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Wave packet dynamics in doubly excited states of He[1] JOHANNES FEIST, STEFAN NAGELE, EMIL PERSSON, JOACHIM BURGDÖRFER, Institute for Theoretical Physics, Vienna University of Technology, 1040 Vienna, Austria, BARRY SCHNEIDER, Physics Division, NSF, Arlington, VA 22230, USA — We have developed a method for the ab initio simulation of the interaction of ultrashort laser pulses with helium atoms. We expand the two-electron Schrödinger equation in coupled spherical harmonics and perform direct time integration utilizing either the Arnoldi-Lanczos or the Leapfrog method. The spatial discretization is performed in an FEDVR basis [1]. This allows for a numerically accurate description while possessing desirable computational features, e.g. a block-diagonal form of the kinetic energy matrix. We will present results on electron-electron correlation and wave packet dynamics in He. By using a suitable combination of attosecond XUV/EUV pulses, we prepare a wave packet in the doubly excited states of helium. The motion of this wave packet can be observed by using a probe pulse to induce ionization. We aim for a detailed understanding of the process by a careful study of the ionized electrons, e.g. by investigating doubly differential momentum spectra.

[1] B. I. Schneider and L. A. Collins. *J. Non-Cryst. Solids* **351**, 1551.

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