

The Clear-PEM Breast Imaging Scanner

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We present results on the characterization of the Clear-PEM breast imaging scanner. Clear-PEM is a dual-head Positron Emission Mammography scanner using APD-based detector modules that are capable of measuring depth-of-interaction (DOI) with a resolution of 2 mm in LYSO:Ce crystals. The full system comprises 192 detector modules in a total of 6144 LYSO:Ce crystals and 384 32-pixel APD arrays readout by ASICs with 192 input channels. The system includes Frontend and Data Acquisition electronics and a robotic gantry for detector placement and rotation. The software implements calibration (energy, time and DOI), normalization and image reconstruction algorithms.

In this work, the scanner main technical characteristics, calibration strategies and the spectrometric performance in a clinical environment are presented. Images obtained with point sources and extended uniform sources are also presented. The image resolution was found to be of the order of 1.3 mm FWHM. The DOI capability was shown to have a strong impact on the image sharpness. Images of extended uniform ^{68}Ge sources, corrected for sensitivity and for the artifacts due detector dead spaces, have good uniformity. An assessment of the first clinical experience will be presented at the conference.

In parallel, a new multimodal Ultrasound - PET scanner is under development. The Clear-PEM Sonic is based on the prototype ClearPEM and will be coupled to an ultrasonic transducer arm. New results are expected soon.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://cmsdoc.cern.ch/~varela/PET/Abstract_JorgeNeves_%20VCI2010.pdf

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