

The virtual wedge modality introduced by Siemens produces a profile similar to that of a physical wedge by dynamically varying the jaw position and dose rate during treatment. The current version of the virtual wedge offers a continuous selection of wedge angles ranging from  $5^\circ$  to  $88^\circ$ . Symmetric and asymmetric fields in either the wedged or non-wedged direction may be treated. One principle advantage of the virtual wedge is a central axis virtual wedge factor (VWF) which is approximately unity for all wedge angles and field sizes.

VWF measurements have been made on a Siemens' PRIMUS accelerator with 6X and 18X photon beams. For symmetric fields, central axis VWF measurements confirm a value very near unity, increasing slightly with both field size and wedge angle. However, the observed variances are large enough (i.e.,  $>\pm 2\%$ ), to require more than one wedge factor for all symmetric field possibilities. For asymmetric fields, the off-axis VWF, measured at the center of the asymmetric field, is seen to vary substantially. For example, the 6X,  $10 \times 10$ ,  $30^\circ$  virtual wedge factor varies from 0.63 to 1.17 across the range of achievable off-axis positions.

A simple analytic model has been derived to determine VWFs for symmetric and asymmetric fields. The model introduced predicts the increase in VWF with field size and wedge angle, as well as the variation with off-axis position. Agreement within  $\pm 2\%$  is obtained for both symmetric and asymmetric field arrangements.