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Precise measurement of the scalar polarizability of ^{115}In in an indium atomic beam ANDERS SCHNEIDER, GAMBHIR RANJIT, NATHAN SCHINE, P.K. MAJUMDER, Williams College, Dept. of Physics — In recent years, we have pursued a series of precise atomic structure measurements in Group III elements thallium and indium in order to test recent *ab initio* theory calculations in these three-valance-electron systems. We are currently completing a precision measurement of the indium scalar polarizability within the 410 nm $5P_{1/2} \rightarrow 6S_{1/2}$ transition using a GaN semiconductor laser interacting transversely with a collimated indium atomic beam in the presence of precisely calibrated high voltage electric field. We use 100 MHz laser frequency modulation and RF lock-in detection to obtain a high-resolution absorption signal despite indium beam optical depths of $< 10^{-3}$. An in-vacuum chopper wheel modulates the atomic beam and provides further noise and background reduction. Our current level of precision produces 1% statistical measurement of the Stark Shift in less than one hour of data collection. Our preliminary results for the scalar polarizability within this transition agree with a previous result,¹ and we expect an eventual tenfold improvement in accuracy, providing a challenge to ongoing atomic theory calculations. Current results will be presented.

¹T.R. Fowler and J. Yellin, Phys. Rev. A 1, 1006 (1970)

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