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Orientation of the Ge Crystals of the iThemba LABS Segmented Clover Detector

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**Abstract content (Max 300 words)
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By using an automated scanning table, the position sensitive response of crystals A, B, C and D, of the iThemba LABS segmented clover detector were measured using the ^{241}Am collimated source [1]. One of the primary parameters to describe a Ge detector for pulse shape analysis is the orientation of the crystallographic axis of the cubic centered Ge crystal. The drift mobility for the electron-hole pair in the Ge depends on the orientation of the electrical field with respect to this axis and causes deviation in the collection times of up to 30% [2]. The intention is to characterize the segmented iThemba LABS Ge clover detector, for pulse shape analysis and develop a technique that determines the individual position of each energy deposition caused by the interaction of a gamma-ray in the segmented Ge crystal [3]. The T30 to T90 rise-time distributions, which refers to the time needed for the pulse to rise from 10% to 90% of its amplitude, were measured from each core at 12 mm radial distance and with a step of 100 around the core. Our results suggest that the drift velocity is position sensitive for each crystal of the detector. This necessitates a measurement of the crystal orientations of the four crystals of the detector.

[1] M. Descovich, et al., Nucl. Instr. And Meth., A553, 512-521 (2005)

[2] B. Bruyneel, et al., Nucl. Instr. And Meth., A569, 764 (2006)

[3] C. E. Svensson, et al., Nucl. Inst. And Meth. A 540, 348-360 (2005)

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