

**Purpose:** To demonstrate the use of a diode array for the direct measurement of the dosimetric leaf separation (DLS) associated with a multi leaf collimator (MLC).

**Methods:** Using the Profiler(TM) diode array, the DLS has been directly measured at multiple points (diode positions). These DLS measurements were obtained by collecting the dose rate spectra as a fixed gap-sliding window is delivered over the diode array. The DLS is derived from the full width at half maximum (FWHM) determined by fitting two sigmoid functions to the dose rate spectra and using the MLC speed to calculate an effective gap. Taking the difference between the effective and nominal gap provides a directly measured DLS for every diode position. In the present study, 49 measurements were obtained with a single sliding window delivery. Using three gap widths, this results in 147 DLS values for each evaluated MLC.

**Results:** The DLS for three MLCs associated with three Varian(TM) linear accelerators has been measured using three sliding window gap sizes (5mm, 10mm and 15mm) and 49 detectors for each measurement. The results are averaged for each MLC along with associated standard deviations. A more detailed characterization of the DLS-MLC can be obtained by plotting the DLS as a function of position along the main axis perpendicular to the direction of leaf motion. This 1-D DLS distribution contains information associated with the effect of inter-leaf and intra leaf transmission on the DLS.

**Conclusions:** Using a diode array for the direct measurement of the DLS provides a quick and simple way to determine the DLS in 1-D. The process can be repeated on a routine basis as part of a Quality Assurance program to monitor the behavior of the MLC system over the course of its use.