

Abstract Submitted
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High-precision measurements of the ^{87}Rb vector polarizability

ADAM FALLON, SETH BERL, CHARLES SACKETT, Univ of Virginia — We report progress on an experiment to measure the vector polarizability of ^{87}Rb atoms in the $F = 2$ ground hyperfine state between the $D1$ and $D2$ spectral lines. The experiment uses a condensate interferometer to measure a tune-out wavelength, the light wavelength at which the ac electric polarizability of the atom equals zero. The location of the tune-out wavelength depends on the optical polarization of the light, and the vector polarizability characterizes this dependence. This can be compared to previous measurements by our group of tune-out wavelengths for the scalar polarizability alone. Measurements of the vector polarizability and tune-out wavelengths near multiple atomic states allows the identification of individual contributions to the polarizability from higher-lying states and from the core electrons. Accurate knowledge of these contributions would be useful as a theoretical benchmark and for improved analysis of atomic parity violation experiments.

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