

Abstract Submitted
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Recent Progress Towards a Measurement of the Neutron Lifetime Using Magnetically Trapped Ultracold Neutrons¹ K.W. SCHELHAMMER, C.R. HUFFER, P.R. HUFFMAN, D.E. MARLEY, North Carolina State University, K.J. COAKLEY, MICHAEL HUBER, P.P. HUGHES, H.P. MUMM, A.K. THOMPSON, A.T. YUE, National Institute of Standards and Technology, N.C. ABRAMS, Whitman College — Free neutron beta decay is a fundamental process in the Standard Model that can be used to test the weak interaction as well as provide information about primordial ^4He abundance. Recent precision measurements of the neutron lifetime have led to reduced confidence in the absolute value of this parameter; due presumably to unknown systematic effects. This work seeks to measure the neutron lifetime using a different technique that employs a superconducting magnetic trap to confine ultracold neutrons. Neutrons are loaded into the trap through the superthermal technique where 1 mEv neutrons down scatter from phonons in liquid helium losing the majority of their energy. Neutrons in the appropriate spin state are then confined by the static magnetic field. During the past year, over 400 run cycles of data were collected using the upgraded apparatus. Analysis of previous data sets was limited due to large numbers of background events relative to the neutron decay signal. An increased number of trapped neutrons as well as a analysis using pulse shape discrimination allows one to significantly increase the overall precision of the measurement. Details of this ongoing analysis will be presented with preliminary results.

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