

AbstractID: 3878 Title: Utilization of Thebes II Linear Ion-Chamber Array to Calculate Wedge Angle Using a Single Exposure

## ABSTRACT

**Purpose:** Thebes II model 7040, a linear array of ion chambers has been utilized in measurement of physical as well as virtual wedge angle using only one exposure. This technique was applied to all available clinical photon energies and various field sizes.

**Methods and Materials:** Measurements were carried out for the 60<sup>0</sup> motorized wedge in Elekta SL-25, and all four wedges of a Varian Clinac 2100-C accelerators. Wedge profiles at the depth of 10 cm of acrylic phantom were measured for 6MV, 10MV, 15MV, 18MV, and 25MV photons. The wedge angle was measured as a function of field size from 5x5 to maximum wedge field. The source to surface of phantom distance was set at 100 cm. Wedge angle was calculated through an attenuation method described by Schmidt, E-L, et. al<sup>1</sup>. Measured data agreed favorably with the expected wedge angle and was reproducible. Preliminary work performed in computing the effective wedge angle when virtual wedge applied will be presented.

**Results:** Results from the motorized wedge in Elekta accelerator measured for photon energies 6, 10, 15, and 25 MV and all clinically relevant field sizes indicate excellent agreement with the largest deviation of 2.7% for the 45 degree wedge in 6MV beam.

**Conclusion:** This device, with 47 water proof air ionization chambers of 0.5 cc on a 0.5 cm pitch can provide a simultaneous measurement in real time for the full width of the radiation field for accurate wedge angle computation.