Abstract Submitted
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Precise measurements of the $7P_{1/2}$-state hyperfine splittings and isotope shift in ^{203}Tl and ^{205}Tl[1] DAVID KEALHOFER, GAMBHIR RANJIT, PROTIK MAJUMDER, Williams College Physics Dept. — We have undertaken a series of high-precision atomic structure measurement in thallium to test ongoing *ab initio* atomic structure calculations of relevance to symmetry violation experiments in this element. In 2009, we completed a two-step vapor cell spectroscopy experiment in atomic indium[2]. Currently we are using a similar two-color, two-step spectroscopy scheme to measure of $7P_{1/2}$ hyperfine structure and isotope shift using a heated thallium vapor cell. One laser, locked near the thallium $6P_{1/2} \rightarrow 7S_{1/2}$ 378 nm transition excites both naturally-occurring stable isotopes to an intermediate state. A second laser at 1301 nm overlaps the UV beam within the thallium vapor cell in both a co-propagating and counter-propagating configuration. Analysis of subsequent Doppler-free IR absorption spectra as we scan across the $7S_{1/2} \rightarrow 7P_{1/2}$ transition allows us to extract both hyperfine and isotope shift information for this excited state. Frequency modulation of the IR beam provides convenient *in situ* calibration method for the splittings. Statistical precision is currently at the 0.1 MHz level. Current results will be presented.

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[2]M. Gunawardena *et al.*, Phys. Rev. A 80, 032519 (2009)

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