Abstract Submitted
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Density Matrix Descriptions for Pump-Probe Optical Phenomena in Moving Atomic Systems[1] VERNE JACOBS, Naval Research Laboratory — Reduced density matrix descriptions are developed for pump-probe optical phenomena in moving many-electron atomic systems, taking into account atomic collisions and external magnetic fields. Time-domain (equation-of-motion) and frequency-domain (resolvent-operator) formulations are developed in a unified manner. In a semiclassical perturbative treatment of the electromagnetic interaction, compact Liouville-space operator expressions are derived for the linear and the general (n'th order) non-linear electromagnetic-response tensors. These expressions are valid for coherent atomic excitations and for the full tetradic-matrix form of the collision operator in the Markov approximation.

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