

## Cherenkov-Based Radiation Beam Monitor

Tech ID: 34388 / UC Case 2024-549-0

## **ABSTRACT**

Researchers at the University of California, Davis have developed an innovative Cherenkov-based system for calibrating radiotherapy beams, enabling precise, real-time calibration of radiation dose delivery, including for high-intensity FLASH radiotherapy, improving treatment accuracy and reliability.

## **FULL DESCRIPTION**

This technology introduces a robust method and apparatus for the calibration of radiotherapy beams using Cherenkov radiation. By detecting Cherenkov radiation emitted within a specially designed monitor body, the system offers a more accurate and reliable means of calibrating radiotherapy beams, including high-intensity FLASH radiotherapy. This approach addresses the limitations of traditional ionization chambers, promising improved calibration accuracy for enhanced patient treatment.

## **APPLICATIONS**

- ► Calibration of external beam radiation therapy devices, including X-ray, electron, and proton therapy machines.
- ▶ Quality assurance tools for radiotherapy clinics to ensure precise dose delivery.
- ▶ Research and development in radiotherapy technologies.
- ▶ Manufacturing of radiotherapy devices with integrated advanced calibration features.

## FEATURES/BENEFITS

- ▶ Increases calibration accuracy for radiotherapy beams, including FLASH-RT.
- ▶ Overcomes the limitations of traditional ionization chambers, such as non-linearity and saturation.
- ▶ Reduces the complexity of beam calibration by minimizing the need for pressure and temperature adjustments.
- ► Enables real-time monitoring and adjustment of radiotherapy doses for better treatment outcomes.
- ▶ Addresses saturation and non-linearity issues of ionization chambers in high dose rate environments.
- ▶ Simplifies complex calibration processes due to pressure and temperature dependencies.
- ▶ Increases accuracy in current radiotherapy beam calibration techniques, impacting treatment precision.

## **PATENT STATUS**

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## **INVENTORS**

Estrada, Gerard

# OTHER INFORMATION

### **KEYWORDS**

treatment technology,
Cherenkov radiation,
FLASH radiotherapy
(FLASH-RT), medical
imaging, radiation
oncology, radiotherapy
calibration, solid-state
detector, waterequivalent materials

## **CATEGORIZED AS**

## Medical

- ▶ Delivery Systems
- Devices
- ▶ Disease: Cancer
- Other

## **RELATED CASES**

2024-549-0

## **ADDITIONAL TECHNOLOGIES BY THESE INVENTORS**

► High Resolution, Ultrafast, Radiation-Background Free PET

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