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Pulse Shape Discrimination of Bulk and Very Bulk Events within HPGe Detectors

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The CDEX (China Dark matter Experiment) now deploys ~10 kg pPCGe (p-type Point Contact Germanium) detectors in CJPL (China Jinping Underground Laboratory). It aims to detect rare events such as dark matter and 0vbb (Neutrinoless double beta decay). The discrimination of bulk and very bulk events are essential for improvements of the analysis threshold of dark matter. Very bulk events are generated near the p+ point surface of pPCGe, which are usually from radioactive materials of electronic devices. Due to different locations of charge collection, bulk and very bulk events have different pulse shape. This paper will use CCM (Charge Comparison Method) to realize the discrimination of bulk and very bulk events. Two kind of ADCs (Analog-to-Digital Converters) are used for pulse digitization and their results are also compared. The preliminary results show that FOMs (Figure of Merit) are 1.34 ± 0.55 and 0.49 ± 0.12 using 1 GSPS 12-bit and 100 MSPS 14-bit ADC respectively.

Minioral

Yes

IEEE Member

Yes

Are you a student?

Yes

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