

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Non-Linear Interactions in Pump-Probe Optical Phenomena¹

VERNE JACOBS, Naval Research Laboratory — Reduced density matrix descriptions are developed for pump-probe optical phenomena in atomic systems, taking into account atomic collisions as environmental phenomena. 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.

¹Work supported by the Office of Naval Research and the Defense Advanced Research Projects Agency.

Verne Jacobs
Naval Research Laboratory

Date submitted: 07 Dec 2008

Electronic form version 1.4