Abstract Submitted
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Measuring the Neutron Lifetime Using Magnetically Trapped Ultracold Neutrons CHRISTOPHER O'SHAUGHNESSY, North Carolina State University, KEVIN COAKLEY, National Institute of Standards and Technology, JOHN DOYLE, Harvard University, ROBERT GOLUB, PAUL HUFFMAN, EKATERINA KOROBKINA, North Carolina State University, STEVE LAMOREAUX, Yale University, HANS MUMM, University of Maryland, KARL SCHELHAMMER, PIL-NEO SEO, CHRISTOPHER SWANK, North Carolina State University, ALAN THOMPSON, GRACE YANG, National Institute of Standards and Technology, LIANG YANG[1], Harvard University — The neutron lifetime is an important parameter for tests of standard model and big bang nucleosynthesis. Our collaboration has successfully demonstrated the feasibility of using magnetically trapped ultracold neutrons for this measurement. In this experiment ultracold neutrons are loaded into an Ioffe-type superconducting magnetic trap as they are produced through the superthermal technique in superfluid helium-3. Trapped neutrons are then detected via scintillation light of liquid helium due to the decay events. The advantages of this technique are the continuous detection of the decay events and the elimination of trap losses due to interactions with a material wall potential. Current work is aimed at upgrading the experiment to include a larger and deeper magnetic trap. This is expected to reduce the statistical uncertainties to 1-3 s. Here the apparatus upgrades will be discussed.

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