

Abstract Submitted  
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**Precision Measurements of Ba<sup>+</sup> Properties**<sup>1</sup> MATTHEW HOFFMAN, SPENCER WILLIAMS, ANUPRIYA JAYAKUMAR, E.N. FORTSON, BORIS B. BLINOV, University of Washington — Single trapped barium ions continue to offer a wealth of information about atomic and nuclear structure, oscillator strengths, and polarizabilities. We report progress towards a series of precision measurements that will provide stringent tests of theorists' predictions of these various properties. The first of these is a measurement of the  $6S_{1/2} \leftrightarrow 5D_{3/2}$  magnetic dipole transition moment (M1), using a frequency stabilized laser operating at 2051 nm.<sup>2</sup> This measurement is of interest, as knowledge of M1 is necessary in a proposed measurement of atomic parity nonconservation (PNC).<sup>3</sup> The second is a radio-frequency (rf) spectroscopic measurement of the hyperfine structure of the  $5D_{3/2}$ , resulting in a measurement of the nuclear magnetic octupole moment of  $^{137}\text{Ba}^+$ . Finally, we have begun work on measuring the branching ratio of spontaneous decay from  $5D_{5/2}$  to  $6S_{1/2}$  and  $5D_{3/2}$ . The underlying theory and motivation behind these measurements will be presented, as well as experimental upgrades and recent results.

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<sup>2</sup>S.R. Williams *et al.*, PRA **88** 012515 (2013)

<sup>3</sup>E.N. Fortson, PRL **70** 2383 (1993)

Matthew Hoffman  
Univ of Washington

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