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Searching for Traces of Planck-Scale Physics with High Energy Neutrinos FLOYD STECKER, NASA Goddard Space Flight Center, SEAN SCULLY, James Madison University, STEFANO LIBERATI, SISSA, DAVID MATTINGLY, University of New Hampshire — High energy cosmic neutrinos provide a sensitive test of Lorentz invariance violation (LIV) as may be a consequence of quantum gravity theories. We consider the effects of LIV on the propagation of high energy neutrinos over cosmological distances using a class of non-renormalizable, Lorentz violating operators in an effective field theory description of LIV. We assume a generic scenario for the redshift distribution of extragalactic neutrino sources and employ Monte Carlo techniques to follow superluminal neutrino propagation. We include kinematically allowed energy losses of superluminal neutrinos caused by both vacuum pair emission (VPE) and neutrino splitting. We compare the spectra that we derive with that obtained by *IceCube* in order to determine the implications of our results regarding Planck-scale physics. We find that if the drop off in the neutrino flux above ~ 2 PeV is caused by LIV a potentially significant pileup effect would be produced just below the drop-off energy in the case of CPT-even operator dominance. However, a clear drop off effect would *not* be observed if the CPT-odd, CPT-violating term dominates.

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