Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Radio-purity design elements for the MAJORANA DEMONSTRATOR[1] CHRISTOPHER O'SHAUGHNESSY, University of North Carolina at Chapel Hill — The MAJORANA collaboration is building an experiment to search for neutrinoless double beta ($0\nu\beta\beta$) decay of ^{76}Ge. The expected signal for half-lifes of 10^{26} to 10^{27} years will be a few counts/tonne-year. This puts very tight constraints on the allowable background radiation in the vicinity of the detector. Designing an experiment that will have a sensitivity to neutrino masses in the in the range dominated by the inverted hierarchy, 15 – 50 meV, will require a source with tonne-scale mass and backgrounds contributions in the region of interest of $\sim$ one count per tonne-year. The added constraints from radio-purity often render the standard solutions to common design problems untenable. Here we will present some of the ultrapure vacuum and cryogenic technologies being developed for the Majorana experiment. While developed for $0\nu\beta\beta$ these design elements can be extended to all manner of low background experiments.

[1]This work is supported by grants from the DOE Office of Nuclear Physics and the NSF Particle Astrophysics program.

Christopher O'Shaughnessy
University of North Carolina at Chapel Hill

Date submitted: 01 Jul 2013 Electronic form version 1.4