

Abstract Submitted
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Scattering of Light by Electron Wave Packets: Size Doesn't Matter JOHN CORSON, Brigham Young University, SCOTT GLASGOW, SEBASTIAN ACOSTA, MICHAEL WARE, JUSTIN PEATROSS — In support of a current experiment, we investigate light scattering by individual free electrons in an intense laser focus using full second quantization. This addresses the question of whether emission from a large electron packet will be suppressed owing to interference between different parts of the packet. Textbook treatments of Compton scattering generally use exact momentum states, but packets necessarily superpose many momentum states with the possibility of quantum interference (see J. Peatross, C. Muller, K. Hatsagortsyan, and C. H. Keitel, *Phys. Rev. Lett.* **100**, 153601, 2008). We investigate the details of this interference for both single- photon and coherent-state scattering. Kinematic constraints eliminate interference in the case of unidirectional stimulation, whether the scattering is single- or multi-photon in nature. To all orders of perturbation theory, the scattering exhibits no dependence on the relative phases of constituent momenta, and thus no dependence on wave packet size.

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