Precision Densitometer for Radiosensitive Film

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WARF: P120265US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a densitometer that measures radiation dose with improved resolution and accuracy.

Overview

Radiosensitive films are used to measure radiation dose, for example, to calibrate equipment prior to cancer treatment. They provide high spatial resolution and are especially useful in advanced systems like intensity modulated radiation therapy (IMRT), in which fine and complex beam patterns must be measured.

One type of radiosensitive film, called radiochromic film, changes color when exposed to ionizing radiation without the need for chemical or other processing. The exposed film typically is run through a flatbed scanner to measure film density (i.e., light absorption caused by the radiation). This information shows how much radiation was received.

While radiosensitive films provide advantages over ionization detectors and solid-state detectors in terms of spatial resolution and dynamic range, it can be challenging to obtain consistent quantitative results.

The Invention

UW–Madison researchers have developed a radiosensitive film densitometer that reduces light scattering and heat problems often encountered during scanning.

The device provides ‘point-to-point’ scanning in which the laser source and detector are moved in tandem over the film. The detector measures the light that is transmitted through the film at different locations and provides a signal at each location. A set of density values based on these signals then is output.

The film is supported in a holder only at its edges to remove scattering and interference caused by the glass support bed. Highly repeatable 25 micrometer resolution density measurements may be obtained.

Applications

- Radiosensitive film densitometry
- Quality assurance and calibration of radiation equipment

Key Benefits

- Eliminates scatter/interference from off-axis light and glass support bed
- Provides consistent illumination and detection over entire scan area
- Reduces heating issues caused by scanner

- Outputs standard measurements
- Suitable for radiochromic film

Additional Information

Related Technologies

- WARF reference number P100285US01describes a customizable 3-D phantom for improved radiation dosimetry.
- WARF reference number P02028US describes a volume phantom that uses radiosensitive film for dose measurement and treatment verification.

Tech Fields

- Radiation Therapy : Other radiation therapy technologies

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846