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Multi-slice Quantum Computed Tomography System using a MHSP

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A Computed Tomography (CT) system with multi-slice capability based on a MicroPatterned Gaseous Detector (MPGD) is proposed for small animal imaging and envisaging mammography. This system, with energy discrimination, allows selecting energy windows for the image reconstruction and visualization. Energy weighting is also possible and lead to the enhancement of Signal to Noise Ratio (SNR) and image contrast [1]. MPGDs are excellent in single photon detection, the possibility to set a threshold to eliminate the electronic noise, good energy resolution and fair count rate capability. This system is based on the third generation of CT scanners using a MicroHole and Strip Plate (MHSP) gas detector filled with Xe. The MHSP is an hybrid microstructure with two charge multiplication stages, allowing charge multiplication above 104 and with 2D intrinsic position discrimination capability [2]. This system provides multi-slice acquisition. A cylinder CT phantom made of Poly(methyl methacrylate) (PMMA) with two holes with 2mm and 4mm of diameter was build. Various combinations of material were made to insert in the holes of the phantom to acquire cross-sectional images. Cross-sectional images of biological samples and 3D images of the studied objects will be presented together with a discussion of the future work.

References
[1]- L.F.N.D. Carramate, et al, "Energy weighting technique in Quantum Computed Tomography using a MPGD"2011 JINST 6 C02002
[2]- H. Natal da Luz, et al, "Single photon counting x-ray imaging system using a MicroHole and Strip Plate", Transactions on Nuclear Science NS-55(2008) 2341-2345.

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