Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Laser trapping of Ra-225 and Ra-226 and progress towards an electric dipole moment measurement[1] J.R. GUEST, N.D. SCIELZO, I. AHMAD, K. BAILEY, J.P. GREENE, R.J. HOLT, Z.-T. LU, T.P. O'CONNOR, D.H. POTTERVELD, Physics Division, Argonne National Laboratory — Permanent electric dipole moments (EDMs) in atoms or molecules are signatures of Time (T)-and Parity (P)-violation and represent an important window onto physics beyond the Standard Model. We are developing a next generation EDM search around laser-cooled and trapped Ra-225 ($t_{1/2}$ = 15 d). Due to octupole deformation of the nucleus, Ra-225 is predicted to be two to three orders of magnitude more sensitive to T-violating interactions than Hg-199, which currently sets the most stringent limits in the nuclear sector. We will discuss our progress, including the successful laser cooling and trapping of Ra-225 and Ra-226 atoms. We have demonstrated transverse cooling, Zeeman slowing, and capture of Ra-225 and Ra-226 atoms in a magneto-optical trap (MOT). By driving a second atomic transition, we have extended the lifetime of the trap from milliseconds to seconds and performed necessary spectroscopic measurements.

[1]This work was supported by the U.S. Department of Energy, Office of Nuclear Physics, under contract no. W-31-109-ENG-38.

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Date submitted: 26 Jun 2006 Electronic form version 1.4