

GEC15-2015-000392

Abstract for an Invited Paper  
for the GEC15 Meeting of  
the American Physical Society

### **Effects of polarization direction on laser-assisted free-free scattering<sup>1</sup>**

BRUNO DEHARAK, Illinois Wesleyan Univ

This work will detail the effects of laser polarization direction (relative to the momentum transfer direction) on laser-assisted free-free scattering. Experimental results will be presented for electron-helium scattering in the presence of an Nd:YAG laser field ( $h\nu = 1.17$  eV) where the polarization direction was varied both in, and out of, the scattering plane. To date, all of our experimental results are well described by the Kroll-Watson<sup>2</sup> approximation (KWA). The good agreement between our experiments and calculations using the KWA includes the case where the polarization is perpendicular to the momentum transfer direction, for which the KWA predicts vanishing cross section; other workers have found that the KWA tends to be inaccurate for cases where it predicts small cross sections.<sup>3</sup> We also present simulations of the effects that multiple scattering might have on experimental measurements.

<sup>1</sup>This work was supported by the United States National Science Foundation under grant number PHY-1402899.

<sup>2</sup>N. M. Kroll and K. M. Watson, Phys. Rev. A 8, 804 (1973)

<sup>3</sup>e.g., M. O. Musa, A. MacDonald, L. Tidswell, J. Holmes, and B. Wallbank, J. Phys. B, 43 (17):175201, 2010