Theory of attosecond transient absorption
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Attosecond transient absorption spectroscopy is potentially a powerful tool for studying electron dynamics on an ultrafast time scale. We present a theoretical study of transient absorption and reshaping of extreme ultraviolet (xuv) pulses by atoms dressed with a moderately strong infrared (ir) laser field. We formulate the atomic response using a time-frequency approach based on the time-dependent dipole induced by the light fields. We study attosecond transient absorption in a macroscopic gas by incorporating the time-frequency approach into a solution of the coupled Maxwell-Schroedinger equations.

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