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Leptogenesis and eV sterile

We consider the minimal extended seesaw model which can accommodate an eV scale sterile neutrino. The scenario also includes three heavy right handed neutrinos in addition to the light sterile neutrino. In this model, the active-sterile mixing act as non-unitary parameters. If the values of these mixing angles are of $O(0.1)$, the model introduces deviation of the PMNS matrix from unitarity to this order. We find that the oscillation data from various experiments imposes an upper bound on the lightest heavy neutrino mass scale as $\sim 10^{11}$ GeV in the context of this model. We study vanilla leptogenesis in this scheme, where the decay of the heavy right handed neutrinos in the early universe can give rise to the observed baryon asymmetry. Here, even though the eV scale sterile neutrino does not participate directly in leptogenesis, its effect is manifested through the non-unitary effects. We find that the parameter space that can give rise to successful leptogenesis is constrained by the bounds on the active-sterile mixing as obtained from the global analysis.

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