

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Prospects for Using Coherent Elastic Neutrino-Nucleus Scattering to Measure the Nuclear Neutron Form Factor KELLY PATTON, North Carolina State University, JON ENGEL, University of North Carolina at Chapel Hill, GAIL MCLAUGHLIN, North Carolina State University, KATE SCHOLBERG, Duke University — We suggest coherent elastic neutrino-nucleus scattering (CENNS) as a method for measuring the neutron part of the nuclear form factor. Using an expansion into moments of the form factor, we show that the second moment (the neutron radius), as well as the fourth moment can be probed using neutrinos from a stopped pion source. We use Monte Carlo techniques to demonstrate that the neutron radius could be found with an uncertainty of a few percent in tonne scale detectors of argon, germanium, and xenon. The effects of detector shape uncertainty and detector size were also studied to determine the prospects of such a measurement. We find that in order to measure the neutron radius to 5%, the the spectral shape uncertainty of the detector needs to be known to 1% or better.

Kelly Patton
North Carolina State University

Date submitted: 28 Jun 2013

Electronic form version 1.4