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Confronting Dark Matter with Dirac Neutrinos

Tuesday, 13 June 2023 17:50 (20 minutes)

We propose a Dirac neutrino portal dark matter scenario by minimally extending the particle content of the Standard Model (SM) with three right-handed neutrinos, a Dirac fermion dark matter candidate, and a complex scalar, all of which are singlets under the SM gauge group. symmetry Z_4 has been introduced for the stability of dark matter candidates and also to ensure the Dirac nature of light neutrinos at the same time. We studied both thermal and non-thermal dark matter scenarios and the possibility of probing such scenarios through the contribution to the effective relativistic degrees of freedom $\Delta N_{\rm eff}$. We also check the stringent constraints on the free-streaming length of such freeze-in DM from structure formation requirements. Such constraints can rule out DM mass all the way up to $\mathcal{O}$(100 keV).

Secondary category for the parallel session (optional)

Astroparticle Physics

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