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Precise measurement of the $7P_{1/2}$-state hyperfine splittings and isotope shift in ^{203}Tl and ^{205}Tl TARYN SIEGEL, GAMBHIR RANJIT, P.K. MAJUMDER, Williams College, Dept. of Physics — We have undertaken a series of high-precision atomic structure measurements in thallium to test ongoing *ab initio* atomic structure calculations of relevance to various symmetry violation tests in this particular element. Currently we are using a two-color, two-step spectroscopy scheme to measure of $7P_{1/2}$ hyperfine structure and isotope shift using a heated quartz thallium vapor cell. Our group recently completed a similar experiment in indium.[1] Here, one laser, locked near the thallium $6P_{1/2} \rightarrow 7S_{1/2}$ 378 nm transition excites both naturally-occurring 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 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 laser provides convenient *in situ* calibration method for the measured splittings. Our goal is to determine the thallium splittings with an accuracy of 0.1 MHz. Current results will be presented.

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

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