

# **An Analysis of Speed and Precision in IMRT Delivery**

The multileaf collimator (MLC) has become the most common tool providing the modulation for intensity modulated radiotherapy (IMRT). One requirement of these delivery systems is the translation of intensity modulated fields into a series of static or dynamic field shapes, a process often called 'leaf-sequencing.' For many commercial MLC's, tradeoffs between the accuracy of field delivery and delivery time must be made. A comparison of two alternate leaf-sequencing algorithms was carried out for a commercial IMRT delivery system. Plans from previously treated patients were re-sequenced using both a sliding window algorithm stressing dose accuracy and reduction of tongue-and-groove effects, and an algorithm primarily optimizing treatment delivery time. Both algorithms were used to generate treatments which were then delivered using a Siemen's IMRT delivery system. The precision with which the desired dose distribution was delivered was evaluated for each approach, as well as relative treatment time. An analysis of total treatment times, including time for patient setup and intra-treatment positioning checks, addresses the feasibility of using IMRT on a large fraction of a clinic's patient population.