

Abstract Submitted
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Influence of Non-Linear Interactions on the Propagation of Electromagnetic Fields in Moving Many-Electron Atomic Systems¹ VERNE JACOBS, Naval Research Laboratory — Reduced-density-matrix descriptions are developed for the propagation of electromagnetic fields in moving many-electron atomic systems, taking into account the center-of-mass motions, atomic collision processes, and applied magnetic fields. The 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.

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