

AbstractID: 1214 Title: Evaluation of a high-resolution diode array system for IMRT commissioning and verification

Commissioning and verification of IMRT requires a series of point dose, 2D, or 3D measurements to compare the delivered dose distribution to the planned dose distribution. Present diode array dosimetry provides a fast and accurate solution for routine IMRT verification; however, increasing the resolution of the diode array may aid in extending the system for commissioning measurements. This study describes the development and initial evaluation of a high-resolution diode array system using a commercial diode array and a micro-stepping positioning stage. Basic parameters such as repeatability, stage repositioning accuracy, and increased backscatter were investigated. The standard error in repeatability and repositioning were both under 1% of the average dose, and the increase in backscatter dose was 0.4%. The ability of the stage to increase the spatial resolution was investigated using a simple IMRT field. The percentage of diodes passing tolerance criteria of 3% dose difference and 2mm distance to agreement decreased with increasing resolution, due to an increase in the percentage of diodes in high gradient regions. A series of nominal leaf and segment MU errors were induced on the IMRT field. All errors except for leaf position errors on the order of the leaf position tolerance were easily detected from plots of out of tolerance diodes with measurements acquired at triple the intrinsic array resolution.

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