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$0\nu\beta\beta$ in left-right theories with Higgs doublets and gauge coupling unification

We consider a version of Left-Right Symmetric Model in which the scalar sector consists of a Higgs bidoublet (Φ) with $B-L=0$, Higgs doublets ($H_{L,R}$) with $B-L=1$ and a charged scalar (δ^+) with $B-L=2$ leading to radiatively generated Majorana masses for neutrinos and thereby, leads to new physics contributions to neutrinoless double beta decay ($0\nu\beta\beta$). We show that such a novel framework can be embedded in a non-SUSY $SO(10)$ GUT leading to successful gauge coupling unification at around 10^{16}GeV with the scale of left-right symmetry breaking around 10^{10}GeV . The model can also be extended to have left-right symmetry breaking at TeV scale, enabling detection of W_R, Z_R bosons in LHC and future collider searches. In the context of neutrinoless double beta decay, this model can saturate the present bound from GERDA and KamLAND-Zen experiments. Also, we briefly explain how keV-MeV range RH neutrino arising from our model can saturate various astrophysical and cosmological constraints and can be considered as warm Dark Matter (DM) candidate to address various cosmological issues. We also discuss on left-right theories with Higgs doublets without having scalar bidoublet leading to fermion masses and mixings by inclusion of vector like fermions.

Summary

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