Contribution ID: **605** Type: **not specified**

Higgs-Coupled Freeze-In Baryogenesis

Tuesday 14 May 2024 16:00 (15 minutes)

Models of freeze-in darkmatter (DM) can incorporate baryogenesis by a straightforward extension to two or more DM particles with different masses. We study a novel realization of freeze-in baryogenesis, in which a new SU(2)-doublet vector-like fermion (VLF) couples feebly to the SM Higgs and multiple fermionic DM mass eigenstates, leading to out-of-equilibrium DM production in the early universe via the decays of the VLF. An asymmetry is first generated in the Higgs and VLF sectors through the coherent production, propagation, and rescattering of the DM. This asymmetry is subsequently converted into a baryon asymmetry by SM processes, and potentially, by additional VLF interactions. We find that the asymmetry in this Higgs-coupled scenario has a different parametric dependence relative to previously considered models of freeze-in baryogenesis. We characterize the viable DM and VLF parameter spaces and find that the VLF is a promising target for current and future collider searches.

Mini Symposia (Invited Talks Only)

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Session Classification: Physics Beyond the Standard Model

Track Classification: Other BSM