



Light Dirac neutrino portal dark matter with observable ΔN_{eff}

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Abstract

We propose a Dirac neutrino portal dark matter scenario by minimally extending the particle content of the Standard Model with three right-handed neutrinos (ν_R), a Dirac fermion dark matter candidate (ψ) and a complex scalar (ϕ), all of which are singlets under the SM gauge group. An additional \mathbb{Z}_4 symmetry has been introduced for the stability of dark matter candidate ψ and also ensuring the Dirac nature of light neutrinos at the same time. In this scenario, we can have thermal or non-thermal dark matter depending upon couplings involving these particles. Most importantly, one can easily correlate the cosmological evolution of dark matter with the dynamics of right-handed neutrinos. This leads to a strong constraint on dark matter parameter space from the measurement of the effective number of relativistic degrees of freedom (N_{eff}) by Planck. The next generation experiments like CMB-S4, SPT-3G etc. will have the required sensitivities to probe a major portion of the entire model parameter space, offering a promising way of probing such light dark matter, where the traditional direct detection experiments are still not sensitive enough.

Venue

PAMU Seminar Hall
A.N. Kolmogorov Building,
ISI, Kolkata

Date & Time

4th January, 2023
03:00 PM



Everyone is invited to attend

Head, PAMU