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Absorption Lineshape Modeling of Neutral Xenon in a Magnetized Optogalvanic Cell. BAILO NGOM, TIM SMITH, ALEC GALLIMORE, University of Michigan — We present a computational model for Zeeman splitting of the $6s^2[3/2]_0^1 \rightarrow 6p\ ^2[5/2]_2$ absorption of neutral xenon at 834.682 nm (air). The model accounts for Zeeman splitting of the xenon hyperfine structure by assuming that the extra-nuclear spin and spin-orbit wavefunctions are separable for an atomic system described by a rigid spherical spinning body in a central force field, all immersed in a magnetic field. This theoretical approach [1] permits calculation of the intensity and displacement of Zeeman-shifted hyperfine lines for σ and π beam polarizations. By comparing the resulting model with previously-reported Zeeman-split optogalvanic spectra [2], we explore the utility of Zeeman splitting of laser-induced fluorescence spectra as a magnetic component intensity diagnostic in xenon electrostatic thruster plumes.

[1] Bacher, R. F. *The Zeeman Effect of Hyperfine Structure,* Ph.D. dissertation, University of Michigan, 1930.
[2] Smith, T.B., Ngom, B.B., Linnell, J.A., and Gallimore, A.D. "Optogalvanic Spectroscopy of the Zeeman Effect in Xenon," ICOPS-2006.

Tim Smith
University of Michigan

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