

A Comparative Study of $0\nu\beta\beta$ in Symmetric and Asymmetric Left-right Model

(Nucl. Phys. B954, 115000 (2020) [arxiv : 2001.9488])

Supriya Senapati

Theoretical High energy Physics Division
Indian Institute of Technology Bombay

July 29, 2020

Aim of the Work

- ▶ New physics contributions to neutrinoless double beta decay ($0\nu\beta\beta$) in a TeV scale LR model with spontaneous D-parity breaking.
- ▶ Comparative study for three different cases:
 - ▶ (i) for manifest symmetric left-right symmetric model ($g_L = g_R$),
 - ▶ (ii) for LR model with spontaneous D parity breaking ($g_L \neq g_R$),
 - ▶ (iii) for Pati-Salam symmetry with D parity breaking ($g_L \neq g_R$).

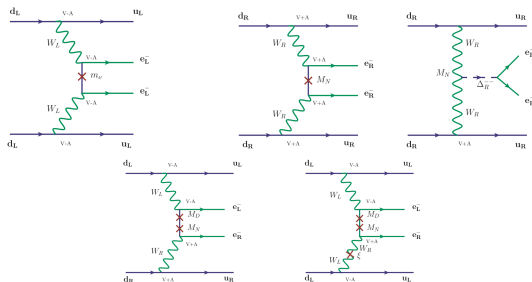


Figure: Relevant Feynman diagrams contributing to $0\nu\beta\beta$ process within the framework of left-right symmetric models.

Dependence of various parameters on $\delta \equiv \frac{g_R}{g_L}$

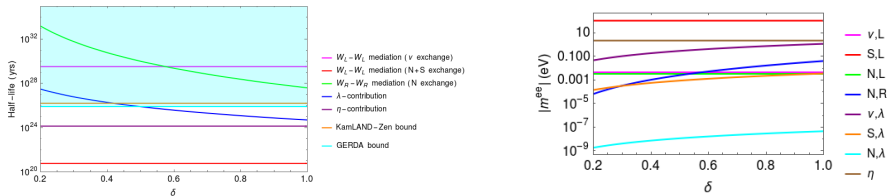


Figure: Left Panel : Dependence of half-life due to individual contribution on the ratio δ . Right Panel : Dependence of effective mass parameters arising due to individual contribution on δ .

- ▶ **Cyan shaded region** in left figure corresponds to allowed region for half-life permitted by GERDA experiment which is clearly saturating by various individual contributions within this framework.
- ▶ We have considered (from unification plots) $\delta = 1, 0.93, 0.62$ for **symmetric LRSM**, asymmetric LRSM **without** and **with** Pati-Salam symmetry respectively.

Dependence of various parameters on M_{WR} (for different δ 's)

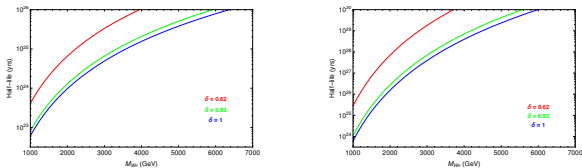


Figure: In the left panel the dependency of half-life due to λ -contribution and in the right panel the same due to RH neutrino exchange on M_{WR} are shown.

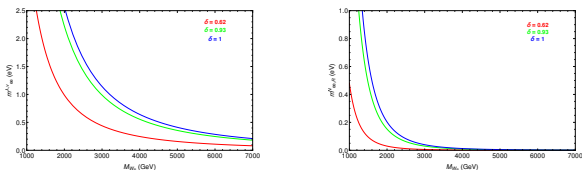


Figure: Left : Plots for effective mass parameter due to λ -diagram vs M_{WR} . Right : Plots for effective mass parameter due to RH neutrino exchange vs M_{WR} .

Thank You.