

Abstract ID: 8506 Title: Investigation of the transmission detectors for daily dose verification and QA of IMRT treatments

Purpose: To study the feasibility of using transmission type detectors for daily IMRT patient dose reconstruction and real time dose delivery verification.

Methods and Materials: Because of the complexity of IMRT there is a need for quality assurance for every patient. However, the daily delivered intensities may vary slightly from the planned ones. In this work we investigated the feasibility of using of transmission type detectors by using films for the verification of daily dose delivered to the patient. Films (Kodak EDR2) were placed in between 2 cm solid water after the MLC and at 100 cm from the source. The optical density matrix (ODM) of the deliverable intensity maps were exported from the treatment planning system (TPS) for each beam calculated. A comparison between the ODM and the film was used to validate the TPS intensity maps.

Results: The film measurements were compared to TPS predicted intensity maps. The agreement between calculated and measured intensity maps were in good agreement. The agreement was better when the intensity maps were compared against the film after the MLC. In both cases the TPS underestimated the dose/intensity at the low dose regions. The underestimation could be due to incorrect MLC leakage in the TPS machine model. By comparing the film at the two locations we observed that the low dose regions have the highest discrepancy, with the film dose to the source measuring lower dose at the low dose regions by 3 to 15%.

Conclusions: Transmission detectors such as films can be used in order to compare the delivered intensity maps against the TPS predicted ones. It is feasible to have a transmission detector on board and verify the delivered ODM on a daily basis and then calculate the dose delivered to the patient especially for cone beam CT is performed daily.