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Heavy Sterile Neutrino Decay at Short-Baseline Experiments

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We studied a neutrino decay scenario as a potential solution to conciliate the tension between appearance and disappearance data at the short-baseline experiments. Particularly, we considered a heavy neutrino mass-eigenstate that decays into a usual light neutrino plus a massless scalar. Under this neutrino decay hypothesis, we fitted LSND and MiniBooNE electron neutrino appearance data assuming Dirac or Majorana neutrinos. We obtained reasonable results for both cases. Including muon neutrino disappearance searches, and also current bounds on the new decay coupling constant, we noticed that the heavy neutrino decay scenario is compatible as long as $1 \text{ MeV} \leq m_4 \leq 10 \text{ keV}$. Finally, we showed that the future SBN program at Fermilab has the potential to definitively test the considered decay hypothesis.

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