

+ MEDICAL PHYSICS SEMINAR SERIES



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Accuracy by the microkelvin: Clinical dosimetry applications of a probe-format calorimeter

Calorimeters are used as primary standards for absorbed dose measurements in ionizing radiation. Due to the complexity of the systems, and the time required to obtain measurements, they have remained in the standards laboratory and are rarely seen in end-user situations, such as cancer centres. However, calorimetry offers some significant advantages over secondary dosimeter systems and a clinical implementation of a calorimeter would provide new measurement capabilities for the medical physicist. In this talk, an introduction to Aerrow, a probe-format graphite calorimeter system, is provided along with a detailing of its use to perform clinical reference dosimetry in conventional and FFF high-energy photons, 1.5 T MR-guided high-energy photons, and ultra-high dose-per-pulse (*e.g.*, FLASH) high-energy electrons. Correction factors relating to heat transfer, field size dependence down to $(0.5 \times 0.5) \text{ mm}^2$, magnetic field presence – in both water and solid phantoms – as well as graphite-to-water absorbed dose conversion factors are investigated.



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