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Visualizing the influence of Coulomb force on electron wavepackets in a strong laser field PREDRAG RANITOVIC, Colorado University - JILA, S. WITTE, University of Colorado - JILA, D. HICKSTEIN, C. DING, P. ARPIN, Colorado University - JILA, M. VRAKKING, Y. HUISMANS, AMOLF, N. TOSHIMA, X.M. TONG, Tsukuba University, X. ZHOU, Colorado University - JILA, P. JOHNSON, LUND University, H.C. KAPTEYN, M.M. MURNANE, Colorado University - JILA — By combining strong-field ionization with 2D electron momentum imaging, we demonstrate a high degree of control over electron trajectories in the vicinity of the Coulomb potential of the parent ion. The interference between the directly ionized and rescattered electrons strongly depends on the localization of the electron wavefunction in the vicinity of the parent ion at the instant of rescattering. A high degree of control of the electron trajectory is obtained by varying the laser intensity, polarization, phase, and the driving wavelength between 267 nm and 2000 nm. The 2D interference pattern encodes attosecond electron dynamics, as well as information about the size of the returning electron wave packet. Also, the interference between the direct and returning electrons provides a direct measurement of the electron-ion differential cross section, which is found to vary significantly for different atomic and molecular targets. Several different theoretical methods will be presented to support the discussion.

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