

Off-axis head-scatter is the major contributor to doses outside the field of high-energy x-rays. For a dynamically collimated beam, these scattered photons also affect the dose inside the treatment region. Head-scatter is measured for the 6 MV photon beam from a Varian 2100CD linear accelerator. The head-scatter at off-axis, *HOA*, is defined as the ratio of the dose from head-scatter at off-axis position x to the dose from primary photons on the central axis, with collimator setting $cx \times cy$. Experimentally, it is determined as

$$HOA(cx, cy, x) = (T(cx, cy, x) - P(cx, x)) / P(cx, 0)$$

Where T is the total dose measured in a 5g/cm^2 thick graphite miniphantom for collimator setting $cx \times cy$ at position x and P is the primary dose measured at the same location in a narrow beam with a collimator setting of $cx \times 3\text{ cm}$ at the position x . The collimator unchanged. *HOA* can be fitted to a gaussian function $a \cdot e^{-(x/b)^2/2}$. For $cx = cy = 10\text{ cm}$, $a = 0.054$ and $b = 4.9\text{ cm}$. The width b of the gaussian increases quadratically with c to 0.128 for $c = 40\text{ cm}$ following the square of an error function. For beams of rectangular cross-section with the same cx , the width b remains unchanged while the value of a increases with increasing cy . At 2 cm outside the field, *HOA* is 120% of the leakage through the collimator for $cx = cy = 10\text{ cm}$ and is increasing with collimator opening.