Abstract Submitted
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Molecular-orientation-dependent ac Stark effect and its impact on multiphoton processes XI CHU, The University of Montana — We study the dependence of the AC Stark shifts of electronic energies on the molecular orientation relative to the polarization direction of an incident intense laser field, using a three dimensional non-Hermitian Floquet method and H_2^+ as a model system [1]. Simultaneously, we also study the orientation dependent high harmonic generation (HHG) and multiphoton ionization (MPI). We find that with the presence of near-one-photon resonance, the Stark effect strongly mixes electronic states of different symmetries to create quasienergy states (QESs). The orientation dependence of multiphoton processes, in which these QESs play an important role, becomes complex. Population transfer is better achieved with aligned molecules and optimized orientation. When the energies of emitted photons are lower than the ionization energy, the Stark effect plays an important role in the orientation dependence of HHG intensity and polarization. It also is important for MPI, when the Keldysh parameter is larger than one. Results from fixed-nuclei calculations for a series of internuclear distances are used to obtain values for different vibrational states. With a multiphoton resonance, the HHG intensity of the fixed-nuclei model resembles that of the lowest vibrational state. Molecular vibration of H_2^+ has a great effect in MPI and the off-resonant HHG. [1] X. Chu, Phys. Rev. A **78**, 043408 (2008).

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