Deep minimum in the Coulomb-Born TDCS for e⁻-H, e⁻-He and e⁺-He ionization

C. M. DEMARS, University of North Texas, J. B. KENT, University of North Texas, Southern Methodist University, S. J. WARD, University of North Texas — A deep minimum in the experimental measurements [1] of the triply differential cross section (TDCS) for electron-helium ionization has been attributed to a vortex in the velocity field that is associated with the ionization amplitude [2]. The deep minimum has been theoretically obtained using the time-dependent close-coupling and distorted-wave methods [3]. We have shown that the Coulomb-Born approximation is able to obtain the deep minimum in the TDCS for electron-helium ionization. Furthermore, we have shown that within this approximation a deep minimum is present for electron-hydrogen ionization and for positron-helium ionization. These minima are due to vortices in velocity field that is associated with the transition matrix element. Previously, vortices have been shown to exist for positron-hydrogen ionization [4].


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