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Leptogenesis in a Left-Right Symmetric Model with double seesaw

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We explore the connection between low-scale CP-violating Dirac phase (δ) and high-scale leptogenesis in a Left-Right Symmetric Model (LRSM) with scalar bidoublet and doublets. The fermion sector of the model is extended with one sterile neutrino (S_L) per generation to implement a double seesaw mechanism in the neutral fermion mass matrix. The double seesaw is performed via the implementation of the type-I seesaw twice. The first seesaw facilitates the generation of Majorana mass term for heavy right-handed (RH) neutrinos (N_R), and the light neutrino mass becomes linearly dependent on S_L mass in the second. In our framework, we have taken charge conjugation (C) as the discrete left-right (LR) symmetry. This choice assists in deriving the Dirac neutrino mass matrix (M_D) in terms of the light and heavy RH neutrino masses and light neutrino mixing matrix U_{PMNS} (containing δ). We illustrate the viability of unflavored thermal leptogenesis via the decay of RH neutrinos by using the obtained M_D with the masses of RH neutrinos as input parameters. A complete analysis of the Boltzmann equations describing the asymmetry evolution is performed in the unflavored regime, and it is shown that with or without Majorana phases, the CP-violating Dirac phase is sufficient to produce the required asymmetry in the leptonic sector within this framework for a given choice of input parameters. Finally, we comment on the possibility of constraining our model with the current and near-future oscillation experiments, which are aimed at refining the value of δ.

Poster prize

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