

## Virtual Micro-IMRT

Techniques for smoothing the edges of a field using a multi-leaf collimator (MLC) with a 1 cm leaf width involve delivering a sequence of fields that are shifted relative to each other. Unfortunately, this technique would be very difficult to implement in the context of intensity modulation. A new technique would allow the delivery of intensity modulated fields with a pencil beam size of 5 mm x 5 mm using a 1 cm leaf width double focused MLC. Two 1 cm x 5 mm intensity modulated fields, whose collimator settings are 90 degrees apart, are combined to produce these smaller pencil beams. This technique does not require the patient to be moved, but higher leaf positioning accuracy is important. Also, since 4 of these pencil beams fit into a 1 cm x 1 cm pencil beam, the gradients between pairs of pencil beams are constrained to be equal in the leaf motion directions. The clinical use of this technique has yet to be assessed, since no inverse treatment planning system can plan for this technique. However the feasibility of the technique has been demonstrated using film dosimetry for a test case. Siemens Medical Systems supported this research.