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Implication of the Temperature-Dependent Charge Barrier Height of Amorphous Germanium Contact Detector in Searching for Rare Event Physics[1] RAJENDRA PANTH, WENZHAO WEI, DONGMING MEI, JING LIU, SANJAY BHATTARAI, HAO MEI, MATHBAR RAUT, PRAMOD ACHARYA, KYLER KOOI, GUOJIAN WANG, University of South Dakota, PIRE-GEMADARC COLLABORATION — Exploration of Germanium (Ge) detectors with amorphous Ge (a-Ge) contacts has drawn attention to the searches for rare-event physics such as dark matter and neutrinoless double-beta decay. The charge barrier height (CBH) of the a-Ge contacts deposited on the detector surface is crucial to suppress the leakage current of the detector in order to achieve a low-energy detection threshold and high-energy resolution. The temperature-dependent CBH of a-Ge contacts for three Ge detectors is analyzed to study the bulk leakage current (BLC) characteristics. The results show that CBH is temperature dependent. The direct relation of the CBH variation to temperature is related to the barrier inhomogeneities created on the interface of a-Ge and crystalline Ge. The inhomogeneities that occur at the interface were analyzed using the Gaussian distribution model for three detectors. The implication of the CBH at zero temperature is discussed for Ge detectors with a-Ge contacts in searching for rare-event physics.

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