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

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We revisit charged lepton flavor violating (CLFV) scattering processes $\ell_i N \rightarrow \tau X$ ($\ell_i \ni e, \mu$) mediated by Higgs. We point out that a new subprocess $\ell_i g \rightarrow \tau g$ via the effective interactions of Higgs and gluon gives the dominant contribution to $\ell_i N \rightarrow \tau X$ 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 $\ell_i g \rightarrow \tau q \bar{q}$ (q denotes quarks) instead of $\ell_i q \rightarrow \tau q$. This corrects the threshold energy of each subprocess contributing to $\sigma(\ell_i N \rightarrow \tau X)$. Reevaluation of $\sigma(\ell_i N \rightarrow \tau X)$ including all of relevant subprocesses shows that the search for $\ell_i N \rightarrow \tau X$ could serve a complementary opportunity with other relevant processes to shed light on the Higgs CLFV.

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