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Photodetachment of H^- from intense, short, high-frequency pulses[1] HUA-CHIEH SHAO, F. ROBICHEAUX, Purdue University — We study the photodetachment of an electron from the hydrogen anion due to short, high-frequency laser pulses by numerically solving the time-dependent Schrödinger equation. Simulations are performed to investigate the dependence of the photoelectron spectra on the duration, chirp, and intensity of the pulses. Specifically, we concentrate on the low-energy distributions in the spectra that result from the Raman transitions of the broadband pulses. Contrary to the one-photon ionization, the low-energy distribution maintains a similar width as the laser bandwidth is expanded by chirping the pulses. In addition, we study the transitions of the ionization dynamics from the perturbative to strong-field regime. At high intensities, the positions of the net one- and two-photon absorption peaks in the spectrum shifts and the peaks split to multiple subpeaks because of the multiphoton effects. Moreover, although the one- and two-photon peaks and low-energy distribution exhibit saturation of the ionization yields, the latter shows relatively mild saturation.

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