

## AbstractID: 5157 Title: A QA test to check MLC carriage calibration

**Purpose:** The leaf span for a Varian MLC is 15 cm. Fields larger than this in the leaf motion direction must be split into multiple ports with a "carriage shift" between ports. Leaf position is a function of both carriage position and leaf position within the carriage. The carriage position is dictated by the outermost leaf position, and the carriages do not move during radiation delivery. We have developed a test to assess carriage positioning accuracy by comparing the same abutting MLC-shaped fields both with and without carriage motion between the delivery of the two fields.

**Methods and Materials:** A 14 cm wide x 40 cm long field was split into two 7 cm wide rectangular ports shaped by the MLC. Width is defined in the leaf motion direction. These two fields were delivered using two separate static MLC files, then using a single DMMLC file. In the former case, the carriages move while the leaves remain stationary with respect to the carriages. In the latter case, the carriages remain stationary while the leaves move with respect to the carriages. Kodak XV film was taped to the collimator face for both cases and compared.

**Results:** Both films appeared identical upon visual inspection. A quantitative analysis of the profiles was performed using the RIT software system. Comparison of the profiles revealed that the FWHM of the abutting region agreed to within 0.2 mm between the two films.

**Conclusion:** If accuracy of leaf calibration has been demonstrated, differences between these profiles would imply carriage miscalibration. Carriage miscalibration would result in mispositioning of all leaves within the carriage, thereby causing significant dose delivery errors. This carriage calibration test could be performed routinely as part of the QA procedure for MLCs used for IMRT delivery.