

Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Construction of the MAJORANA DEMONSTRATOR¹ LOGAN RICE, Wabash College and University of North Carolina, MAJORANA COLLABORATION COLLABORATION — The MAJORANA DEMONSTRATOR aims to demonstrate the feasibility of searching for neutrinoless double beta decay of ^{76}Ge at the tonne scale. The DEMONSTRATOR will consist of an array of 30 kg of enriched ^{76}Ge and 10 kg of natural high purity Ge detectors that serve as both source and detector. It is currently being constructed at the Sanford Underground Research Facility in Lead, SD. Searching for such a rare process with a half-life of at least 10^{25} years requires a detector with correspondingly low background rates. Cosmologically induced backgrounds are reduced by shielding the detector 4850 feet underground and inside a layered shield of Cu, Pb, and neutron absorbing plastic. Additional background reduction is provided by using an inner shield of electroformed copper that is fabricated in a controlled underground environment to reduce U and Th contaminants by a factor of ~ 1000 over OFHC copper. Backgrounds can be reduced further by using data analysis methods to reject multi-site events, events consistent with a decay chain series, and other events likely to have occurred because of contaminants. These methods are expected to allow MAJORANA DEMONSTRATOR to achieve backgrounds 3.0 counts in the region of interest per tonne year of exposure.

¹Presented on behalf of the MAJORANA Collaboration

Logan Rice
Wabash College and University of North Carolina

Date submitted: 03 Aug 2012

Electronic form version 1.4