Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Study Well-Shaped Germanium Detectors for Low-background Counting WENZHAO WEI, DONGMING MEI, CHAO ZHANG, The University of South Dakota, CUBED COLLABORATION — Radiogenic particles are known as the main sources of background for all ultra-low background experiments in the detection of dark matter and neutrino properties. In particular, the radiogenic gamma rays from PMTs are a main component of the observed backgrounds in the noble liquid detectors such as XENON100 and LUX. This suggests a more accurate screening of PMTs is needed for the next generation experiments such as LUX-Zplin or Xenon1T. Hence, we propose to develop well-shaped germanium detectors for a better understanding of the radiogenic background from PMTs. A well-shaped germanium detector array and PMT (R11410MOD) have been designed in a Geant4-based Monte Carlo simulation, in which three radiogenic background sources from ^{238}U, ^{232}Th and ^{40}K have been studied. In this work, we show the detector performance including the detector efficiency, energy resolution and the detector sensitivity for low-background counting in the detection of rare event physics.

Wenzhao Wei
The University of South Dakota

Date submitted: 01 Jul 2014 Electronic form version 1.4