

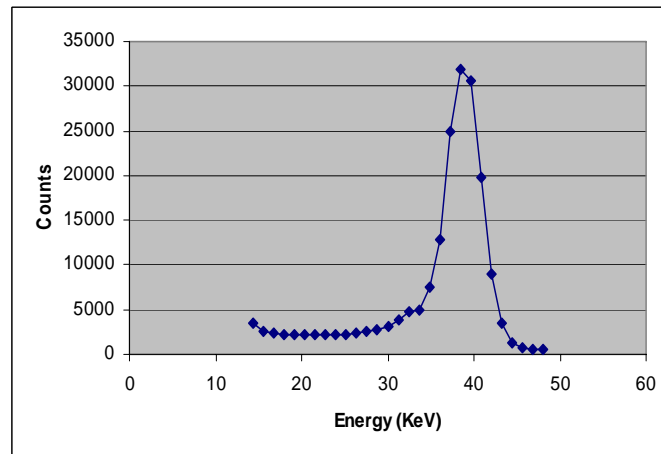
# Characterisation of a pixellated CdTe detector with Single Photon Processing Readout

C. Fröjd<sup>1</sup>, H. Graafsma<sup>2</sup>, B. Norlin<sup>1</sup>, H. E. Nilsson<sup>1</sup>, C. Ponchut<sup>2</sup>

1. Mid Sweden University, Sundsvall, Sweden,

2. ESRF, Grenoble, France

A 1mm thick pixellated CdTe detector bonded to the MEDIPIX2 [1] readout chip has been characterised using a monoenergetic microbeam at the ESRF. This is an extension of the tests previously reported in [2]. The results show that a full energy peak can be obtained when a narrow beam is focussed in the centre of the pixel. There is also evidence of significant charge spreading and fluorescence. These effects are however difficult to decouple without using a number of different energies. The results indicate that the properties of the response are caused by a combination of fluorescence and charge sharing.



**Figure 1:** Spectrum obtained from a CdTe detector illuminated with a narrow monoenergetic beam. Data was taken in window scanning mode.

During the measurements the beam was scanned over the pixel to collect information of the charge spreading. Since almost all X-ray photons are absorbed close to the surface of the detector significant charge spreading due to diffusion is expected. Figure 1 shows the spectrum obtained with the beam located in the centre of the pixel.

A significant number of counts was also detected in pixels up to a distance of several pixels away from the beam. This is an evidence of fluorescent photons travelling through the detector. Simulation models have been set up to explain the different properties of the detector response.

## References

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- [2] - M. Chmeissani, C. Frojd, O. Gal, X. Llopart, J. Ludwig, M. Maiorino, E. Manach, G. Mettievier, M. C. Montesi, C. Ponchut, P. Russo, Member, IEEE, L. Tlustos, and A. Zwerger, IEEE Trans. Nucl. Sci., Vol. 51, No. 5, October 2004.