

AbstractID: 3052 Title: Characteristics of a double-focused  $\mu$ MLC

**Purpose:** Micro multi-leaf collimators ( $\mu$ MLC) are widely used as add-on to linear accelerators for the generation of small irregular shaped beams. The purpose of this paper is to measure the dosimetric characteristics of a double-focused  $\mu$ MLC. The dose field generated by a double-focused  $\mu$ MLC has a steep dose gradient at all field edges and is therefore able to spare the healthy tissue better than a single-focused  $\mu$ MLC

**Method and Materials:** At our department we have mounted a double-focused  $\mu$ MLC on a Siemens Primus linear accelerator. Base on the separate gantry sensor, this  $\mu$ MLC is independent from the type or manufacturer of the linac. The basic dosimetric properties, such as transmission or leakage, depth-dose curves and penumbra, have been measured by use of radiographic and radiochromic films, pinpoint ionization chambers and our multi-purpose QA-Phantom (Easy Cube).

**Results:** Transmission and leakage between the leaves are due to their special focusing design very low. The depth doses distributions for different field sizes generated by the  $\mu$ MLC are identical to the depth doses for the same field sizes generated by the MLC integrated in the linac. Therefore the  $\mu$ MLC affects only the off-axis ratio. Due to the double-focusing characteristics the penumbra is small and identical for the field length and width. The penumbra gradient does not differ significantly with different field sizes.

**Conclusion:** The mechanical investigations show that the  $\mu$ MLC can securely be used with a Siemens Primus linear accelerator. The measured dosimetric properties show a small penumbra that is identical in both directions (inplane and crossplane). This is important if the  $\mu$ MLC is applied for stereotactic and intensity modulated radiotherapy.

**Conflict of Interest (only if applicable):**