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A Time-dependent Analysis of Few-Photon Coherent Control Schemes[1] SHAOHAO CHEN, JILA, University of Colorado, Boulder, CO 80309-0440, AGNIESZKA JARON-BECKER, ANDREAS BECKER, JILA and Department of Physics, University of Colorado, Boulder, CO 80309-0440 — Nowadays coherent quantum control is an important topic in atomic, molecular and optical physics as well as chemistry, due to recent development in ultrashort laser technology. Coherent control schemes have been proposed to realize dark or bright pulses with near-infrared wavelengths in the perturbative intensity regime for two-photon excitations in atoms. In this work, we investigate the coherent control of a non-resonant two-photon excitation and a 2+1 photon ionization process from the time-dependent perspective. To this end, we have solved the time-dependent Schrodinger equation for hydrogen atom interacting with a shaped ultrashort ultraviolet laser pulse. The time-dependent analysis offers complementary information about the control mechanisms from a direct comparison of the time evolution of the laser field with the instantaneous response of the quantum system for two control schemes based on the modulation of the spectral phase, i.e. symmetric/antisymmetric phase distribution and pi phase-step modulation.

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