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Deep minima in the Coulomb-Born triply differential cross section for electron and positron ionization of hydrogen and helium[1] C. M. DEMARS, S. J. WARD, J. B. KENT, Univ of North Texas — Previous measurements [1] of a deep minimum in the triply differential cross section (TDCS) for electron-impact ionization of helium at 64.6 eV have been connected by Macek *et al.* [2] to a vortex in the velocity field associated with the ionization amplitude. In the experiment, a gun angle of 67.5and energies of 54.6 eV, 64.6 eV and 74.6 eV were considered; the deepest minimum occurred at 64.6 eV [1]. Theoretical calculations have been compared to the experimental results, for instance the time-dependent close coupling and the 3DW calculations [3]. We applied the Coulomb-Born (CB1) approximation to the experimental geometries and obtained minima in the TDCSs [4]. However, we had to vary the gun angles used in the experiment to obtain deep minima that correspond to zeros in the CB1 transition matrix element. We applied the CB1 from 44.6 eV to 79.6 eV (in 5 eV steps) and determined the gun and polar angles to obtain deep minima in the TDCSs. Corresponding to each zero in the CB1 transition matrix element there is a vortex in the velocity field associated with this element. Using the CB1 method we also obtained a deep minimum in the TDCS for electron-impact ionization of hydrogen as well as for positron-impact ionization of hydrogen and helium. All calculations were done in a double symmetric geometry [1].

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