Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Unravelling the dynamical origin of below- and near-threshold harmonic generation of H_2^+ in an intense NIR laser field[1] JOHN HESLAR, National Taiwan University, SHIH-I CHU, University of Kansas — Recently, the study of near- and below-threshold regime harmonics as a potential source of intense coherent vacuum-ultraviolet radiation has received considerable attention. However, the dynamical origin of these lower harmonics, particularly for the molecular systems, is less understood and largely unexplored. Here we present a fully ab initio and high precision 3D quantum study of the below- and near-threshold harmonic generation of H_2^+ molecules in an intense 800-nm near-infrared (NIR) laser field. Combining with a synchrosqueezing transform of the quantum time-frequency spectrum and an extended semiclassical analysis, we explore in-depth the roles of various quantum trajectories, including short- and long-trajectories, multiphoton trajectories, resonance-enhanced trajectories, and multiple rescattering trajectories of the below- and near-threshold harmonic generation processes. Our results shed new light on the dynamical origin of the below- and near-threshold harmonic generation and various quantum trajectories for diatomic molecules.

[1]This work was partially supported by DOE.

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Date submitted: 18 Jan 2017 Electronic form version 1.4