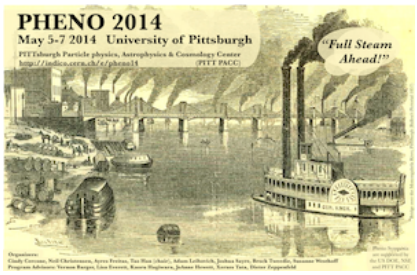

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Mirage Models Confront the LHC: Flux-Stabilized Type IIB String Theory

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We continue the study of a class of string-motivated effective supergravity theories in light of current data from the CERN Large Hadron Collider (LHC). In this installment we consider Type IIB string theory compactified on a Calabi-Yau orientifold in the presence of fluxes, in the manner originally formulated by Kachru, et al. We allow for a variety of potential uplift mechanisms and embeddings of the Standard Model field content into D3 and D7 brane configurations. We find that an uplift sector independent of the Kahler moduli, as is the case with anti-D3 branes, is inconsistent with data unless the matter and Higgs sectors are localized on D7 branes exclusively, or are confined to twisted sectors between D3 and D7 branes. We identify regions of parameter space for all possible D-brane configurations that remain consistent with PLANCK observations on the dark matter relic density and measurements of the CP-even Higgs mass at the LHC. Constraints arising from LHC searches at 8 TeV center-of-mass energies, and the LUX dark matter detection experiment, are discussed. The discovery prospects for the remaining parameter space at dark matter direct detection experiments are described, and signatures for detection of superpartners at the LHC, with center-of-mass energy of 14 TeV, are analyzed.

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