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Role of laser-driven electron multi-scattering in resonance-enhanced below-threshold harmonic generation of He atoms[1] PENG-CHENG LI, Department of Physics, National Taiwan University, SHIH-I CHU, Department of Chemistry, University of Kansas — We perform an *ab initio* study of the resonance-enhanced harmonic generation of He atoms below the ionization threshold by solving the time-dependent Schr\"odinger equation and Maxwell's equation simultaneously. An accurate angular-momentum-dependent model potential is constructed for the description of the He atoms low-lying and Rydberg states. We find that the process of laser-driven electron multi-scattering can play a crucial role in resonance-enhanced below-threshold harmonic generation. This result is confirmed by simulations with an extended semiclassical model and time-frequency analysis of macroscopic harmonic spectra by means of the synchrosqueezed transform based on short time Fourier transform. Our results emphasize that the laser-driven electron multi-scattering must be taken into account to fully understand the quantum path contribution related to resonance-enhanced below-threshold harmonic spectra.

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