DNP16-2016-000435
E

Abstract for an Invited Paper
for the DNP16 Meeting of
the American Physical Society

Neutral atom traps of rare isotopes[1]

PETER MUELLER, Physics Division, Argonne National Laboratory

Laser cooling and trapping techniques offer exquisite control of an atoms external and internal degrees of freedom. The species of interest can be selectively captured, cooled close to absolute zero temperatures, and observed with high signal-to-noise ratio. Moreover, the atoms electronic and magnetic state populations can be precisely manipulated and interrogated. Applied in nuclear physics, these techniques are ideal for precision measurements in the fields of fundamental interactions and symmetries, nuclear structure studies, and isotopic trace analysis. In particular, they offer unique opportunities in the quest for physics beyond the standard model. I will shortly review the basics of this approach and the state of the field and then cover in more details recent results from two such efforts: the search for a permanent electric dipole moment in ^{225}Ra and the beta-neutrino angular correlation measurement with laser trapped ^{6}He.

[1]This work is supported by the U.S. DOE, Office of Science, Office of Nuclear Physics, under contract DE-AC02-06CH11357.