

Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Atom trap for ^{221}Fr from ^{225}Ac ion beam implantation¹ M. TANDECKI, J.A. BEHR, M.R. PEARSON, TRIUMF, J. ZHANG, L. OROZCO, U. Maryland, R. COLLISTER, G. GWINNER, U. Manitoba, E. GOMEZ, U. San Luis Potosi, S. AUBIN, College of William and Mary — A neutral atom trap for francium parity violation experiments is being set up at TRIUMF. The half-lives of the longest isotopes are minutes, which mostly will be produced by the online mass separator of the ISAC facility. For systematic error studies for precision measurements, it can help to have a longer-lived source. ^{221}Fr is produced by $t_{1/2}=10$ day ^{225}Ac α decay, and has been trapped at JILA [Z.-T. Lu PRL 79 994 (1997)]. Our approach would implant the mass-separated ^{225}Ac beam produced by ISAC at $1 \times 10^7/\text{s}$ for a day after the production proton beam is turned off. The scheme to be tested: 30 keV ^{225}Ac beam is implanted in tantalum for a day; the sample is held in front of an yttrium foil (normally used to stop a mass-separated Fr beam) for 1 minute; 100 keV ^{221}Fr recoils escape and implant in the yttrium; tantalum is withdrawn, yttrium is moved to trap and heated; cycle repeats. First tests are planned for September, and one goal is precise measurements of atomic hyperfine splittings sensitive to the spatial distribution of nuclear magnetism.

¹Supported by NSERC, NRC through TRIUMF, DOE, NSF.

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Date submitted: 10 Jul 2012

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