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Using attosecond pulses to probe ultrafast electronic motions inside atoms L. A. COLLINS, S. X. HU, Los Alamos National Laboratory — With using an efficient and accurate parallel solver for the time-dependent Schrödinger equation, we have performed full-dimensional numerical simulations of the proposed attosecond pump-probe for *exploring* the extremely fast motion of an electronic wave packet inside atoms. Pumped by a broadband femtosecond UV pulse, one electron of ground-state Helium can be launched into a superposition of low-lying excited states, thus forming a bound wavepacket oscillating relative to the atomic core. A time-delayed attosecond EUV (probe) pulse then ionizes the atom causing three-body breakup. Measuring either the energy sharing of the ionized electrons or the total ionization probability as a function of the time delay traces out the internal motion of the excited electron. Our simulations have shown that an ultrashort oscillating period of 2 fs can be followed for several cylces. This opens the prospect of a wealth of similar pump-probe experiments to examine ultrafast *electronic* motions.

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