The 19th International Workshop on Neutrinos from Accelerators (NUFACT2017)



Contribution ID: 49

Type: talk

Higgs mediated CLFV processes $\mu N(eN) \rightarrow \tau X$ via gluon operators

Tuesday, 26 September 2017 11:22 (23 minutes)

We revisit charged lepton flavor violating (CLFV) scattering processes $\ell_i N \to \tau X$ ($\ell_i \ni e, \mu$) mediated by Higgs. We point out that a new subprocess $\ell_i g \to \tau g$ via the effective interactions of Higgs and gluon gives the dominant contribution to $\ell_i N \to \tau X$ for an incident beam energy of $E_{\ell} < 1$ TeV in fixed target experiments. Furthermore, in the light of quark number conservation, we consider quark pair-production processes $\ell_i g \to \tau q \bar{q}$ (q denotes quarks) instead of $\ell_i q \to \tau q$. This corrects the threshold energy of each subprocess contributing to $\sigma(\ell_i N \to \tau X)$. Reevaluation of $\sigma(\ell_i N \to \tau X)$ including all of relevant subprocesses shows that the search for $\ell_i N \to \tau X$ could serve a complementary opportunity with other relevant processes to shed light on the Higgs CLFV.

Reference: arXiv:1705.01059 [hep-ph]

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Session Classification: WG4: Muon physics

Track Classification: Working Group 4: Muon Physics