

Chayan Majumdar: Exploring Alternative Left-Right Model: Neutrinoless double beta decay and Leptogenesis

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Left-Right (LR) theories are one of the successful beyond Standard Model scenarios to provide a unified explanation to the origin of small neutrino masses and low-energy parity violation. However, conventional LR theory faces stringent constraints due to Flavor Changing Neutral Currents (FCNCs). We have explored an Alternative LR model (ALRM) that avoids FCNC constraints and introduces new physics signatures in decay and leptogenesis. We have shown that the new type of vector-scalar diagram contributes significantly in Neutrinoless Double Beta decay (NDBD). When the relevant charged Higgs boson has mass around 200 GeV, the half-life of decaying nucleus is approximately 10^{26} years for both Ge-76 and Xe-136, which falls well within the anticipated sensitivity of future NDBD experiments. Moreover, this model has the potential to explain the correct baryogenesis, even in the presence of small Dirac CP phase in right-handed neutrino sector and without requiring any more fine-tuning, by invoking the resonant leptogenesis.