The PIXSCAN is a small animal CT-scanner based on hybrid pixel detectors. These detectors provide very large dynamic range of photons counting at very low detector noise. They also provide high counting rates with fast image readout. Detection efficiency can be optimized by selecting the sensor medium according to the working energy range. Indeed, the use of CdTe allows a detection efficiency of 100% up to 50 keV. Altogether these characteristics are expected to improve the contrast of the CT-scanner, especially for soft tissues, and to reduce both the scan duration and the absorbed dose. A proof of principle has been performed by assembling into a PIXSCAN prototype the photon counting pixel detector initially built for detection of X-ray synchrotron radiations. Despite the relatively large pixel size of this detector (330 x 330 µm²), we can present nice tomographic reconstruction of mice at good contrast and spatial resolution. A new photon counting chip (XPAD3) is designed in sub-micronique technology to achieve 130 x 130 µm² pixels (see the poster "XPAD3: A new photon counting chip for X-ray CT-Scanner " at this conference). This improved circuit has been equipped with an energy selection circuit to act as a band-pass emission filter. Such energy selection should improve the image quality by cutting the low and high energy queues after the pre-filtered X-ray source. For example in the presence of iodinated contrast agents, one can select an energy window lower and higher than the iodine photoelectric absorption jump and, by image subtraction, have the iodine only. Furthermore, the PIXSCAN XPAD3 hybrid pixel detectors will be combined with the Lausanne ClearPET scanner demonstrator (see poster "Measured and Simulated Specifications of the Lausanne ClearPET Scanner Demonstrator" at this conference). CT image reconstruction in this non-conventional geometry is under study for this purpose.
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