

Device and Method for Measuring Beam Quality in CT

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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 setup 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.

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OTHER INFORMATION

KEYWORDS

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

CATEGORIZED AS

▶ Imaging

Characterization

- Medical
- Medical
 - Devices
- **▶** Sensors &

Instrumentation

Medical

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FEATURES/BENEFITS

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

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