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Electron Vortex Beam Ionization[1] ALLISON HARRIS, ALEX PLUMADORE, ZORYANA SMOZHANYK, VICTOR TURPIN, Illinois State Univ
— Electron vortex beams (EVBs) carrying non-zero orbital angular momentum have only been experimentally realized in the last decade. Many unique applications and uses have been proposed, such as the control and rotation of nanoparticles and improved resolution in electron microscopy. Unfortunately, very little is known about how EVBs interact with individual atoms, and there are no experimental results yet for collisions between EVBs and atoms. There is also very little theoretical work on this topic, with only a handful of studies to date for EVB collisions with hydrogen atoms. If EVBs are to be used for any of the proposed applications, it is crucial to understand how electrons with non-zero angular momentum interact with atoms on a fundamental level. We present here the first theoretical calculations for ionization collisions between electron vortex beams and simple atoms.

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