Abstract Submitted
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Graviton Corrections to Maxwell's Equations[1] KATIE LEONARD, RICHARD WOODARD, University of Florida, Department of Physics — We use dimensional regularization to compute the one loop quantum gravitational contribution to the vacuum polarization on flat space background. Adding the appropriate BPHZ counterterm gives a fully renormalized result which we employ to quantum correct Maxwell's equations. These equations are solved to show that dynamical photons are unchanged, provided the free state wave functional is appropriately corrected. The response to the instantaneous appearance of a point dipole reveals a perturbative version of the long-conjectured, "smearing of the light-cone." There is no change in the far radiation field produced by an alternating dipole. However, the correction to the static electric field of a point charge shows strengthening at short distances, in contrast to expectations based on the renormalization group. We check for gauge dependence by working out the vacuum polarization in a general 3-parameter family of covariant gauges.

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