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Minimal lepton flavor violating realizations of minimal seesaw models

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We study the implications of the global $U(1)_R$ symmetry present in
minimal lepton flavor violating implementations of the seesaw mechanism for neutrino masses. In the context of minimal type I seesaw scenarios with a slightly broken $U(1)_R$, we show that, depending on the R-charge assignments, two classes of generic models can be identified. Models where the right-handed neutrino masses and the lepton number breaking scale are decoupled, and models where the parameters that slightly break the $U(1)_R$ induce a suppression in the light neutrino mass matrix. We show that within the first class of models, contributions of right-handed neutrinos to charged lepton flavor violating processes are severely suppressed. Within the second
class of models we study the charged lepton flavor violating
phenomenology in detail, focusing on $\mu \to e\gamma$, $\mu \to 3e$ and $\mu - e$ conversion in nuclei. We show that sizable contributions to these processes are naturally obtained for right-handed neutrino masses at the TeV scale.

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