

AbstractID: 7013 Title: Relative Dosimetry for DMLC Treatment Delivery with an a-Si AMFPI-based Dosimetry System

Commissioning, routine quality assurance, and plan-specific quality assurance procedures for Intensity Modulated Radiation Therapy (IMRT) treatment delivery are very dependent on high-resolution, high quality 2-D dosimetry measurements, currently often performed with film. We have modified an experimental amorphous silicon detector system (similar to the AMFPI megavoltage imagers which are now being implemented in clinics across the country) to create a dosimetry-specific AMFPI -based detector system. We report here the initial characterization of this device for relative dose measurements for DMLC (dynamic) and SMLC (segmental or stop-and-shoot) IMRT treatment delivery using a 120-leaf MLC system. Multiple dose rates and photon energies were used in DMLC delivery. In order to measure high dose DMLC treatment delivery with the AMFPI dosimetry system, it is necessary to utilize the full pixel capacity to be able to resolve the wide range of dose delivered in a single DMLC treatment. Higher capacity preamplifiers were manufactured in order to be able to extend the detectable dose range. Using the detector in direct detection configuration (without scintillator screen), integrated and multiframe (maximum frame rate ~ 22 fps) images of DMLC treatments were obtained and converted to dose. Up to 100 cGy can be delivered in a given AMFPI pixel without driving it into saturation. Delivery of higher doses is possible, but requires some extensive corrections for saturation effects. Comparisons with film dosimetry and other benchmark data are summarized.

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