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A few eV sterile neutrino as partial dark matter

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Recent short baseline experiments (MiniBooNE and LSND) as well as reactor experiments (Daya bay and T2K) might be hinting for an extra eV scale light sterile neutrino state. But these results are in tension with the recent Planck data as it does not allow an extra thermalized neutrino. To alleviate this conflict, we propose a scenario where the light sterile neutrino is in thermal equilibrium with a hidden sector which has a temperature lower than CNB temperature. We have studied analytically the effects of this sterile neutrino on CMB temperature power spectrum and matter power spectrum. We have modified \texttt{CAMB} accordingly and we are running an MCMC analysis to see the whether this scenario can make a friendship between the Planck data and the short baseline experiments. We show that , to be consistent with all data, this light neutrino can only serve a tiny fraction of DM.

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