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Measuring The Neutron Lifetime to One Second Using in Beam Techniques JONATHAN MULHOLLAND, University of Tennessee, NIST IN BEAM LIFETIME COLLABORATION — The decay of the free neutron is the simplest nuclear beta decay and is the prototype for charged current semi-leptonic weak interactions. A precise value for the neutron lifetime is required for consistency tests of the Standard Model and is an essential parameter in the theory of Big Bang Nucleosynthesis. A new measurement of the neutron lifetime using the in-beam method is planned at the National Institute of Standards and Technology Center for Neutron Research. The systematic effects associated with the in-beam method are markedly different than those found in storage experiments utilizing ultracold neutrons. Experimental improvements, specifically recent advances in the determination of absolute neutron fluence, should permit an overall uncertainty of 1 second on the neutron lifetime. The technical improvements in the in-beam technique, and the path toward improving the precision of the new measurement will be discussed.

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