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Plugging holes in constraints on linearly Planck suppressed Lorentz violation DAVID MATTINGLY, Univeristy of California-Davis, TED JACOBSON, University of Maryland, STEFANO LIBERATI, SISSA — Over the past few years much work has gone into constraining the possibility that, due to quantum gravity effects, Lorentz invariance may not be an exact symmetry of nature. A number of astrophysical phenomena, such as polarization of light from distant sources, high energy gamma rays, and the spectrum of the Crab nebula have been used to put stringent limits on Lorentz violation in particle dispersion relations that is suppressed by a single power of the Planck scale. However, despite these attempts there have been some holes in the various constraints, mainly due to the fact that this type of Lorentz violation is CPT violating. In this talk we discuss the existing holes and show that consideration of particular helicity states for threshold reactions significantly strengthens some constraints, thereby plugging these holes. We conclude that the entire parameter space of linearly suppressed Lorentz violation is bounded at a least an order of magnitude below one.

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