

Constraints on Inelastic Dark Matter imposed by Capture in White Dwarves and Left-Right gauge symmetry

Tuesday, 23 July 2024 16:35 (25 minutes)

Weakly Interacting Massive Particles (WIMPs) can be captured in compact stars such as white dwarves (WDs). If they are in a Dark Matter (DM)-rich environment, this process can lead to an increase in the star luminosity because of the DM annihilation process. N-body simulations indicate that the core of the Messier 4 globular cluster (where plenty of WDs are observed) is rich of DM. We make this assumption to analyze the Inelastic Dark Matter (IDM) scenario, showing that when the DM mass exceeds a few tens GeV DM mass splittings as large as 40 MeV can be probed. This largely exceeds the sensitivity to the IDM mass splitting from direct detection in terrestrial detectors, which does not exceed 200 keV. We also apply such constraint to the specific DM scenario of self conjugate bi-doublet in the left-right symmetric model, where the standard SU(2) left group with coupling g_L is extended by an additional SU(2) right group with coupling g_R . In such scenario, we show that bounds from WDs significantly reduce the cosmologically viable parameter space, especially requiring $g_R > g_L$.

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Session Classification: Presentations