Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Low-energy photoelectron interference structure in attosecond streaking[1] JINTAI LIANG, YUEMING ZHOU, PEIXIANG LU, School of Physics, Huazhong University of Science and Technology, Wuhan 430074, China — By numerically solving the time-dependent Schrdinger equation, we theoretically investigate the interference structures of low-energy photoelectron spectrum produced by a single attosecond pulse in the presence of an infrared laser field. These low-energy photoelectrons ionized by the attosecond pulses could be driven back to the parent ion by the infrared laser field and thus the photoelectrons momentum distributions exhibit complicated interference structures. We show that these structures respectively originate from the interferences between the direct electrons (the electron reaching the detector without interaction with the parent ion after ionization) and direct, direct and near-forward rescattering, direct and backward rescattering, backward and backward rescattering electrons. Moreover, by changing the time delay between the attosecond pulse and the infrared laser field or the center frequency of the attosecond pulses, these interference structures could be selectively enhanced or suppressed. The information of the electronic dynamic process and the continuum electronic wave packets is encoded in the interference structures. As an example, we show that the phase of the electronic wave packets ionized by the linear and circular polarized attosecond pulse can be extracted by the forward-rescattering holography.

[1]National Natural Science Foundation of China (Nos. 11622431 and 61405064).

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Date submitted: 27 Feb 2019 Electronic form version 1.4