

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Development of HPGe detectors with amorphous Ge contacts for rare-event physics searches¹ WENZHAO WEI, RAJENDRA PANTH, XI-ANGHUA MENG, HAO MEI, GUOJIAN WANG, DONGMING MEI, JING LIU, Univ of South Dakota, PIRE-GEMADARC COLLABORATION — Large high-purity germanium (HPGe) detectors are needed for dark matter and neutrinoless double-beta decay experiments. Currently, large (up to 10 cm in diameter) HPGe crystals with impurity concentration below $5 \times 10^{10}/\text{cm}^3$ can be grown at the University of South Dakota (USD). The quality of USD-grown crystals has been verified to be sufficient for use in large detectors by converting those crystals into small planar HPGe detectors and characterizing the detector performance. We report the testing results from ten good detectors fabricated so far with amorphous germanium (a-Ge) contacts, which can block both electrons and holes. We investigated an important property of the a-Ge contacts, the energy barrier to charge injection, to optimize the a-Ge contacts and thus minimize the detector leakage current. We also studied the charge trapping processes utilizing nine of our planar detectors to have a better understanding of the crystals we grow at USD.

¹This work is supported by NSF OISE-1743790, NSF PHY-1902577, NSF OIA-1738632, DOE DE-SC0004768, and the state of South Dakota.

Wenzhao Wei
Univ of South Dakota

Date submitted: 08 Jan 2020

Electronic form version 1.4