

AbstractID: 6795 Title: Using a 3D diode Array System to Verify 3D Dose Distribution

Purpose: We have been used a 3D diode array to verify 3D dose distributions from IMRT plans, and SRS plans using conical arcs or dynamical arcs. Some of the results are reported here. We are also going to study the possibility of using this diode array for routine QA of the treatment machine and the treatment planning system.

Method and Materials: IMRT plans are developed on Varian Eclipse, and delivered on a Varian Trilogy treatment unit by using sliding window technique. The SRS plans are developed on a BrainLab IPlan Dose, and delivered on the Trilogy. The 3D diode array is the Delta4 system from Scandidos. Delta4 has 1069 P type Si diodes on two planes in a cylindrical PMMA phantom. In the treatment planning systems, a patient plan is copied to the phantom, and recalculated. The plan and dose distribution are transferred to the Delta4 system by using DICOM RT. In the Delta4 software, the planned dose and measured dose are compared by using 2D isodose display, profile comparisons, percentage dose deviation, and DTA and Gamma index.

Results: We have used this method to verify 61 IMRT plans. The average percent diodes with deviation of 5% or less is 84.5%; the average distance to agreement (DTA) of 3mm or less is 86.7%. The average Gamma Index (5% and 3mm) of 1.0 or less is 91.8%. We have also used this system to verify the isocenter dose of BrainLab SRS plans, each using a cone from 7.5 mm to 30 mm with 180 degree arc. The average absolute difference between measurement and plan isocenter dose is 1.8%.

Conclusion: The 3D diode system is a good tool to verify 3D dose distribution.