Abstract Submitted
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Measurement of hyperfine structure and isotope shifts in the $8p$ excited states of thallium and the $7p$ excited states of indium using two-step laser spectroscopy[1] P. MILINDA RUPASINGHE, SAUMAN CHENG, NATHANIEL VILAS, ELI HOENIG, BINGYI WANG, P.K. MAJUMDER, Williams College — Using a two-color, two-step vapor cell spectroscopy technique we have completed measurements of hyperfine splittings of $8p$ states in ^{205}Tl and ^{203}Tl, as well as the $7s-8p$ transition isotope shifts. The same experimental scheme has been used to measure the hyperfine splitting of the ^{115}In $7p_{1/2}$ state and the hyperfine a, b, c constants within the $7p_{3/2}$ state. An external-cavity diode laser locked to the 1st step transition excites atoms to an intermediate state and a second, red laser diode overlaps the first within a heated atomic vapor cell in both a co-propagating and counter-propagating configuration. Analysis of subsequent Doppler-free absorption spectra of the second-step transitions ($7s_{1/2} \rightarrow 8p_{1/2,3/2}$ in thallium and $6s_{1/2} \rightarrow 7p_{1/2,3/2}$ in indium) allows us to extract both hyperfine and isotope shift information with uncertainties well below 1 MHz. Frequency modulation of the red laser provides convenient *in situ* frequency calibration. For the case of thallium ^{205}Tl $8p_{3/2}$ state hyperfine splitting, our results disagree with older measurements and show a well-resolved hyperfine anomaly not previously observed for this state.

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Protik Majumder
Williams College

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