Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Cosmogenic activation in the neutrinoless double-beta decay experiment CUORE[1] BARBARA WANG, ERIC NORMAN, University of California, Berkeley, NICHOLAS SCIELZO, Lawrence Livermore National Laboratory, ALAN SMITH, Lawrence Berkeley National Laboratory, KEENAN THOMAS, University of California, Berkeley — The Cryogenic Underground Observatory for Rare Events (CUORE) will search for the neutrinoless double-beta ($0\nu\beta\beta$) decay of ^{130}Te using an array of 988 high-resolution bolometers. Each bolometer, comprised of a TeO_2 crystal and a thermal sensor, serves as both a source and a detector. Observation of $0\nu\beta\beta$ decay requires that all backgrounds be identified and understood. One source of background that is poorly characterized is cosmogenic neutron activation of the TeO_2 crystals. This process, which produces long-lived radioisotopes that can obscure the $0\nu\beta\beta$ decay signal, occurs while the crystals are transported by ship from their production site in China to the detector site in Italy. Cross-section measurements in which TeO_2 targets are irradiated with a spectrum mimicking that of cosmic-ray neutrons were carried out at the Los Alamos Neutron Science Center. The resulting cross-sections have been used in a Monte Carlo simulation to estimate the cosmogenic background that will be present in CUORE.

[1]Supported by the U.S. Dept of Energy, Office of Defense Nuclear Nonproliferation (NA-22), LLNL under Contract DE-AC52-07NA27344, and a Nuclear Forensics Graduate Fellowship from the U.S. Dept of Homeland Security, DNDO and the U.S. Dept of Defense, DTRA

Barbara Wang
University of California, Berkeley

Date submitted: 04 Jul 2012 Electronic form version 1.4