

Abstract Submitted
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Random Electrodynamics, the Harmonic Oscillator and Electron Diffraction¹ CHENG-WEI HUANG, University of Nebraska-Lincoln, JAMES STROHABER, Academia Sinica Taiwan, HERMAN BATELAAN, University of Nebraska-Lincoln — In the Kapitza-Dirac effect the mechanism by which the electron exchanges momentum with the light grating is stimulated Compton scattering. However, it is unknown by which mechanism electrons exchange momentum when diffracting from a material grating.¹ We are studying mechanism by which momentum could be exchanged. One such mechanism is based on vacuum field interactions. A full QED calculation has never been performed for either the KD-effect or diffraction from a material grating, and is considered very hard to do. Therefore, we use the semi-classical theory of Random Electrodynamics (RED). To test our capability to describe the vacuum field appropriately with RED, we apply it to the ground state of the harmonic oscillator. We find a Gaussian probability distribution that satisfies the Heisenberg uncertainty principle. Progress towards applying RED to excited states and diffraction from gratings will be reported. 1. H. Batelaan. Rev. Mod. Phys. 79, 929 (2007)

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