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### **Measuring the Neutron Lifetime Using Magnetically Trapped Ultracold Neutrons<sup>1</sup>**

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The neutron lifetime plays an important role in understanding both the Standard Model and Big Bang Nucleosynthesis. The two most precise measurements to date use ultracold neutrons (UCN) bottled in a material-walled trap. Each group reports measurements with uncertainties of approximately 1 s, but differ in their central value by almost 7 s. We are in the process of measuring the lifetime using a newly-developed technique employing magnetic trapping that has a completely different set of systematic effects than all previous measurements. We have successfully demonstrated the feasibility of the technique, with current work aimed at upgrading the apparatus to significantly increase the number of trapped neutrons. We expect to reduce the statistical uncertainties in our measurement technique to 1-2 s when running at NIST, with greater improvements expected at the SNS.

<sup>1</sup>In collaboration with Chris O'Shaughnessey, Chris Swank, and Pil Seo, North Carolina State University; Pieter Mumm and Alan Thompson, National Institute of Standards and Technology; and John Doyle, Harvard University.