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Observable N_{eff} with Dark Matter in Dirac Scotogenic Model

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We study the possibility of generating light Dirac neutrino mass from a radiative seesaw mechanism with dark sector particles going inside the loop, known as the scotogenic framework. The loop suppression and additional free parameters allow large ($\sim \mathcal{O}(1)$) coupling of light Dirac neutrinos with the dark sector particles. Such large Yukawa coupling not only dictates the relic abundance of heavy fermion singlet dark matter but also can lead to thermalization of the right chiral part of Dirac neutrinos, generating additional relativistic degrees of freedom N_{eff}. We find that the parameter space consistent with dark matter phenomenology can also be probed at future cosmic microwave background experiments like CMB-S4 via precision measurements of N_{eff}. The same parameter space can also have other interesting and complementary observational prospects at colliders, charged lepton flavour violation.

Session

Astroparticle Physics and Cosmology

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