Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Compton Scattering with a Vortex Light Beam**[1] MAZEN NAIRAT, Physics Department, New Mexico State University, DAVID VOELZ, Klipsch School of Electrical and Computer Engineering, New Mexico State University — The Compton effect is applied to a vortex light beam. A photon in a vortex beam possesses spin angular momentum associated with the polarization and orbital angular momentum that consists of two orthogonal components: azimuthal and axial. The azimuthal part is directly proportional to the axial part. This study considers inelastic collision of a photon possessing angular momentum with a free electron. The conservation of angular momentum as well as total energy is applied to the photon-electron system to generalize the Compton scattering model. We describe the momentum exchange and characterize the Compton effect beyond the well-known photon wavelength shift to include other parameters such as the radius of gyration. Our analysis suggests that upon an exchange of angular momentum with an electron, it is possible for the scattered photon to have no wavelength to shift.

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Date submitted: 16 Nov 2013 Electronic form version 1.4