Abstract Submitted
for the APR16 Meeting of
The American Physical Society

High-Energy Neutron Spectra and Flux Measurements Below Ground CALEB ROECKER, Univ of California - Berkeley, ADAM BERNSTEIN, Lawrence Livermore National Laboratory, PETER MARLEAU, Sandia National Laboratories, KAI VETTER, Lawrence Berkeley National Laboratory, Univ of California - Berkeley — High-energy neutrons are a ubiquitous and often poorly measured background. Below ground, these neutrons could potentially interfere with antineutrino based reactor monitoring experiments as well as other rare-event neutral particle detectors. We have designed and constructed a transportable fast neutron detection system for measuring neutron energy spectra and flux ranging from tens to hundreds of MeV. The spectrometer uses a multiplicity technique in order to have a higher effective area than traditional transportable high-energy neutron spectrometers. Transportability ensures a common detector-related systematic bias for future measurements. The spectrometer is composed of two Gd containing plastic scintillator detectors arranged around a lead spallation target. A high-energy neutron may interact in the lead producing many secondary neutrons. The detector records the correlated secondary neutron multiplicity. Over many events, the response can be used to infer the incident neutron energy spectrum and flux. As a validation of the detector response, surface measurements have been performed; results confirm agreement with previous experiments. Below ground measurements have been performed at 3 depths (380, 600, and 1450 m.w.e.); results from these measurements will be presented.

Caleb Roecker
Univ of California - Berkeley

Date submitted: 06 Jan 2016 Electronic form version 1.4