Abstract Submitted
for the NWS11 Meeting of
The American Physical Society

Driving the $5D_{5/2}$ to $6P_{1/2}$ transition of Barium 138 ions ERIK JOSBERGER, TOM NOEL, BORIS BLINOV, MATT DIETRICH, SHAW-PIN CHEN, JOHN WRIGHT, University of Washington — We present our efforts to drive the $5D_{5/2}$ to $6P_{1/2}$ transition of Barium-138 ions. Ytterbium is the only element in which a similarly forbidden transition has been observed: an electric octupole transition with a subhertz linewidth connects the ground state to a metastable state [1]. In Barium, the transition connects the metastable $5D_{5/2}$ state to the short-lived $6P_{1/2}$ state, so the natural linewidth is much broader. Measurements were performed on a single Doppler-cooled ion in a linear Paul trap. We drive the transition with a frequency stabilized external cavity diode laser of nominal wavelength 686nm, with accuracy better than 20MHz. Detection is facilitated by a laser at 1762nm which takes the ion from the ground state to the $5D_{5/2}$ level. To date, we have not found significant evidence of a driven transition, suggesting that it is too weak to be excited by laser intensities on the order of $10W/cm^2$ over an integration times of 10s.

[1] M. Roberts *et al.*, Phys. Rev. Lett. **78,** 1876 (1997).

Erik Josberger
University of Washington

Date submitted: 14 Sep 2011 Electronic form version 1.4