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Reconciling a quantum gravity minimal length with lack of photon dispersion DOUGLAS SINGLETON, MICHAEL BISHOP, JOEY CONTRERAS, JAEYEONG LEE, California State University, Fresno — Generic arguments lead to the idea that quantum gravity has a minimal length scale. A possible observational signal of such a minimal length scale is that photons should exhibit dispersion. In 2009, the observation of a short gamma ray burst seemed to push the minimal length scale to distances smaller than the Planck length. This poses a challenge for such minimal distance models. Here we propose a modification of the position and momentum operators, \hat{x} and \hat{p} , which lead to a minimal length scale, but preserve the photon energy-momentum relationship $E = pc$. In this way there is no dispersion of photons with different energies. Additionally, this can be accomplished without modifying the commutation relationship $[\hat{x}, \hat{p}] = i\hbar$.

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