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Study of the nonlinear interactions of atomic autoionizing states with ultrashort intense EUV pulses W.-C. CHU, J. R. Macdonald Laboratory, Kansas State University, Manhattan, Kansas 66506, USA, TORU MORISHITA, Department of Applied Physics and Chemistry, University of Electro-Communications, Tokyo, Japan, C.D. LIN, J. R. Macdonald Laboratory, Kansas State University, Manhattan, Kansas 66506, USA — We study theoretically the formation and decay of atomic autoionizing states by intense ultrashort EUV pulses. In the case of the $2s2p(^1P^o)$ resonance in helium, we examined how the electron yields and the shape of the electron spectra (the Fano q-parameter) change with the pulse intensity and pulse duration. Results obtained using a theory generalized to short pulses from the earlier models for long pulses [1,2] are compared to *ab initio* calculations based on the numerical solution of the time-dependent Schrödinger Equation for the two-electron helium. In view of the emerging intense light pulses from free-electron lasers, the theory will be used to evaluate the condition for observing nonlinear near-resonance photoabsorption for EUV and X-rays.

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