Abstract Submitted
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Cooper minima in electron spectra after multiphoton above-threshold ionization[1] DMITRY A. TELNOV, St. Petersburg State University, Russia, SHIH-I CHU, University of Kansas, USA — We have performed calculations of electron momentum and energy distributions after multiphoton above-threshold ionization (ATI) for several one-electron quantum systems (H, He^+, H_2^+, and HeH^{2+}) in intense laser fields. We use the carrier wavelengths in the near-infrared band (730 to 800 nm) and the peak intensities 5×10^{13} to 1×10^{14} W/cm^2. For some initial states of the systems under consideration, the spectra exhibit minima in the low-energy region (3 to 7 eV), which resemble the famous Cooper minima in one-photon ionization processes. The minima are well pronounced for the initial states with the electronic orbitals that have nodal surfaces, such as $2s$ state of He^+, $1\sigma_u$ state of H_2^+, and 2σ state of HeH^{2+}. Such minima are not observed for the initial ground electronic states, as well as for initial $2p$ state of He^+, which possess nodeless orbitals. The effect is essentially non-perturbative; the positions of the minima depend on the intensity and frequency of the laser field. Nonetheless, it seems the nodal structure of the initial electronic orbital plays a crucial role in shaping these minima in the ATI electron spectra.

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