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U(1)' coupling constant at low energies from heterotic orbifolds

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Extensions of the Standard Model include frequently an additional U(1) gauge symmetry. Such scenarios are known as Z'or dark photon models and are relevant to address issues such as the meta-stability of the Higgs vacuum, the nature of DM or the muon g-2 anomaly. In the context of $E_8 \times E_8$ heterotic string compactifications, MSSM-like models with extra U(1) can be found, so that Z'models can be realized in the low energy limit. We study such string vacua, obtained from a $\mathbb{Z}_8$ toroidal orbifold compactification, and characterize the Z'coupling at low energies under certain assumptions. We find Z' coupling values around 0.44-0.7 and argue that a sample model may have the required properties to stabilize the Higgs vacuum.

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