

Abstract Submitted  
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**Proposal for parity nonconservation measurements in a single trapped Ba ion**<sup>1</sup> ANUPRIYA JAYAKUMAR, MATTHEW R. HOFFMAN, SPENCER WILLIAMS, E.N. FORTSON, BORIS B. BLINOV, University of Washington — The interaction of the weak neutral currents between the atomic nucleus and electrons through the exchange of  $Z_0$  Bosons results in parity violations in atomic systems. The precision of a single Ba<sup>+</sup> parity nonconservation (PNC) experiment is predicted to be 0.13% (three fold improvement over the recent atomic PNC measurements in Cs [1]). This combined with the atomic theory of Ba<sup>+</sup> will act as a means to test the electroweak physics. We propose to measure the parity violation in Ba<sup>+</sup> by coherently exciting the transition  $6S_{1/2} \leftrightarrow 5D_{3/2}$  with a 2051 nm laser. Interference between  $E1_{PNC}$  (non-vanishing electric dipole transition amplitude between transition  $6S_{1/2} \leftrightarrow 5D_{3/2}$ ) and  $E2$  (electric quadrupole transition amplitude) or  $M1$  (magnetic dipole transition amplitude) gives a measure of the parity violating light shifts. Controlling the polarization of the 2051 nm laser and measuring the associated Rabi frequency in each case enables the extraction of  $E1_{PNC}$  and  $E2/M1$  amplitude from these measurements.

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