

Phenomenology 2023 Symposium



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Title: Baryogenesis in Mirror Twin Higgs

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Abstract: The Twin Higgs framework is a solution to the hierarchy problem that is compatible with LHC null results for colored top partner searches. The Higgs mass is stabilized via a hidden sector related to the SM by a Z_2 symmetry that is softly broken in the IR to give the hidden Higgs a larger vev f , with $f/v \sim 3-7$ in the natural range. The Minimal Twin Higgs has an unacceptable cosmological history, generating ΔN_{eff} of order a few, which can be ameliorated by including a source of asymmetric reheating to dilute the hidden sector. We investigate baryogenesis within an asymmetrically reheated twin Higgs framework. Hidden Baryons implement a version of the Atomic Dark Matter scenario. The discrete symmetry relates the hidden baryon asymmetry to the SM baryon asymmetry, and we find that astrophysically interesting and not excluded for atomic dark matter fractions $< O(10\%)$ which are naturally generated. This has important theoretical implications for astrophysical and cosmological studies of atomic dark matter, and their possible connection to the hierarchy problem.

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