

Abstract Submitted
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Exploration of the dynamical origin of near- and below-threshold harmonic generation¹ PENG-CHENG LI, Department of Chemistry, University of Kansas, YAE-LIN SHEU, Center for Quantum Science and Engineering, and Center for Advanced Study in Theoretical Sciences, Department of Physics, National Taiwan University, CECIL LAUGHLIN, School of Mathematical Science, University of Nottingham, SHIH-I. CHU, Department of Chemistry, University of Kansas — We report the finding of a new dynamic process of near- and below-threshold harmonic generation (HG) of cesium (Cs) atoms in a 3600-nm mid-infrared laser field. We find that the multiphoton dominated trajectories only involve the electrons scattered from the combined atom-field potential wall followed by the absorption of many photons in near- and below-threshold HG. Furthermore, only the below-threshold HG near resonant structure involves the single dynamical phase which is almost constant at the different emission time, indicating that the dynamical phases are locked. We confirmed our findings by performing quantum and semiclassical analysis simultaneously. Our results provide a new understanding of the dynamic origin of the near- and below-threshold HG.

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