

## Silicon Microdosimetry and Its Application to Equivalent Dose Measurements in Ground Based, Space, and Aviation

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Owing to the mixed radiation fields encountered at aircraft altitudes and the variability of the field with changes to cosmic conditions, it is necessary to monitor equivalent doses in real time. Microdosimetry measures the distribution of energy deposition events on the cellular scale through the use of detectors with sizes (or simulated sizes) commensurate with cell nuclei dimensions. Silicon microdosimetry offers a convenient alternative to the conventional bulky TEPC microdosimeters; utilizing microelectronic devices to measure equivalent dose. Over the past decade, the Centre for Medical Radiation Physics and its collaborative partners have been developing microdosimetry systems for ground based hadrontherapy applications: proton therapy, fast neutron therapy, and boron neutron capture therapy. More recently, the technique has been applied to terrestrial and space radiation protection applications. A system will be flown aboard a small research satellite as part of a collaborative project with USNA, CMRP, and NASA. A summary of silicon microdosimetry and plans for its application to radiation monitoring at aircraft altitudes will be reported in this paper.