

Five-zero texture in neutrino-dark matter model within the framework of minimal extended seesaw

We study a model of neutrino and dark matter within the framework of a minimal extended seesaw (MES). This model is based on A_4 flavour symmetry along with the discrete $Z_3 \times Z_4$ symmetry to stabilize the dark matter and construct desired mass matrices for neutrino mass. Five-zero textures are imposed in the final 4×4 active-sterile mass matrix, which significantly reduces the free parameter in the model. Three right-handed neutrinos were considered, two of them have degenerate masses, which help us to achieve baryogenesis via resonant leptogenesis. A singlet fermion (sterile neutrino) with mass $\sim \mathcal{O}(\text{eV})$ is also considered, and we can put bounds on active-sterile mixing parameters via neutrino oscillation data. Resonant enhancement of lepton asymmetry is studied at the TeV scale, where we discuss a few aspects of baryogenesis considering the flavour effects. The possibility of improvement in effective mass from neutrinoless double beta decay ($0\nu\beta\beta$) in the presence of a single generation of sterile neutrino flavour is also studied within the fermion sector. In the scalar sector, the imaginary component of the complex singlet scalar (χ) behaves as a potential dark matter candidate and simultaneously the real part of the complex scalar is associated with the fermion sector for sterile mass generation. This complex singlet scalar behaves as a bridge connecting the dark sector with the visible sector.

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