

Abstract Submitted
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Precise measurement of the scalar polarizability of ^{115}In within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition using an atomic beam¹ PROTIK MAJUMDER, GAMBHIR RANJIT, NATHAN SCHINE, Williams College Physics Dept. — In recent years, we have pursued a series of precise atomic structure measurements in Group III elements—currently thallium and indium - in order to test recent *ab initio* theory calculations in these three-valance-electron systems. Such high-accuracy theory is essential for atomic physics-based tests of symmetry violation in these high- Z systems. We have recently completed 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 a large, precisely-calibrated electric field. We use laser frequency modulation and lock-in detection to obtain a high-resolution absorption signal despite indium beam optical depths of < 0.001 . Our result for the indium scalar polarizability within this transition is 1000.2 ± 2.7 in atomic units, and is in excellent agreement with a new atomic theory calculation². By combining the experimental result and theory expressions, new, precise values for the indium 6P-state lifetimes can be extracted. Details of the measurement and future plans will be presented.

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²M.S. Safranov, private communication

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