A Lower X-Ray Dose, Higher Resolution, Photon-Counting System for Computed Tomography

Published date: July 2, 2013

Technology description

Invention

This technology is an X-ray or Gamma ray imaging system that uses photon-counting to achieve high resolution images with lower radiation doses than traditional machines. The system combines upfront optical gain with high-speed CCD or CMOS detectors to capture images. Then, using Maximum Likelihood Estimation (MLE) techniques to parse the image data, the system counts the x-ray photons that interacted with the scintillator and determines their precise three-dimensional position and energy.

Background

Computed Tomography (CT) is an important medical imaging tool that can be used to diagnose a variety of conditions such as cancer, heart disease, and bone fractures. CT works by sending bursts of x-ray radiation through a patient and recording the results with a computer. The traditional drawback of CT is that better imaging is achieved through higher bursts of radiation. Excessive exposure to radiation can be harmful to patients, so doctors have to monitor radiation doses carefully.

Application area

CT imaging (research or clinical)
Digital radiography
Digital mammography

Advantages

Higher spatial resolution, allowing for better detection of lesions
Lower radiation dose due to efficiency of photon-counting
Cost-efficient

Institution

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Inventors

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