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Characterization of M-π-N CdTe Pixel Detectors Coupled to Hexitec Readout Chip

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atterning or pixelization of anode-side of an M-π-n CdTe diode, where the pn-junction is diffused into the detector bulk, is highly motivated to improve the spatial and energy resolution by reading out the electrons instead of holes; to reduce the effects of polarization, and to be able to fabricate double sided M-π-n CdTe detector.
It has been shown that very high inter-pixel resistance and low leakage currents are obtained by physical isolation of the pixels of M-π-n CdTe detectors. For this presentation we have patterned M-π-n CdTe detectors to stud bonded them at RAL to a spectroscopic readout chip, Hexitec. The CdTe pixel detectors have 250 μm pixel pitch and area of 5x5 mm2 with thicknesses of 0.5, 1 and 2 mm.

The presentation aims to present polarization and energy resolution dependence of the M-π-n CdTe detectors as a function of detector thickness, bias voltage and temperature. The first results with the 1 mm thick Hexitec CdTe detector indicate no obvious polarization at 600 V reverse bias at room temperature when exposed to a Tb fluorescence source (Kα - 44.5 keV) for 2 hours. A single pixel energy resolution at best has been demonstrated to be of the order of 700 eV defined by observed separation of the Kα1 and Kα2 lines of the Tb fluorescence source.

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