

## AbstractID: 1683 Title: Characteristics of Bremsstrahlung Photons in Megavoltage Clinical Electron Beams

Clinical electron beam produced by linear accelerator contains contaminated photons. These high energy photons are produced via bremsstrahlung process when the electron beam passes through the head of linear accelerator and interacts with various components and when the electron beam reaches the patient and interacts with tissue. The percentage of the contaminants is about 1%-5% for electron beam energies of 6-21 MeV for most linear accelerators. We have investigated the characteristics of the bremsstrahlung photons for a Siemens Oncor linear accelerator. To measure the photon components, we eliminated the electron beams by inserting a 15 cm thick wax block in the beam path. We quantified the depth dose and off-axis ratios at various depths of the photons for a 10 cm  $\times$  10 cm field in a water phantom using a photon diode detector. The depth dose characteristics are typical of the high energy photons with depths of maximum ranging from 8 mm to 30 mm for corresponding electron energies of 6 MeV to 21 MeV. The depths of  $d_{max}$  are shallower compared to clinical photon beams of the same nominal energy and can be explained by thin target production of bremsstrahlung photons with more low energy components. The beam off-axis ratios are peaked forward and include signature of the secondary electrons produced by the contaminated photons in the electron applicator. The percentage of contaminant photon dose produced in accelerator head to the total bremsstrahlung dose is energy dependent and varies between 90% -80% for electron energy between 6-21 MeV.