Abstract Submitted
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Time-Dependent B-Spline R-Matrix Approach to Double Ionization of Atoms by XUV Laser Pulses[1] XIAOXU GUAN, OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University, CLIFFORD NOBLE, Daresbury Laboratory, BARRY SCHNEIDER, National Science Foundation — We have extended our *ab initio* and non-perturbative time-dependent approach to describe the effect of intense XUV laser pulses on a general atom [1] to handle the double ionization process. After using a highly flexible B-Spline R-matrix method [2] to generate field-free Hamiltonian and electric dipole matrices, the initial state is propagated in time using an efficient Arnoldi-Lanczos scheme. Test calculations for double ionization of He by a single laser pulse yield good agreement with benchmark results obtained with other methods, such as recent finite-element discrete-variable approaches [3,4]. The method is then applied to two-color pump-probe processes, for which momentum and energy distributions of the two outgoing electrons are presented. [1] X. Guan *et al.*, Phys. Rev. A **76**, 053411 (2006). [2] O. Zatsarinny, Comp. Phys. Commun. **174**, 273 (2006). [3] J. Feist *et al.*, Phys. Rev. A **77**, 043420 (2007). [4] X. Guan *et al.*, Phys. Rev. A **77**, 043421 (2007).

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