# AbstractID: 13817 Title: Accounting for the effect of a magnetic field from the bending magnet in Monte Carlo accelerator treatment head simulation

**Purpose:** To account for a fringe magnetic field from the bending magnet in Monte Carlo treatment head simulation. **Method and Materials:** A Tesla meter was used to map the magnetic field between the exit window and secondary scattering foil of a clinical linac for 6-21 MeV electron beams. The foil and monitor chamber were removed to access this region. Measurements extended 12.0 cm along the central axis and 1.0-3.0 cm off-axis. The Monte Carlo code EGSnrc was adapted to incorporate the magnetic field with accuracy validated in simple geometries. **Results:** The magnetic field was orientated crossplane, with the deflection of the electron beam inplane. The highest intensity, measured at the exit window, increased with nominal beam energy from 0.006 T for 6 MeV to 0.020 T for 21 MeV. The field falloff, approximated by a cubic function, was 5% at the secondary scattering foil. The field deflected the electron beams by 0.82-1.24 cm at isocenter. The peak position in the calculated and measured profiles, with no scattering foils in the beam, matched to 1 mm inplane and crossplane. A preliminary comparison of calculated and measured dose profiles with the foils and chamber in the beam support our contention that the simulations can accurately account for the deflection of the electron beam by the fringe magnetic field from the bending magnet. It appears the lateral variation in the magnetic field can be neglected. **Conclusion:** The calculated fluence is expected to have an improved uncertainty of 1%/1 mm, without the non-physical adjustment in the monitor chamber and secondary foil positions required when the field is left out of the simulation, having a better match to the undulations in the measured profiles with the bremsstrahlung peak in the correct position.