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Development of Planar P-type Point Contact Germanium Detectors for Low-Mass Dark Matter Searches[1] WENZHAO WEI, HAO MEI, KYLER KOOI, DONGMING MEI, JING LIU, JIANCHEN LI, RAJENDRA PANTH, GUOJIAN WANG, University of South Dakota, PIRE-GEMADARC COLLABORATION — The detection of low-energy deposition in the range of sub-eV through ionization using germanium (Ge) with a bandgap of about 0.7 eV requires internal amplification of charge signal. This can be achieved through high electric field which accelerates charge carriers to generate more charge carriers. The minimum electric field required to generate internal charge amplification is derived for different temperatures. A point contact Ge detector provides extremely high electric field in proximity to the point contact. We show the development of a planar point-contact detector and its performance. The field distribution is calculated for this planar point contact detector. We demonstrate the required electric field can be achieved with a point contact detector.

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