

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Role of Non-Linear Interactions in Electromagnetic-Field Propagation through Moving Many-Electron Atomic Systems¹ VERNE JACOBS, Naval Research Laboratory — Reduced-density-matrix descriptions are developed for the propagation of electromagnetic fields through moving many-electron atomic systems, taking into account center-of-mass motions, atomic collision processes, and applied magnetic fields. Time-domain (equation-of-motion) and the frequency-domain (resolvent-operator) formulations are developed in a unified manner. A semiclassical perturbative treatment of the electromagnetic interaction is employed to derive compact Liouville-space operator expressions for the general n'th-order non-linear macroscopic electromagnetic-response tensors. Coherent atomic excitations and the full tetradic-matrix form of the collision-radiative self-energy operator in the Markov approximation are taken into account.

¹Work supported by the Office of Naval Research.

Verne Jacobs
Naval Research Laboratory

Date submitted: 08 Feb 2011

Electronic form version 1.4