Progress toward measuring the $6S_{1/2} \leftrightarrow 5D_{3/2}$ magnetic-dipole transition moment in Ba$^{+}\text{1}$ SPENCER WILLIAMS, University of Washington, ANUPRIYA JAYAKUMAR, MATTHEW HOFFMAN, BORIS BLINOV, NORVAL FORTSON, University of Washington — We report the latest results from our effort to measure the magnetic-dipole transition moment (M1) between the $6S_{1/2}$ and $5D_{3/2}$ manifolds in Ba$^+$. We describe a new technique for calibrating view-port birefringence and how we will use it to enhance the M1 signal. To access the transition moment we use a variation of a previously proposed technique$^2$ that allows us to isolate the magnetic-dipole coupling from the much larger electric-quadrupole coupling in the transition rates between particular Zeeman sub-levels. Knowledge of M1 is crucial for a parity-nonconservation experiment in the ion where M1 will be a leading source of systematic errors. No measurement of this M1 has been made in Ba$^+$, however, there are three calculations that predict it to be $80 \times 10^{-5} \mu_B$, $22 \times 10^{-5} \mu_B$, and $17 \times 10^{-5} \mu_B$. A precise measurement may help resolve this theoretical discrepancy which originates from their different estimations of many-body effects.

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