

AbstractID: 8259 Title: Evaluation of a New Detector for Measuring Small Field Dosimetry

**Purpose:** To evaluate a new diode detector design for measuring small field dosimetry. Accurate, small volume detectors are necessary to compile data for Stereotactic Radiosurgery (SRS), Stereotactic Radiotherapy, and Intensity Modulated Radiotherapy.

**Method and Materials:** Three semiconductor diode detectors and one ionization chamber were used to measure profiles, Percent Depth Dose (PDD), and relative output factors (OF) for a Varian Trilogy 6MV SRS beam. Profiles and PDD data were collected for 5.0 and 10.0 mm SRS cones as well as the 10x10 cm<sup>2</sup> field size. OF were collected for SRS cones of 5.0 mm, 10.0 mm, 20.0 mm, and 30.0 mm.

The detectors evaluated were one Wellhofer Stereotactic Field Detector (SFD), one Wellhofer CC04 Ion chamber (CC04), one Sun Nuclear EDGE diode detector (EDGE Gold), and one modified Sun Nuclear EDGE diode detector (EDGE Silver). The EDGE Gold has a copper slug underneath the diode die, while EDGE Silver was filled with glass epoxy.

Detector measurements were performed in a Wellhofer Blue Water phantom at 100 cm source-to-surface distance, depth of 1.5 cm, and analyzed with OmniPro Accept version 6.5A software.

**Results:** For the SRS cones, the semiconductor diodes had similar measurements for OF and PDD. The Wellhofer SFD exhibited an apparent energy response for the 10x10 cm<sup>2</sup> field as seen from the 10x10 cm<sup>2</sup> PDD data collected.

**Conclusion:** Both EDGE detectors performed comparably for all small field measurements. Additionally, the EDGE detectors showed no evidence of an energy response for the 10x10 cm<sup>2</sup> field, an important consideration when measuring relative OF for small fields or gathering larger field size data for treatment planning system commissioning.