

Frontiers in Gamma Ray Spectroscopy

FIG18

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Study of cross-talk in a planar HPGe strip detector

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Content :

An important observation common in strip detectors is the cross-talk occurring between its different strips due to electronic coupling between them. In the present work this has been investigated for a planar HPGe strip detector, proposed to be used in the g-array for the DEcay SPECTroscopy [1] measurements at the upcoming FAIR [2] facility. The effect of cross-talk on the summed energy signal from all strips is seen to manifest as a double peak structure around the expected photo-peak energy and a degraded energy resolution. An average cross-talk of 1.5% of the deposited energy for the AC side and 0.5% for the DC side has been observed. To correct for the cross-talk and recover the correct photo-peak energies, a correction procedure has been developed assuming that the cross-talk affects the energy in each strip linearly. Application of the correction procedure removes the double peak structure but over-corrects the summed energy. Reducing the cross-talk coefficients by an offset factor gives the best correction to recover the photo-peak energy. Nonlinear cross-talk is observed for Compton scattered events between different strips and is found to be the origin of the offset factor required for the cross-talk coefficients.

References:

- [1] Technical Proposal for the Design, Construction, Commissioning and Operation of the HISPEC/DESPEC experiment at the Low-Energy Branch of the Super-FRS facility, Technical Report, 2005. URL: http://personal.ph.surrey.ac.uk/~phs1zp/Tech_Proposal_HISPEC_DESPEC-published.doc
- [2] FAIR homepage, 2016. URL: <http://www.fair-center.eu/>.

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