

AbstractID:9741 Title: Photon counting x-ray detectors and DR and CT imaging methods

Two major x-ray-based techniques used for medical imaging are digital radiography (DR) and computed tomography (CT). Most of their detectors integrate the intensity of x-ray flux and output grayscale images or projections. Detectors with indirect detection type heavily weigh x-ray photons with higher energy as they generate more light. This results in suboptimal contrast of images because the contrast of different tissues reduces as the energy of photons increases. In the past few years, there have been strong driving research interests in an *old concept*—the use of photon energy—to improve equality and accuracy of diagnosis.

Recently, novel photon counting x-ray detectors (PCXDs) with energy discrimination capabilities have been developed for x-ray DR and CT imaging. These PCXDs count the number of x-ray photons within multiple energy windows. This allows us to improve the quality of the current grayscale images and the accuracy of the material decomposition. We will discuss the state-of-the-art detector technologies and imaging methods unique to these PCXDs.