LICENSING OPPORTUNITY: PHOTONIC DOSIMETER

DESCRIPTION

Invention

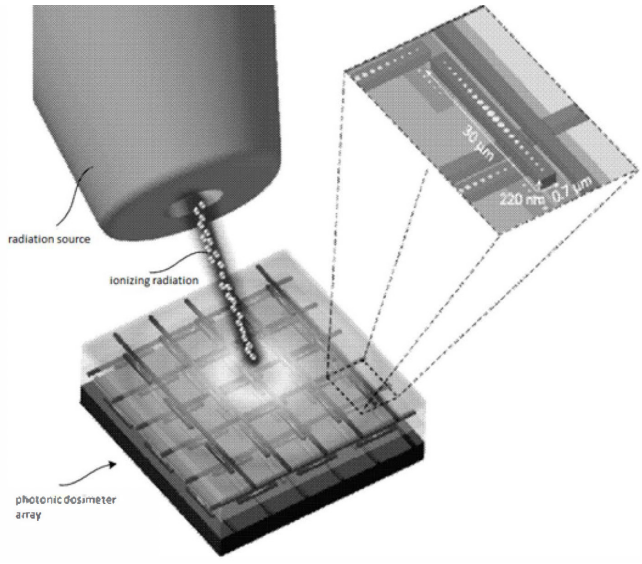
NIST scientists have developed a photonic device whose resonance characteristics (such as quality factor, peak position, and free spectral range) change in a predictable way in response to the interaction of radiation with the sensor and/or its surroundings. The invention consists of one or more photonic structures (such as a Bragg mirror, a ring resonator, or a photonic crystal cavity) that are designed to undergo structural changes in response to ionizing radiation. The changing structure produces measurable shifts in photonic response (e.g., peak frequency, quality factor Q, free spectral range) that are used to measure cumulative absorbed dose.

The invention can be used to measure real-time dose by making a differential measurement using two or more photonic sensors having different sensitivities to cumulative dose, allowing the latter to be isolated.

BENEFITS

Competitive Advantage

- Can be used in an offline mode, in which the cumulative dose can be quantified
- Leverages commercial communications technology and chip fabrication for inexpensive manufacturing and operation
- Invention works in harsh environments where electronic dosimeters could fail
- Size scale is smaller than the state of the art, so it can be used for dosimetry of microscopic samples, surfaces, and regions of large dose gradients (e.g., near beam penumbrae or near boundaries of dissimilar materials within bulk matter)



An array of photonic dosimeters subjected to ionizing radiation.

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