

AbstractID: 8871 Title: Investigation of a 2D ionization chamber array for quality assurance of intensity modulated arc therapy

**Purpose:** To characterize a new two-dimensional ionization chamber (IC) array (IBA, Schwarzenbruck, Germany), commercially referred to as the I<sup>m</sup>RT MatriXX, and to evaluate its viability for quality assurance (QA) of intensity modulated arc therapy.

**Method and Materials:** IC array characterization tests included determination of the effective plane of measurement, angle dependency, and investigations into the limiting minimum target volume. The response of the IC array as a function of beam angle with respect to its front face was compared among radiochromic film (type EBT, ISP), planning calculations, and beam measurements using the IC array. The limiting minimum target volume is of interest due to the relatively large detector size and inter-detector spacing. To investigate the effect on small target volumes, treatment planning calculations for spherical targets with diameters ranging from 0.5 to 4 cm were compared to measurements taken on film and the IC array. Lastly, patient-specific QA results were compared among film, array measurements, and treatment planning calculations for several treatment sites, including head and neck, pancreas, and cranial-spinal cases.

**Results:** Our results indicate inherent buildup thicknesses of the 0.48 cm and 5.19 cm for the front and rear faces of the IC array. A large angle dependency of the IC array existed as its response deviated from treatment planning calculations in the range of -6.2% to 7.5%. However, the film response at the identical angles exhibited a similar trend. Comparisons among treatment plans measured with film and the IC array showed similar regions of disagreement. Film tended to show better agreement in regions of high dose gradients.

**Conclusion:** In general, the IC array performed well in the patient QA tests. However, the user should be aware of the effects of dose gradients and angular dependency on the QA results.