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Neutrino Mass Implications for Muon Decay Parameters JENNIFER KILE, REBECCA ERWIN, MICHAEL RAMSEY-MUSOLF, PENG WANG, California Institute of Technology — We use the scale of neutrino mass to derive model-independent naturalness constraints on possible contributions to muon decay parameters from new physics above the electroweak symmetry-breaking scale. Focusing on Dirac neutrinos, we obtain a complete basis of dimension four and dimension six operators that are invariant under the gauge symmetry of the Standard Model and that contribute to both muon decay and neutrino mass. We show that–in the absence of fine-tuning–the most stringent bounds on chirality-changing operators relevant to muon decay arise from one-loop contributions to neutrino mass and obtain bounds on the operator coefficients that are approximately 100 times stronger than bounds previously obtained in the literature. We arrive at bounds on the corresponding contributions to the Michel parameters that are six or more orders of magnitude below present experimental limits.

Jennifer Kile
California Institute of Technology

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