

Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Large-size germanium crystal growth for rare event physics¹
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ORATION — Cosmogenic production in germanium crystals grown on the surface
can limit the sensitivity for the next generation deep underground experiments in
searching for rare event physics beyond the Standard Model. One of the best so-
lutions to eliminate unwanted cosmogenics is to produce the germanium crystals
and detectors in an underground environment. The goal of this project is to cre-
ate state-of-the-art detectors to advance neutrinoless double-beta decay and dark
matter exploration research and technology while simultaneously paving the way
for infrastructure to support an underground laboratory for zone refining, crystal
growth, and detector fabrication. The greatest challenge in the growth of germa-
nium crystals is a lack of precise control of individual crystal properties such as the
impurity distribution, the dislocation density, and the crystalline structure. With
knowledge gained from the pioneers in the field of crystal growth, the researchers
have developed a novel technique to grow detector-grade crystals. In this paper, we
will report detector-grade large-size germanium crystal growth at the University of
South Dakota.

¹DE-FG02-10ER46709 and the state of South Dakota

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Date submitted: 01 Jul 2014

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