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A quantum-trajectory approach for the full dynamics of polyatomic molecules in strong laser fields[1] ZHONGYUAN ZHOU[2], SHIH-I CHU[3], Department of Chemistry, University of Kansas, Lawrence, KS 66045 — A quantum-trajectory approach is developed for the study of full dynamics of polyatomic molecules in strong laser fields. In this approach, the particles (electrons and nuclei) are characterized by the time-dependent coherent states and the particle trajectories are described by the positions and momenta of the coherent states. The basic equation is a group of coupled Hamilton Canonical equations for the trajectories. As a demonstration, we apply this approach together with Monte Carlo technique to study full dynamics of H_2 in strong laser fields. The energy-angular distribution of the probabilities of ionization, dissociation, and Coulomb explosion are calculated. The results are in fair agreement with available experimental and other theoretical results. The behaviors of H_2 in long-wavelength laser fields are also explored. The results show the low-energy structure of photoelectron spectra and behaviors of the structure change with laser wavelength and intensity as observed in recent experiments.

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