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Minimal three-loop neutrino mass models and charged lepton flavor violation

We study charged lepton flavor violation for the three most popular minimal three-loop Majorana neutrino mass models. We call these models “minimal” since their particle content correspond to the minimal particle contents for which genuine three-loop models can be constructed. In all the three minimal models the neutrino mass matrix is proportional to some powers of standard model lepton masses, providing additional suppression factors on top of the expected loop suppression. To correctly explain neutrino masses, large Yukawa couplings are needed in these models. We calculate charged lepton flavor violating observables and find that the three minimal models survive the current constraints only in very small regions of their parameter spaces. Only particular choices of the Dirac and Majorana phases survive the current constraints for a narrow range of the lightest neutrino mass.

Mini-abstract

Severely constraining the parameter space of minimal three-loop Majorana neutrino mass models

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