LICENSING OPPORTUNITY: PHOTONIC CALORIMETER

DESCRIPTION

Invention

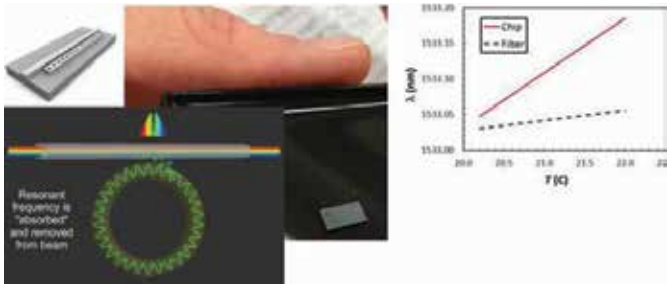
The calorimeter uses embedded, nanofabricated photonic sensors to enable micro-scale spatial resolution of dose (energy) distributions and gradients. It presents an alternative to thermistors used in conventional calorimeters for radiation dosimetry, comprising photonic sensors for in-situ dose and dose-gradient measurements in various materials (e.g., silicon, graphite, diamond, water, human tissue, etc.).

These new devices will have much higher spatial resolution, lower self-heating, reduced artifacts at sensor-absorber interfaces, and capability for 2D and 3D imaging using arrays of sensors. Improves capability to measure dose and dose gradients (near beam penumbrae and near surfaces or material boundaries) for measuring energy deposition from beams with low penetration depth (e.g., low-energy electrons, etc.).

BENEFITS

Competitive Advantage

- Leverages inexpensive commercial communications technology and chip fabrication for inexpensive manufacturing.
- Enables absolute dosimetry with potential for unprecedented micron-scale spatial resolution across six orders-of-magnitude of absorbed dose, from medical diagnostic and therapeutic procedures up through industrial materials processing, sterilization, and aerospace applications.



In-situ micro-scale dosimetry and calorimetry technology leading to new chip-based metrology for industrial and medical applications. Increased sensitivity, spatial resolution, optical readout and multiplexing capabilities would yield new portable sensors for absolute dosimetry, enabling traceable measurements that reduce dependence on Co-60 sources and help close the loop on quantitative nuclear medicine. Graph inset shows plots of measurements obtained at NIST exhibiting linear temperature dependence for Fiber Bragg Gratings and Photonic Ring Resonators on a Chip.

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