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Analysis of the Scalar sector and prospect of a scalar dark matter candidate in the Electroweak Scale Right handed neutrino-model

Motivated by the no-show of New Physics signals coming from BSM searches in the post-Higgs era of the LHC, we study the scalar sector of the original electroweak-scale right-handed neutrino model, which includes Majorana masses and new mirror fermions having masses in the EW scale. This scenario successfully connects the see-saw mechanism, strong CP and DM problem and contains distinguished Long-lived particle (LLP) signals with large displaced vertices (mm-cm) in quark and lepton sectors. In this work, we analyze the complete scalar sector spectrum which includes heavier triplets, doublets and singlet higgs states in conjunction with the specific 125-GeV scalar state. We also specifically investigate the prospect of the light singlet scalar fulfilling the role of the DM candidate in this framework.

Mini-abstract

Light singlet Scalar Dark Matter prospect in the electroweak scale right handed neutrino model

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