Abstract Submitted
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Relativistic non-dipole effects in strong field ionisation[1] NIDA HARAM, HAN XU, ATIA-TUL NOOR, SATYA SAINADH UNDURTI, Griffith University, IGOR IVANOV, Institute for Basic Science, IGOR LITVINYUK, ROBERT SANG, Griffith University, CENTRE FOR RELATIVISTIC SCIENCE, IBS, GWANGJU, KOREA COLLABORATION — Breakdown of dipole approximation in strong field ionisation has been investigated experimentally earlier [Phys.Rev.Lett.**106**,193002 (2011); Phys.Rev.Lett.**113**,243001 (2014)] - Those experimental results have been interpreted using different theoretical approaches. For certain laser parameters, the peaks of transverse electron momentum distributions (TEMD)s were found to be shifted forward along the laser propagation direction due to the radiation pressure caused by the Lorentz force. However, in the long wavelength limit, at intensities as low as 10^{13} W/cm^2, the counter-intuitive shifts opposite to the laser propagation direction were reported. **In this work**, we explore the non-dipole effects on the TEMD of noble gas atoms (Ar) at intensities greater than 5 x 10^{14} W/cm^2. The TEMD along the laser propagation direction are recorded with a reaction microscope using few cycle (6-7 fs) near-infrared (800 nm) linearly polarized laser pulses. In agreement with the fully relativistic theoretical results based on the time-dependent Dirac equation, we report increasing counter-intuitive peak shifts with increasing laser intensities. The underlying mechanism of these counter-intuitive dynamics can be explained on the basis of interplay between the Coulomb potential and the Lorentz force.

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