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Fluid Modeling of the Delayed Nonlinear Raman Response of a Diatomic Gas THOMAS RENSINK, JOHN PALASTRO, THOMAS ANTONSEN, University of Maryland College Park — Intense laser pulses induce polar alignment of diatomic molecules when propagating through a gas, resulting in nonlinear focusing and frequency shifts. Here the gas is treated as an ensemble of classical rigid rotors that interact with the field through an induced dipole moment. The evolution of the angular distribution of the gas is solved by applying the Finite Volume Method (FVM) to a set of fluid equations derived as moments of the Boltzmann equation. This technique offers considerable computational savings over full quantum mechanical density matrix calculations, while providing good agreement with the initial delayed Raman response of the gas. As a result, the FVM method is ideal for implementation in atmospheric laser pulse propagation simulations.

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