Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Towards a Laser Spectroscopic Determination of the ^{8}He Nuclear Charge Radius[1] P. MUELLER, K. BAILEY, R.J. HOLT, R.V.F. JANSSENS, Z.-T. LU, T.P. O'CONNOR, J.P. SCHIFFER, I. SULAI, Argonne National Laboratory, M.-G. SAINT LAURENT, J.-CH. THOMAS, A.C.C. VILLARI, GANIL, O. NAVILIAT-CUNCIC, X. FLECHARD, Laboratoire de Physique Corpusculaire, Caen, S.-M. HU, University of Science and Technology of China, G.W.F. DRAKE, University of Windsor, M. PAUL, Hebrew University — ^{8}He ($t_{1/2}$ = 119 ms) has the highest neutron to proton ratio of all bound nuclei. Precision measurements of its nuclear structure shed light on nuclear forces in neutron rich matter that, for example, play a critical role in neutron stars. Our experiment to measure the ^{8}He nuclear charge radius is based on our previous work of high-resolution laser spectroscopy of helium atoms cooled and confined in a magneto-optical trap. This technique enabled us to accurately measure the atomic isotope shift between ^{6}He and ^{4}He and thereby to determine the ^{6}He rms nuclear charge radius to be 2.054(14) fm. We are currently well on the way to improve the overall trapping efficiency and signal-to-noise ration of our system to compensate for the shorter lifetime and lower production rates of ^{8}He as compared to ^{6}He. The ^{8}He measurement is planned to be carried out at the GANIL cyclotron facility in Caen, France in late 2006.

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

Peter Mueller
Argonne National Laboratory

Date submitted: 10 Jul 2006 Electronic form version 1.4