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Laser pulse duration dependence of the low-energy structure in strong field ionization YU HANG LAI, KAIKAI ZHANG, COSMIN BLAGA, JUNLIANG XU, PIERRE AGOSTINI, LOUIS DIMAURO, The Ohio State University, BRUNO SCHMIDT, FRANÇOIS LÉGARÉ, Institut National de la Recherche Scientifique, THE OHIO STATE UNIVERSITY TEAM, INSTITUT NATIONAL DE LA RECHERCHE SCIENTIFIQUE TEAM — Low-energy structure (LES) in strong field ionization is a spike-like feature appearing in the low energy part (a few eV) of photoelectron spectra along the laser polarization.[1] It has been observed in rare gas atoms and diatomic molecules. In the classical picture, the formation of LES is due to the Coulomb interaction between the ionized electron and its parent ion via the process of multiple forward scattering, which can happen only if the electron is ionized with a small drift momentum. We have studied the LES in rare gas atoms with few-cycle laser pulses centered at 1800nm. We observed that the LES peak shifts to lower energy as the pulse duration decreases from 5 down to 2 optical cycles, which is in qualitative agreement with classical-trajectory Monte Carlo simulations. Classically, the shift could be attributed to the dependence of the ratio between the field amplitude of the central cycle and the adjacent cycle on the pulse duration.[2] Our data support the classical nature of the LES.

[1]C. I. Blaga et al, Nat. Phys. **5**, 335 (2009); W. Quan et al, Phys. Rev. Lett. **103**, 093001 (2009)
[2]A. Kastner, U. Saalmann, and J. M. Rost, J. Phys. B **45**, 074011 (2012)

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