each pixel. The chip offers high energy resolution as well as time resolution (1.6ns). In this contribution we present a single layer Compton camera consisting of a single Timepix3 detector with a thick 2 mm CdTe sensor. Thanks to the high precision ToA measurement of Timepix3, it is possible to measure the time of charge transport within the sensor and therefore the depth of the interaction. From this depth the vertical distance between two coincidence events can be determined. With the knowledge of position and energy of two coincidence events it is possible to estimate the probable direction of the original gamma and therefore reconstruct the position of original gamma source.

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Study of the response of a commercial photodiode for photons and electrons with energies between 10 and 100 keV (#1899)

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Content

In this work, a commercial low-cost silicon PIN (p type-Intrinsic-n type) photodiode model BPX 65 is characterized with respect to reverse current and capacitance of the junction. The measurements indicate that the photodiode is fully depleted for a reverse bias greater than 17 V and the width of the depletion zone is estimated to be 60 (3) μm. The device has been applied for gamma spectrometry, showing a resolution around 2.4 keV (FWHM - Full Width at Half Maximum) for photons with energies between 14 and 136 keV. This is the same resolution obtained with a pulser, 2.39 (2) keV, indicating that the main limitation of the spectroscopy system employed is electronic noise. As this is a promising detector not only for low-energy photons, but also for charged particles, the response of the BPX 65 has been investigated with a low-dispersion electron beam with energies between 20 and 100 keV. Under such conditions, the response function cannot be described as a simple Gaussian distribution. Moreover, the analytical response functions for electrons presented in the literature need to be generalized including a polynomial term. The proposed response function was tested and the behavior of the free parameters with the energy of the impinging electron is shown to be smooth. Thus, it is possible to extract from the data a well behaved parametrization.