AbstractID: 3391 Title: Measurements of surface dose for 6MV and 10 MV x-ray beams using micro-MOSFET and comparisons to Monte Carlo skin dose calculations

Purpose: Accurate measurement of skin dose in radiation therapy is of considerable clinical importance, especially in treating head-and-neck and breast cancers. MOSFET dosimeters have been introduced as a more efficient and easier-to-use alternative to TLD and radio-chromic film for skin dose measurement. However, existing data with standard-size MOSFET suggest large differences from TLD or film measurements. We investigated the applications of a micro-MOSFET for skin dose measurements and studied the correlation between the measured surface dose by micro-MOSFET and the skin dose expected from a Monte Carlo calculation.

Method and Materials: 1). Measurements were conducted for normally incident 6MV and 10MV beams onto a flat solid water phantom. MOSFET data were compared with both measurements using a parallel plate ion chamber and a MC dose calculation for the build-up region. 2). Measurements of surface dose were conducted for 6MV oblique beams incident onto the surface of a semi-cylindrical solid water phantom. Results were compared to a MC calculated dose in a skin layer extending 2mm down from the surface.

Results: For normal beam incidence, depth doses measured by micro-MOSFET agree within 3% with parallel-plate ion chamber data and MC calculation; In the build-up region, comparison of MOSFET data with the MC calculation suggests that the MOSFET has a water-equivalence thickness of ~0.5mm. For oblique beams incident on the curved phantom, the micro-MOSFET measurements correlate well with the MC calculated skin dose for a 6 MV beam, with up to ~ 6% differences depending on the positions of the MOSFET on the surface. Results from a 10 MV beam will also be presented.

Conclusion: Preliminary results indicate that the measured surface dose with a micro-MOSFET on a curved surface under a 6MV oblique beam irradiations provide a good approximation (within ~ 6%) of the skin dose.