

**AbstractID: 4942 Title: Dosimetric comparison of a semi-conductor array (MapCheck), EDR2 film and ion-chamber in the commissioning of Enhanced Dynamic Wedges on a Varian Linear Accelerator (21 EX)**

**Purpose:** To evaluate the accuracy of Mapcheck, EDR2 film and ion-chamber for enhanced dynamic wedge (EDWs) on a Varian Linear Accelerator (21-EX).

**Method and Materials:** Dosimetric measurements for the entire range of available field-sizes ( $4 \times 4 \text{cm}^2$  to  $30 \times 30 \text{cm}^2$ ) for both 6- and 23-MV photon beams on 21-EX were performed as a part of commissioning of EDWs. Eclipse computed dose profiles in the coronal plane at 5cm depth for 100MUs were compared with measurement using a 445 diode-array (MapCheck; Sun Nuclear Corp.) after calibrating it for relative and absolute dosimetry. Planar dose measurements were also repeated using EDR2 radiographic film. Each film was digitized with 0.17mm resolution using the RIT 113 film dosimetry system (Radiological Imaging Technology) and converted to dose using an appropriate H&D curve. These measurements were also compared with those made using a 0.6cc Farmer chamber.

**Results:** For the majority of the EDWs and field size geometries, the CAX dose values between MapCheck measurement and Eclipse computed values were within 2% except for very large wedge angles at large field sizes. Interestingly, for field sizes less than  $10 \times 10 \text{cm}^2$ , the results of MapCheck device demonstrated a better agreement to the TPS computed values than those of ion-chamber measurement which could be attributed to the miniature size of the diode detector. Also, EDR2 film dosimetry showed consistent 2-3% over-response for all wedge angles and field sizes which was very evident at the toe region of EDW.

**Conclusion:** The three measurement detection systems were used to verify the beam profiles and depth doses of EDW. Our results have demonstrated the superiority of MapCheck device in the commissioning and routine QA of EDW over EDR2 film that had an inherent over-response of 2-3% despite an appropriate H&D curve. The only disadvantage of the Mapcheck device was its restrictive measurement area of  $20 \times 20 \text{cm}^2$ .