

Abstract Submitted
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Experimental study of electrical conduction mechanisms in P-type amorphous germanium (Ge) used as contacts for Ge detectors in search for rare-event physics¹ SANJAY BHATTARAI, RAJENDRA PANTH, DONGMING MEI, JING LIU, WENZHAO WEI, Univ of South Dakota, PIRE-GEMADARC COLLABORATION — The surface leakage current of a High purity Germanium detector can decrease the detector performance significantly. This surface leakage current mainly depends upon the electrical property of the passivating material(a-Ge).Electrical conduction mechanisms in the disordered material system p-type amorphous germanium (a-Ge) used for surface passivation of a high purity germanium detector were experimentally studied for the first time. The localization length and the Hopping parameters in a-Ge were determined using the surface leakage current measured from three high-purity planar germanium detectors. The temperature-dependent hopping distance and hopping energy were obtained for a-Ge fabricated as the electrical contact materials for high-purity germanium planar detectors. As a result, we find that the hopping energy in a-Ge increases as temperature increases while the hopping distance in a-Ge decreases as temperature increases. The localization length of a-Ge is on the order of 1.7 \AA to 2.94 \AA , depending on the density of states near the Fermi level.

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