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Propagation Effects on Attosecond Pulse Generation in Molecular Media ANDRE D. BANDRAUK[1], Universite de Sherbrooke, EMMANUEL LORIN, Centre de recherches mathematiques Montreal, MATHEMATIQUES APPLIQUEES TEAM — We investigate numerically on large scale parallel supercomputer the dynamics of "attosecond" pulse generation created from high order harmonic generation, HHG, in molecular media. Propagation of an intense 5-fs Ti:Sa (800 nm) in a H2+ gas medium is studied from numerical solution of the coupled time-dependent Schroedinger (TDSE)and Maxwell equations. Exact 1-D and 3-D solutions of the H2+ TDSE are compared as the 1-D molecular model coupled to 3-D Maxwell equations allows for including up to 10 000 molecules on an appropriate grid.The simulations allow for exact calculation of electron ionization and recombination leading to HHG including propagation effects.In particular we have designed mathematical boundary conditions which allow free ionized electrons to be transmitted from one molecule to another. Instabilities such as filamentation of the incident intense (800 nm)pulse are observed as a function of medium density.The effect of 3- photon resonances which occur in atmospheric filamentation are examined using the present novel algorithm.

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