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**High-precision Stark shift measurements using an indium atomic beam**[1] PROTIK MAJUMDER, NATHAN BRICAULT, BENJAMIN AUGENBRAUN, Physics Dept., Williams College — 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-valence-electron systems. We 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. Our result is in excellent agreement with a new atomic theory calculation. By combining the experimental result and theory expressions, new, precise values for the indium 6p-state lifetimes have been extracted. Currently we are extending this measurement using a second, 1343 nm infrared laser to reach the indium $6p_{1/2}$ state by locking the 410 nm laser and performing two-step spectroscopy. The small infrared absorption in our atomic beam is detected using two-tone FM spectroscopy. The characteristic sideband features in our RF-demodulated spectrum offer built in frequency calibration. For electric fields of order 10 kV/cm, we expect Stark shifts of order 100 MHz for this excited state.

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