Abstract Submitted
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**Cesium $7d\,^2D_{3/2}$ hyperfine coupling constants measured using two-photon fluorescence spectroscopy of a thermal beam**[1] V. FIORE, A. KORTYNA, Lafayette College — The hyperfine intervals of the $^{133}$Cs $7d\,^2D_{3/2}$ manifold are determined through resonant two-photon, laser-induced-fluorescence spectroscopy. These intervals are used to calculated the magnetic dipole coupling constant, $A$, and the electric quadrupole coupling constant, $B$. Two single-mode, external-cavity diode lasers counter-propagate through a thermal beam of cesium. A servo-feedback circuit locks one laser to the $6s\,^2S_{1/2}(F) \rightarrow 6p\,^2P_{1/2}(F')$ transition. The second laser is scanned over the $6p\,^2P_{1/2}(F') \rightarrow 7d\,^2D_{3/2}(F'')$ transitions. Its relative frequency is calibrated through a phase modulation technique, and high accuracy is achieved by referencing the modulation frequency in real time to the $^{87}$Rb $5s\,^2S_{1/2}(F=1) \leftrightarrow 5s\,^2S_{1/2}(F=2)$ ground state hyperfine transition using an atomic frequency standard. The $7d\,^2D_{3/2}$ hyperfine intervals are found through non-linear fitting of Voigt profiles to the fluorescence spectra, and give the hyperfine coupling constants $A = 7.38 \pm 0.04$ MHz and $B = -0.06 \pm 0.26$ MHz. The magnetic dipole constant, $A$, agrees well with a previously measured value of $7.4 \pm 0.2$ MHz (G. Belin et al., Phys. Scr. **14**, 39 (1976)).

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