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Probing ultrafast electronic motions in atoms with the attosecond pump-probe LEE COLLINS, SUXING HU, Los Alamos National Laboratory, BARRY SCHNEIDER, National Science Foundation — Through full-dimensional numerical simulations with using our recently-developed efficient and accurate parallel solver for the time-dependent Schrödinger equation, we have demonstrated that an attosecond pulse can effectively *probe* the extremely fast motion of an electronic wave packet in 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 wavepacket that begins to orbit the atomic core. A time-delayed attosecond EUV pulse (probe) 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 displays the internal motion of the excited electron. Our simulation has shown that an ultrashort Kepler period of 2 fs can be followed for several cylces. This opens the prospect of a wealth of similar pump-probe experiments to examine *electronic* motion.

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