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A modular S_4 inverse seesaw model with a keV dark matter candidate

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We present a simple model on neutrino masses and mixings based on S_4 modular symmetry. Two right-handed neutrinos and three fermion singlets are introduced to account for the light neutrino masses through inverse seesaw and to provide an intermediate scale sterile neutrino as a dark matter candidate. The model has a viable parameter space given the latest constraints on lepton mixing matrix and squared-mass differences ratios. The viable parameters also lead to a sterile neutrino with mass in $[0.03, 45]$ keV and mixing to active neutrinos as $\sin^2 2\theta \in [10^{-8}, 10^{-14}]$, which is subject to X-ray search and Lyman- α constraints. We find that the sterile neutrino can still serve as a viable dark matter candidate. Besides, the model can be falsified with future neutrino experiments.

Collaboration name

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