

Minimal Dark Matter Freeze-in with Low Reheating Temperatures and Implications for Direct Detection

Monday, 8 July 2024 14:00 (20 minutes)

In this presentation, I will investigate the influence of the reheating temperature of the visible sector on the freeze-in dark matter (DM) benchmark model for direct detection experiments, where DM production is mediated by an ultralight dark photon. I will consider a new regime for this benchmark where the initial temperature of the thermal Standard Model (SM) bath is below the DM mass. The production rate from the SM bath is drastically reduced due to Boltzmann suppression, necessitating a significant increase in the portal coupling between DM and the SM to match the observed relic DM abundance. This enhancement in coupling strength increases the predicted DM-electron scattering cross section, making freeze-in DM more accessible to current direct detection experiments.

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Session Classification: Parallel 2

Track Classification: Parallel session: Cosmology Dark Matter