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Electroweak baryogenesis from a hidden sector

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Electroweak baryogenesis is ruled out (or nearly so) in the MSSM and two Higgs doublet models. We present a new, less constrained realization, where the Higgs sector is extended with a singlet scalar that strengthens the electroweak phase transition, and the CP asymmetry needed for baryogenesis is generated by dark matter interactions with the bubble walls. The CP asymmetry is communicated to the standard model by dark matter interacting with tau leptons and an inert Higgs doublet. This interaction controls the dark matter relic density and the baryon asymmetry. It is constrained by reinterpreting searches for MSSM staus decaying to taus and missing energy, which could be improved with data from Run 2 of the LHC.

Authors: Prof. TUCKER-SMITH, David (Williams College); Prof. CLINE, James (McGill University); Prof. KAINULAINEN, Kimmo (Univ. of Jyvaskyla)

Orateur: Prof. CLINE, James (McGill University)

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