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Improved white dwarves constraints on inelastic dark matter and Left–Right Symmetric Models

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Weakly Interacting Massive Particles (WIMPs) can be captured in compact stars such as white dwarves (WDs) located in a dark matter(DM)-rich environment, leading to an increase in the star luminosity through their annihilation process. N-body simulations suggest that the core of the M4 globular cluster (where plenty of WDs are observed) is rich of dark matter. Assuming this is the case, I will show that when the WIMP interacts with the nuclear targets within the WD through inelastic scattering, and its mass exceeds a few tens GeV, the data on low-temperature large-mass WDs in M4 can probe values of the inelastic mass splitting as large as 40 MeV, if the recent improvement in the calculation of the WD equation of state is used. Such a value largely exceeds those ensuing from direct detection and from solar neutrino searches. We apply such improved constraint to the specific DM scenario of a self-conjugate bi-doublet in the Left-Right Symmetric Model (LRSM). I will show that bounds from WDs significantly reduce the cosmologically viable parameter space of such scenario.

Secondary category for the parallel session (optional)

Dark Matter Physics

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