Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Improved measurement of the Landé g factor of the $5D_{5/2}$ state of Ba II with a single trapped ion THOMAS NOEL, CAROLYN AUCHTER, MATT HOFFMAN, BORIS BLINOV, University of Washington — We report an improved measurement of the Landé g factor of the $5D_{5/2}$ level of singly ionized barium. The measurement was performed by interrogation of Doppler-cooled $^{138}Ba^{+}$ ions in a linear Paul trap. The $5D_{5/2}$ g factor is extracted from radiofrequency spectroscopy of both the ground level and the metastable $5D_{5/2}$ level. We measure the ground and $5D_{5/2}$ Zeeman splittings at multiple trap rf voltages and magnetic field strengths in order to ensure that ac Zeeman shifts from trap currents do not contaminate the measurement. Other systematics including effects from the power line phase, magnetic field gradients, and magnetic field drifts are addressed. The g factor is found to be 1.20040(4), an increase in precision of an order of magnitude over our previous measurement. This increased precision will enable a new measurement of the octupole moment of the ^{137}Ba nucleus, reducing the dependence on atomic theory calculations to below experimental error.

Thomas Noel
University of Washington

Date submitted: 25 Jan 2013 Electronic form version 1.4