

AbstractID: 11316 Title: Low dose breast CT with photon counting detectors: a phantom study

Purpose: To investigate image quality improvement of breast computed tomography (CT) using a photon counting detector as compared to an energy integrating flat panel detector. **Method and Materials:** A cone-beam CT system was built that utilized a CsI-based flat panel detector. The system consisted of a standard tungsten target x-ray tube and a CsI indirect flat panel detector (Paxscan 4030CB) mounted on an optical bench. The photon counting CT system was built with the same setup, but with the flat panel detector replaced by a row of cadmium .. (CZT) detector (eV2500, eV Products). The CZT detector consisted of 64 pixels with a pitch of 0.8 mm and five energy bins for spectral separation. A Lucite phantom (2.5 cm in diameter) was constructed with iodine and calcium contrast materials. Tomographic data were acquired with both systems and the contrast-to-noise ratio was compared. The data from CZT was energy weighted before analysis. **Results:** Image quality improved when comparing the CZT energy weighted images to flat panel images. The CNR improvements were 24% and 19% for calcium and iodine, respectively. **Conclusions:** Phantom results showed significant improvement in CNR for breast CT using an energy resolving photon counting detector as compared with an energy integrating flat panel detector.