purely geometric computation on the M-theory side, and I will argue that such a computation may plausibly be necessary in order to control type IIB flux compactifications stabilized by instantons.

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