Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Probing the spatial distribution of nuclear magnetism in francium by optical spectroscopy[1] S. AUBIN, Dept. of Physics, College of William and Mary, Williamsburg, VA 23187, USA, M. TANDECKI, J.A. BEHR, M.R. PEARSON, TRIUMF, Vancouver, BC V6T 2A3, Canada, J. ZHANG, L.A. OROZCO, JQI, NIST, and Dept. of Physics, UMD, College Park, MD 20742, USA, R. COLLISTER, G. GWINNER, Dept. of Physics, U. of Manitoba, Winnipeg, MB R3T 2N2, Canada, E. GOMEZ, Instituto de Fisica, UASLP, San Luis Potosi 78290, Mexico — The recently commissioned Francium Trapping Facility at TRIUMF in Vancouver, Canada will enable experiments to study weak interactions in francium atoms. We have successfully trapped and cooled ^{206,207,209,213,221}Fr isotopes in large quantities (10^4 to 10^5) with trap lifetimes comparable to the radioactive lifetimes of the shortest lived trapped isotope ($t_{1/2}$ = 14.8s). We use a combination of radio-frequency and optical spectroscopy to determine the hyperfine splittings of the $7P_{1/2}$ level of isotopes ^{206,207,209,213}Fr to the 100 ppm level. These measurements, in combination with the known hyperfine ground state splittings, can be used to study the hyperfine anomaly in these isotopes. Our results extend previous work on the neutron distribution[2] to a closed neutron shell isotope (213) and to neutron deficient isotopes (206, 207). These spectroscopic measurements also allow us to extract the isotope shifts to study changes in the charge radius.

[1]Work supported by NSERC and NRC from Canada, NSF and DOE from USA, and CONACYT from Mexico

[2]Grossman *et al.*, *Phys. Rev. Lett.* **8**3, 935 (1999).

S. Aubin
College of William and Mary

Date submitted: 01 Jul 2013 Electronic form version 1.4