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An Apparatus for Absolute Neutron Flux Measurement A. YUE, The University of Tennessee - Knoxville, G. GREENE, The University of Tennessee - Knoxville / Oak Ridge National Laboratory, M.S. DEWEY, D. GILLIAM, J. NICO, National Institute of Standards and Technology, A. LAPTEV, Tulane University —
A fully-absorbing neutron detector is being developed to measure the absolute flux (s^{-1}) of a cold neutron beam at the level of 0.1 %. The device will be used to calibrate a neutron flux monitor used in an in-beam neutron lifetime measurement performed at NIST ($\tau_n = (886.3 \pm 3.4)$ s). The precision of the measurement was limited by the uncertainty in the efficiency of the neutron flux monitor (0.3 %). The flux monitor operates by counting charged particles produced when neutrons impinge on a ^{6}Li (or ^{10}B) foil. Its efficiency was calculated from the cross section, the solid angle subtended by the charged particle detectors, and the amount of neutron-absorbing material present on the foil. Successful calibration would reduce the neutron lifetime uncertainty to approximately 0.25 %. In addition, using the measured solid angle and amount of material on the deposit, a new experimental value for the ^{6}Li or (^{10}B) capture cross section will be obtained. Details of the apparatus and the measurement technique along with the status of the experiment will be discussed.

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