

AbstractID: 12740 Title: Diagnostic X-ray Beam Profiles Measured with a 2D Ion Chamber Array

**Purpose:** To explore the feasibility of measuring and analyzing beam profiles for diagnostic x-ray beams with a 2D ion chamber array.

**Method and Materials:** Diagnostic x-ray beam profiles were measured using PTW seven29 ionization chamber array at 100 SSD with 0.5 cm buildup. Acuity simulator (Varian Medical Systems Inc.) was used for generating diagnostic x-rays. Fluoroscopy mode was used throughout the study. Blades were used to shape the fields while the wires were set completely out of those filed. For 115 kVp beam energy, field size 10X10 was used and for 75 kVp beam energy, field size 20X20 was used. For 10X10 field size, the operating parameters were: 80 mA, 15 ms. Approximately 60 seconds measurement time was used to improve signal-to-noise ratio and for 20X20 field size: 50 mA, 5 ms with 30 seconds measurement time. Beam flatness and symmetry were analyzed using MultiCheck and VeriSoft software (PTW Inc.)

**Results:** The flatness (Percentage Dose Difference) for 10X10 field is 6.0%, and for 20X20 field is 4.0%. The symmetry (Maximum Dose Ratio) for 10X10 is 1.05, and for 20X20 is 1.03.

**Conclusion:** Diagnostic x-ray beam profiles were measured with PTW seven29 2D ion chamber array. The device came with a calibration certificate for  $^{60}\text{Co}$ . And was designed for dose measurements in radiation therapy. It could be used in relative dose mode to provide a straightforward way for verifying beam flatness and symmetry for diagnostic x-ray beams. The data obtained could be added to form the basis for a periodic QA program for such units. Further study is needed to investigate the relative advantages and limitations of this method.