Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Measuring Underground Neutron Fluxes for Neutrinoless Double Beta Decay[1] KATRINA COLLETTI, Fordham University, REX TAYLOE, ROBERT COOPER, LANCE GARRISON, TYLER THORNTON, ETHAN STEELE, Indiana University — The goal of this project was to measure the muon-induced neutron flux in lead at sea level using the SciBath neutral particle detector. The muon-induced neutron rate is not well known, is challenging to measure and simulate, and potentially an important background for underground experiments such as the EXO neutrinoless double beta-decay experiment. A mass of 45 kg of lead was placed on top of the detector, and muon/neutron-capture correlated events were measured. Events with accidental neutron-capture signals were subtracted as were muon/neutron-capture correlated events from spallation in the detector liquid scintillator. This procedure resulted in a neutron yield from lead at sea level of $1.4\,(\pm 1.1) \times 10^{-5}\,\frac{\mathrm{n}}{\mu}\,(\mathrm{gcm}^{-2})^{-1}$ with the typical muon energy at sea level $E_\mu \approx 4\mathrm{GeV}$. We compare this to parameterizations created for underground experimental sites extrapolated up to sea level.

[1]NSF funded

Katrina Colletti
Fordham University

Date submitted: 29 Jul 2013 Electronic form version 1.4