AbstractID: 7463 Title: Surface dose determinantion for modulated electron radiotherapy

Purpose: To determine the skin dose from photon multileaf collimator (pMLC) delivered electron beams for modulated electron therapy (MERT) and examine its dependence on source to surface distance (SSD), energy, obliquity, and field size.

Method and Materials: Measurements of surface dose for various fields at six source SSDs were taken using a parallel plate ion chamber for electron energies of 6, 9, 12, 16, and 20 MeV. These measurements were supplemented by measurements of surface dose using ultra-thin TLDs at the same SSDs used for the parallel plate measurements. The behavior of the parallel plate dose data was analyzed with respect to its dependence on energy for each field size as well as dependence of dose on field size for each energy for all different SSDs studied. The TLD data were examined for dependence of dose on SSD, and the dose to the surface was examined as a fraction of the maximum dose delivered.

Results: The doses measured using the parallel plate chamber and the TLDs both indicated that the dose to the skin decreases as the SSD increases. TLD and parallel plate chamber measurements indicate the surface dose increases with increasing electron beam energy, field size and beam obliquity

Conclusions: Patient skin dose from electron beams delivered through a pMLC shows a strong dependence on field size, energy, and SSD. Lower doses were measured as field size and energy decreased and as SSD increased. Knowledge of the variation in surface dose with these factors is necessary during treatment planning for the appropriate choice of electron beam energy in modulated electron radiotherapy.