

## AbstractID: 13856 Title: Use of the PTW 729 for routine QA of a TomoTherapy unit

### **Purpose:**

To evaluate the use of the PTW 729 chamber array for routine quality assurance checks on a TomoTherapy unit.

### **Method and Materials:**

The 729 was used to perform quality assurance tests for the following:

Individual patient IMRT QA; beam profile, output, and energy constancy at the 4 cardinal angles; verification of the 70cm virtual isocenter distance.

IMRT QA was performed by using the 729 in the Octavius phantom. Results were compared at specific points to measurements with a 0.1cc ion chamber. Beam profile and output constancy was performed at 0 degree gantry position at 1.5cm depth. Energy constancy was performed by placing the 729 in the Octavius phantom with the array parallel to the beam axis. This was done for the 4 cardinal angles. Output and profile constancy was similarly measured but with the array perpendicular to the beam. The virtual isocenter position was verified by aligning the 729 to the lasers. The table was then indexed to the true isocenter by the TomoTherapy control system prior to the exposure. Any deviation of the longitudinal profiles from the zero position would indicate an offset in the virtual isocenter laser position. Intentional offsets were introduced to determine the sensitivity of the test.

### **Results:**

The IMRT QA results achieved results of > 90% of points passing 3%/3mm criteria for all deliveries checked. This is comparable with other reported results. In addition the individual points were within 2%. Beam profile, output, and energy constancy was within 1% for multiple readings. The beam profile was within 3% of water scans within the useful beam (+/-20cm) for all points. The average difference was 0.74%. The virtual isocenter was verified to within 1mm.

### **Conclusion:**

The PTW 729 is suitable for routine QA measurements on a TomoTherapy unit.

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