Abstract Submitted
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High-precision atomic structure measurements in lead[1] ELI HOENIG, P.M. RUPASINGHE, P.K. MAJUMDER, Williams College — Two high-precision measurements of atomic parity nonconservation in lead were completed more than two decades ago. The ability of these results to test the Electroweak Standard Model was limited, however, by the poor accuracy of lead atomic structure calculations. Very recently, significantly improved wavefunction calculations in lead suggest that a new, precise electroweak test in this system may be possible[2]. We have undertaken new measurements of atomic structure properties of lead to test the new calculations and guide their further refinement. Using both direct absorption and Faraday optical rotation techniques, we are measuring isotope shifts and ^{207}Pb hyperfine structure splittings in ground-state transitions. In particular we are measuring the electric quadrupole $6P_0 \rightarrow 6P_2$ transition amplitude relative to the more-easily-calculable $6P_0 \rightarrow 6P_1$ magnetic dipole amplitude. The high sensitivity of our optical rotation technique allows the E2 and M1 absorptivities to be measured simultaneously in the same cell, even though the E2 transition strength is approximately two orders of magnitude smaller. Current experimental results will be presented.

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[2]Porsev *et al.*, Phys. Rev. **A** 93, 012501 (2016)

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