

AbstractID: 6695 Title: Using a matrix detector for Helical delivery QA

Purpose: To investigate the possibility of extending the matrix detector for IMRT QA in Helical beam delivery

Method and Materials: Matrix detectors, usually consisting of arrays of ion chambers or diodes, are a valuable tool for linac QA. A common method for IMRT is to irradiate the matrix with the detector plane perpendicular to the beam axis with each of the number of IMRT beams (typically 7 to 9) and the measured dose compared to the planned one. To evaluate the complete beam delivery, the individual distributions have to be combined. This is different from the standard means of using films for helical treatments as delivered by the Tomotherapy linac. In this work we want to investigate the possibility of extending the matrix detector for IMRT QA in such complex treatments. The proposed method is to configure the matrix as a phantom for setting up a delivery QA (DQA) plan, and then deliver the treatment plan beams on it as usual, taking care not to irradiate the electronics housing of the matrix. The detector plane will be designated in the DQA plan as the dose plane for comparison to the calculated one. A major concern is the angular dependency of the detectors on the direction of incidence of the radiation beams. This work aims to evaluate this limitation and to assess the usefulness of the device within the scope of this limitation

Results: Preliminary measurements indicate quantitative agreement between calculated plan and measurements. More extensive results will be presented.

Conclusion: The matrix detector has the potential to provide a fast QA tool for Tomotherapy and allows a dynamic view as radiation is being delivered. We propose to exploit this dynamic property to establish useful QA procedures to provide checks and analysis to a complex sequence of beam delivery.