

**Purpose:** Off-axis head-scatter is the major contributor to doses outside x-ray collimation. For an IMRT beam, these scattered photons also affect the dose inside the treatment field. This study determines the headscatter components for an accelerator with MLC as an attachment.

**Method and Materials:** Head-scatter is measured for the 6 and 18 MV photon beams from a Varian 2100C linear accelerator. The head scatter off-axis,  $HOA$ , is defined as the scatter-to-primary ratio for head-scatter with collimator setting  $cx \quad cy$  at off-axis position  $x$ , i.e.,  $HOA(cx,cy,x) = (T(cx,cy,x) - P(cx,x))/P(cx,0)$ , where  $T$  is the total dose measured in a graphite miniphantom for collimator setting  $cx \quad cy$  at position  $x$  and  $P$  is the primary dose measured at the same location  $x$  under a collimator setting of  $3 \quad cx$ . The collimator setting along  $x$ ,  $cx$ , is kept the same so that the primary remains unchanged. The results are fitted to a two-source model [1].

**Results:** The widths of the two Gaussian sources are 1.4 and 16 cm, respectively, for both energies. Compared to the leakage outside beam collimation,  $HOA$  at 2 cm outside field width is 100 % of the primary for  $c = 5$  cm to 400 % of the primary for  $c = 30$  cm.

**Conclusion:** Compared with the conventional collimator jaws,  $HOA$  for MLC shaped field is lower at off-axis locations due to the difference in physical locations of the MLC and the collimator jaws. 1.Zhu TC and Bjarngard BE, "Head scatter off-axis for megavoltage x rays," Med Phys 30: 533 – 543 (2003).