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A direction sensitive sapphire detector for single particle detection

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A multichannel detector designed for single minimum ionising particle detection using a stack of sapphire plates is presented.
The performance of the detector was studied in a 5 GeV electron beam at DESY-II. The detector was operated together
with the EUDET beam telescope, which allowed the reconstruction of the position of the impact point at the detector. For each sapphire
plate the charge collection efficiency was measured as a function of the bias voltage and the signal size as a function of the hit
position with respect to the metal electrodes. The charge collection efficiency rises with the voltage, reaching about 10% at
950V. Also evidence for the presence of a polarization field was observed. The data confirms the prediction that mainly electrons
contribute to the signal. Based on these results the next generation sapphire detector will be designed

Collaboration

FCAL

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