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Advances in High Purity Germanium Single Crystals: Characterization and Progress at the USD

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This presentation provides an overview of the recent advancements in High Purity Germanium (HPGe) crystals at the University of South Dakota (USD). The focus of this research lies in the meticulous characterization of HPGe crystals, addressing critical parameters such as impurity concentration, dislocation density, and diameter control during crystal growth.

Our goal is to improve the efficiency and performance of HPGe detectors, driven by the requirements of the research and development involved in rare event searches. In order to investigate elusive events such as neutrinoless double- beta decay and dark matter interactions, these detectors are essential that demand unprecedented sensitivity and precision. Such detectors can only be fabricated if good quality of crystals can be grown with homogenous net impurity concentration of ˜5x10ˆ{9} to 3x10ˆ{10}/cm3.

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Primary author: BHATTARAI, Sanjay (University of South Dakota)

Co-authors: Dr MEI, Dongming (University of South Dakota); Mr DONG, Kungming (University of South Dakota); Mr WARREN, Austin (University of South Dakota); Mr BUDHATHOKI, Narayan (University of South Dakota)

Presenter: BHATTARAI, Sanjay (University of South Dakota)

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