

## AbstractID: 6887 Title: Characterization of Amorphous Silicon Flat Panel Imager for Dose Measurements

**Purpose:** The major objective of the work was to categorize the dosimetric response of a Varian aS500 type Electronic Portal Imaging Device (EPID) for dose measurements.

**Method and Materials:** For a 6MV beam from a Varian 21EX linear accelerator, reproducibility of EPID pixel response, dose rate effect, and cumulative dose linearity were studied. In addition, scatter characteristics and depth doses were also determined using the EPID. A Capintec ion chamber in a polystyrene miniphantom and a Wellhöfer water phantom were used for comparative measurements.

**Results:** The EPID response was found to be independent of dose rates from 100 MU/min to 600 MU/min at larger source to detector distances. However, pixel saturation was observed for dose rates beyond 300 MU/min with the EPID placed at the isocentre. Raw pixel response was reproducible to within 2 % when measured over a period of 6 weeks. Changes in scatter conditions with field size were also measured for the EPID. The EPID scatter was found to be in between 5 to 10 cm of a full water phantom. The gray scale response is linear with the dose to the portal imager. The validity of inverse square relationship was also tested to be within 0.5%, for the EPID at various distances from the source.

**Conclusions:** The depth dose data measured with EPID showed good correspondence with that measured with a thimble type ionization chamber in a water phantom. Compared to ionization chamber data, open beam profiles measured with EPID show flat response in high dose region, rapid fall-off in high dose gradients ( $> 30\%/cm$ ), and higher penumbra tail. The agreement with the ion chamber measurements could be improved if the flood field correction is performed to restore off-axis variation of beam profile. In general the EPID qualifies as a useful tool for planar dose measurements.