

Abstract Submitted  
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**Below-threshold Harmonic Generations of Aligned Hydrogen Molecular Ions** SHIH-I CHU, University of Kansas, FU-YUAN JENG, YAE-LIN SHEU, National Taiwan University — We perform *ab initio* 3D quantum calculations of harmonic generations of the hydrogen molecular ions exposed to intense linearly polarized laser pulses. To fully understand the quantum path contributions related to below-threshold harmonics, the laser-driven electron multi-scattering must be considered. We also find that the orientation of the molecular axis with respect to the polarization of the laser field strongly affect the electron returning times. These results are confirmed by generalized semiclassical simulations and time-frequency analysis of harmonic spectra by means of synchrosqueezed transform based on short-time Fourier transform.

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