

Abstract Submitted  
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**Out-of-plane  $(e, 2e)$  angular distributions and energy spectra of He autoionizing states**<sup>1</sup> B.A. DEHARAK, University of Kentucky, K. BARTSCHAT, Drake University, N.L.S. MARTIN, University of Kentucky — Out-of-plane  $(e, 2e)$  measurements and calculations are reported for the helium autoionizing levels  $(2s^2)^1S$ ,  $(2p^2)^1D$ ,  $(2s2p)^1P$ , and for direct ionization.<sup>2</sup> While the recoil peak almost vanishes in the angular distribution for direct ionization, it remains significant for the autoionizing levels and exhibits a characteristic shape for each orbital angular momentum  $L = 0, 1, 2$ . These findings can qualitatively be explained by an  $L$ -dependent addition to the ionization amplitude, but only a second-order model in the projectile–target interaction can quantitatively reproduce the observed magnitudes of the recoil peaks. We present the data as both angular distributions and energy spectra for the resonances.

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<sup>2</sup>B.A. deHarak, K. Bartschat, and N.L.S. Martin, *Phys. Rev. Lett.*, In press

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