Device and Method for Measuring Beam Quality in CT

Tech ID: 22455 / UC Case 2010-719-0

ABSTRACT

Researchers at the University of California, Davis have invented a device and methods for half-value layer (HVL) characterization in computed tomography (CT) to allow a medical physicist to measure the HVL of an X-ray system while the X-ray tube is rotating - that is, during its normal operation without the necessity to make the x-ray tube stationery.

FULL DESCRIPTION

For medical imaging applications which use X-rays, part of the necessary characterization of the X-ray beam "quality" required the measurement of the half value layer (HVL), which is the thickness, typically in aluminum, which reduces the X-ray intensity of the X-ray beam by 50%. The HVL is routinely measured in projection X-ray imaging situations such as in mammography, radiography, and fluoroscopy. However, for computed tomography (CT), the X-ray source rotates around the gantry and this precludes the measurement of HVL using the standard set-up of an exposure meter with aluminum filters.

Researchers at the University of California, Davis have developed a device and methods for measuring HVL in a CT machine while the X-ray tube is rotating. Therefore, the CT gantry does not need to be placed in a parked position, and a service engineer is not required to help in the measurements. This invention, therefore, makes the measurement of the HVL in CT practical, automated, accurate, and fast. Our researchers have prototyped a case device to be used with a real-time dosimeter; accompanying method packages for estimation of the HVL from the real-time doe measurements have also been developed.

APPLICATIONS

Measurement of X-ray beam quality in CT scanners and in projection radiography settings (including fluoroscopy, radiography and mammography) and enable rapid and reliable characterization of the x-ray beam.

FEATURES/BENEFITS

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OTHER INFORMATION

KEYWORDS

Computed Tomography (CT), Radiography, X-ray Beam Quality, Half layer value, HVL Characterization

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Devices
- **Sensors & Instrumentation**
  - Medical

RELATED CASES

2010-719-0

- Allows HVL measurements to be preformed with one rotation of the CT scanner
- Enables rapid and reliable characterization of the x-ray beam that is used in CT scanners
- Adapts easily to stationary X-ray sources (e.g. fluoroscopy, radiography and mammography) to obtain HVL measurements

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,008,264	04/14/2015	2010-719

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