

Muon g-2 anomaly in $U(1)_{L_\mu - L_\tau}$ extension of left-right symmetric model

(accepted in JHEP)

arXiv: 2004.14259

Dr Prativa Pritimita

Department of Physics,
Indian Institute of Technology Bombay.

ICHEP-2020

31st July, 2020

Neutrino mass, mixing and muon ($g - 2$) anomaly in a single framework

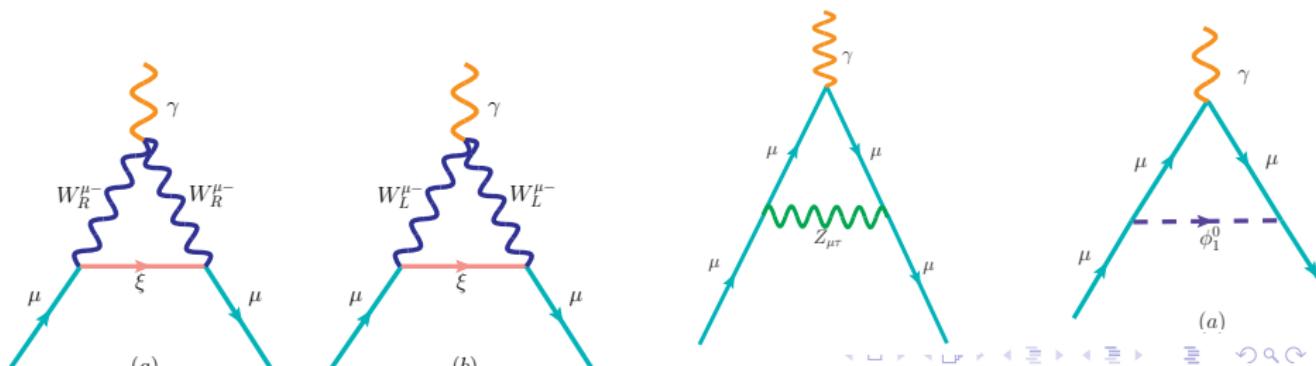
$$\mathbb{G}_{\text{LR}}^{\mu\tau} \equiv SU(2)_L \times SU(2)_R \times U(1)_{B-L} \times SU(3)_C \times U(1)_{L_\mu - L_\tau}$$

- Particle content: usual fermions, scalars of a manifest LRSM + 3 extra sterile fermions + 1 extra scalar,
- extra sterile fermions → help in inverse seesaw,
- extra scalar → breaks $U(1)_{L_\mu - L_\tau}$ symmetry,
- extra gauge bosons → $W_R^\pm, Z_R, Z_{\mu\tau}$
- $m(Z_{\mu\tau}) \sim 150 \text{ MeV} \rightarrow$ light enough to explain muon ($g - 2$) anomaly,
- $g_{\mu\tau} = 8 \times 10^{-4} \rightarrow$ satisfies the bounds from neutrino trident production expts,
- Neutrino mass → inverse seesaw mechanism → large light-heavy neutrino mixing → W_L 's interaction with heavy RH neutrino → dominant contribution to Δa_μ .

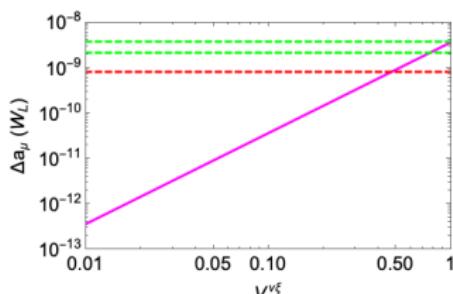
New contributions to Δa_μ in LRSM with inverse seesaw mechanism

In our model, new contributions to muon ($g - 2$) anomaly arise from the interactions of;

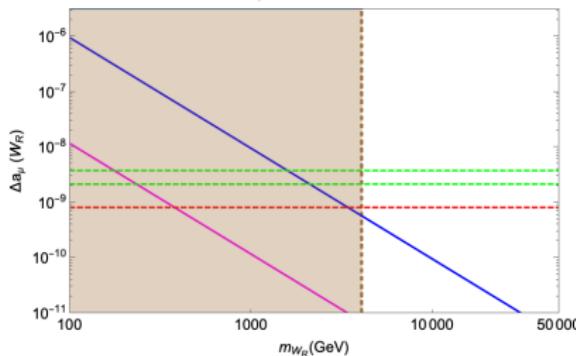
- singly charged gauge bosons with heavy neutral fermions,
- neutral vector boson with singly charged fermions,
- singly charged scalars with neutral fermion,
- neutral scalars with muons,
- extra light new gauge boson $Z_{\mu\tau}$ with muons.



Individual contributions of different particles to Δa_μ



— Dependence on light-heavy neutrino mixing
— Δa_μ Current
— 1σ Bound Current



— $g_v=0, |g_a|=0.22$
— $|g_v|=0.22, |g_a|=0.22$
— Δa_μ Current
— 1σ Bound Current

