Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Studies of radon nuclear polarization and relaxation[1] SARAH NUSS-WARREN, ERIC TARDIFF, CASEY SCHNIEDER-MIZELL, TIM CHUPP, University of Michigan FOCUS Center, JOHN BEHR, MATTHEW PEARSON, TRIUMF, NORBERT PIETRALLA, GEORGI RAINOVSKI, GENE SPROUSE, Nuclear Structure Lab, SUNY Stony Brook — In preparation for electric dipole moment (EDM) measurements with octupole deformed ^{223}Rn, a radon source has been developed at the Stony Brook Nuclear Structure Lab, and studies of radon polarization and relaxation are underway. The ^{209}Rn (29 m) is produced from the decay of ^{209}Fr (50 s) produced by ^{197}Au(^{16}O,4n) at about 100 MeV beam energy. The ^{209}Fr ionizes at the surface of the heated gold target, is accelerated to 5 keV and implanted in a zirconium foil. To release the radon, the foil is heated. The radon is frozen into a valved measurement cell to which N_2 buffer gas is added. The radon is polarized by spin exchange with optically pumped Rb vapor and nuclear orientation is detected by observing anisotopy of ^{209}At gamma rays populated by beta-decay/electron capture. The EDM measurements require free precession with coherence times of order 100 seconds, which are expected to be limited by wall relaxation in the measurement cell. Spin exchange parameters and wall relaxation will be studied with varying temperatures, wall coatings, and buffer gas compositions.

[1]supported by DOE, NSF, UM FOCUS Center, NSERC

Sarah Nuss-Warren
University of Michigan

Date submitted: 25 May 2005 Electronic form version 1.4