

## AbstractID: 4735 Title: Source Measurement for Electron Monte Carlo Calculations

**Purpose:** Monte Carlo calculations can reproduce most measured data for electron beams with very good accuracy. It should be possible, and arguably desirable, to be able to accurately reproduce all measured data with only knowledge of the linear accelerator geometry and the initial electron source; however, information regarding the latter is not as readily available. The purpose of this study is to study the properties of the electron beam close to the electron source.

**Method and Materials:** Radiochromic film was inserted into a film holder consisting of two thin pieces of polystyrene, and attached to the distal side of the linear accelerator scattering foil assembly. For each electron energy, films were exposed to 50 and 100 MU. The films were scanned with a resolution of 89 microns, and images were converted to dose using film strips irradiated to known doses. For Monte Carlo calculations of the same geometry, the initial source was assumed to be Gaussian with a FWHM of 1.5 mm, and a phase space was collected between the polystyrene slabs. It was assumed that electron fluence was proportional to the film dose.

**Results:** Agreement between measurement and calculation was generally very good, but better for higher energies. Varying the initial electron source in the Monte Carlo calculations showed that these profiles are relatively insensitive to the initial source size; profiles are dominated by scattering in the foil assembly.

**Conclusion:** Because of the insensitivity of the profiles to exact details of the initial electron source, it may not be possible for these measurements to resolve the details of the initial source parameters. The results may have also been affected by the assumption that the electron fluence was proportional to film dose; therefore further calculations of the dose to the film (rather than fluence) need to be done.