

Abstract Submitted
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Atomic hyperpolarisabilities and the non-linear optics of atomic gases¹ MICHAEL BROMLEY, The University of Queensland, BRANDON RIGSBEE, Kansas State University, JIM MITROY, Charles Darwin University — The properties of one and two-electron atoms are calculated numerically using configuration interaction and perturbative methods. We present calculations here the dynamic hyperpolarisabilities of these atoms, the emphasis here being on low-energy fields of interest in atomic clocks, and high-energy excitations that probe near Rydberg states. The variance of transition energies and magic wavelengths with hyperpolarisability will be discussed. Two forms of the susceptibilities, $\chi_3(\omega, I)$, that describe the non-linear optics of atoms in electric fields, will be presented that describe the variation of the refractive index of an atomic gas in ground or excited states, as well as third-harmonic generation.

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