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Baryogenesis and Dark Matter from Dark, 1st Order Phase Transitions

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We present two distinct models which rely on 1st order phase transitions in a dark sector. The first is a minimal model for baryogenesis which employs a new dark SU(2) gauge group with two doublet Higgs bosons, two lepton doublets, and two singlets. The singlets act as a neutrino portal that transfers the generated baryon asymmetry to the Standard Model. The model predicts extra relativistic degrees of freedom, exotic decays of the Higgs and Z bosons, and stochastic gravitational waves detectable by future experiments.

The second model additionally produces (asymmetric) dark matter while the dark sector is expanded to an SU(3)xSU(2)xU(1) gauge group. Dark matter is comprised of dark neutrons or dark protons and pions.This model is highly discoverable at both dark matter direct detection and dark photon search experiments and the strong dark matter self interactions may ameliorate small-scale structure problems.

Summary

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