AbstractID: 9232 Title: Dosimetry Impact of Radiation Beams Due to Presece of Calypso Electromagnetic Array

Purpose:The 4D Calypso systems are used for accurately localizing and continuously tracking the targets in prostate treatments. An electromagnetic array composed of low density materials is positioned over the patient during radiation treatment delivery to excite the Beacon transponders, which are permanently implanted in targets, and sense their motions. This study is to investigate and verify the attenuation of photon beams due to presence of the array. **Method and Materials**: A solid water phantom was used to simulate the radiation treatment. The array was positioned at distant of 18cm to isocenter and aligned to ceiling laser. The 0.3cc cylinder chamber was used for measurement of the attenuation for field size of $5x5cm^2$ and $10x10cm^2$ and 0.015cc pinpoint chamber for field size of $2x2\ cm^2$ and IMRT fields. For each field, chambers were at depth of 8cm, 10cm, and 12cm respectively and the 6MV beams delivered 200MUs at gantry angles of 0, 10, 20, 30, and 40 degree. Each measurement was repeated twice. The attenuation was evaluated by comparison of dose measured at isocenter with and without the array. **Results**: The measurements show that the attenuation from beams normal to the array ranges from 1% to 2%. This result is consistent to conclusion provided in Calypso user manual (<2% at 6 cm depth), but disagrees with another published results (<0.5%, Med Phys, 30(6), 1473 (2003)). The results demonstrate that attenuations increase with gantry angle and are larger than 2% at 40 degree for field size of $10x10cm^2$. Measurements with IMRT beams show that the attenuations are less than 2% at gantry angle less that 20 degree and could be as high as 3% at 40 degree. **Conclusions:** To minimize the array impact to radiation delivery, the large oblique angle should be avoided for the beams incident to the array.