Abstract Submitted
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A vortex line for K-shell ionization of a carbon atom by electron impact[1] S.J. WARD, University of North Texas, J.H. MACEK, University of Tennessee — We obtained using the Coulomb-Born approximation [1] a deep minimum in the TDCS for K-shell ionization of a carbon atom by electron impact for the electron ejected in the scattering plane [2]. The minimum is obtained for the kinematics of the energy of incident electron $E_i = 1801.2$ eV, the scattering angle $\theta_f = 4^\circ$, the energy of the ejected electron $E_{\mathbf{k}} = 5.5$ eV, and the angle for the ejected electron $\theta_k = 239^\circ$. This minimum is due to a vortex in the velocity field. At the position of the vortex, the nodal lines of Re[T] and Im[T] intersect. We decomposed the CB1 T-matrix into its multipole components [1] for the kinematics of a vortex, taking the z'-axis parallel to the direction of the momentum transfer vector. The $m = \pm 1$ dipole components are necessary to obtain a vortex. We also considered the electron to be ejected out of the scattering plane and obtained the positions of the vortex for different values of the y-component of momentum of the ejected electron, k_y. We constructed the vortex line for the kinematics of $E_i = 1801.2$ eV and $\theta_f = 4^\circ$.

[1] J. Botero and J. H. Macek, Phys. Rev. A **45**, 154 (1992).
[2] S. J. Ward and J. H. Macek, submitted to Phys. Rev. A.

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S.J. Ward
University of North Texas

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