

Abstract Submitted
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Model for atomic dielectric response in strong, time-dependent laser fields¹ T.C. RENSINK, T.M. ANTONSEN, J.P. PALASTRO, University of Maryland, College Park, D.F. GORDON, Naval Research Laboratory, Plasma Physics Division, Washington DC, 20375 — A nonlocal quantum mechanical model is presented for calculating the atomic dielectric response to a strong laser electric field. By replacing the Coulomb potential with a nonlocal potential in the Schrodinger equation, a 3+1D calculation of the time-dependent electric dipole moment can be reformulated as a 0+1D integral equation that retains the 3D dynamics, while offering significant computational savings. The model is benchmarked against an established ionization model and *ab initio* simulation of the time-dependent Schrodinger equation. The reduced computational overhead makes the model a promising candidate to incorporate full quantum mechanical time dynamics in laser pulse propagation simulations.

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