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Towards an In-Beam Measurement of the Neutron Lifetime to 1 Second JONATHAN MULHOLLAND, University of Tennessee — 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 dependence of the primordial mass fraction on the neutron lifetime, technical improvements of the in-beam technique, and the path toward improving the precision of the new measurement will be discussed.

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