

## AbstractID: 7030 Title: Monte Carlo modeling and commissioning of a bi-directional micro multileaf

**Purpose:** A new bidirectional micro multileaf collimator (mMLC) from Acculeaf has been installed in our department. The purpose of this study is to commission the micro multileaf collimator system for Monte Carlo dose calculations.

**Materials and Methods:** The mMLC is attached on a Varian 600C linac. The mMLC is able to shape the field in the two orthogonal directions with four banks of leaves. The maximum field size that is allowable with mMLC attached is 10cm x 10cm. The Monte Carlo commissioning of the system was performed in two steps. Commissioning of the 6MV beam alone and then commissioning with the mMLC on. The EGSnrc/BEAMnrc code was used to simulate the linac and the mMLC. Phase space files were scored before the linac jaws, and after the mMLC for several field sizes. When the mMLC is attached the field size defined by the linac jaws is 10cm x 10cm.

**Results:** For the commissioning of the linac, several fields of various sizes were simulated and compared against measurement in water using ion chamber. Several fields, rectangular and irregular were simulated and compared against measurements in water when the mMLC was in place. The data collected were depth dose curves, dose profiles at various depths and output factors for different field sizes.

**Conclusions:** Agreement between measured and calculated data was better than 1% and less than 1.0mm in the penumbra region for the linac part. With mMLC attached the agreement between measurements and calculations is within 2% and 1.5 mm in the penumbra region.