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A Global three-parameter model for neutrino oscillations using Lorentz violation TEPPEI KATORI, ALAN KOSTELECKY, REX TAYLOE, Indiana University — The neutrino oscillation experiment is a natural interferometer. It is sensitive to small spacetime properties without using the photon (QED) but the sensitivity is comparable with precision optical measurements ($< 10^{-19} GeV$). So neutrino oscillations may be seeing small spacetime effects, such as Lorentz violation. Lorentz and CPT violation are predicted phenomena from Planck scale physics and are actively studied, mainly under the Standard-Model Extension (SME) formalism, the Standard Model with Particle Lorentz Violation. We have developed a model of neutrino oscillations that has only three degrees of freedom and is consistent with existing data under the renormalizable sector of SME, and it offers an alternative to the standard 3-neutrino massive model. All classes of neutrino data are described, including solar, reactor, atmospheric, and LSND oscillations. The disappearance of solar neutrinos is obtained without matter-enhanced oscillations (MSW effect). Quantitative predictions are offered for the ongoing MiniBooNE experiment and for the future experiments OscSNS, NOvA, and T2K.

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