

Abstract Submitted
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Precision measurement of light shifts in a single trapped Ba⁺ ion as test of atomic theory JEFF SHERMAN, TIMO KOERBER¹, WARREN NAGOURNEY, NORVAL FORTSON, University of Washington — Using a single trapped barium ion we have developed an rf spectroscopy technique to measure the ratio of the off-resonant vector ac Stark effect (or light shift) in the $6S_{1/2}$ and $5D_{3/2}$ states to 0.1% precision at the 514 nm argon-ion laser line. Our preliminary result² of $R = -11.493(13)$ yields a new test of the theory of alkali-like atomic systems. Since the light shift ratio is expressible as sums of dipole matrix elements, our result also establishes a sum rule involving imprecisely known matrix elements, one of which is important for a proposed single-ion parity violation experiment³. Along with these results we discuss analogous measurements at other wavelengths and future experimental plans.

¹Now with Universitat Innsbruck

²Sherman, J.A. et al., *In preparation*.

³Koerber, T.W. et al., *J. Phys. B* **36** (2003) 637–48.

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