AbstractID: 11818 Title: Segmented field electron conformal therapy with an electron multi-leaf collimator

Purpose: To investigate the potential of a prototype electron multi-leaf collimator (eMLC) to deliver segmented-field electron conformal therapy (ECT) and to improve dose homogeneity to the planning target volume (PTV) by feathering the abutting edge of the higher energy electron fields. **Method and Materials:** Electron beams (6-20 MeV) using a prototype eMLC were commissioned for the pencil beam dose algorithm in the Pinnacle treatment planning system. A discrete Gaussian edge spread function was used to match electron dose penumbras of differing energies at a specified depth in a water phantom. The effect of edge feathering on dose homogeneity was computed for a segmented-field ECT treatment plan for a cylindrical, 2-step PTV in a water phantom (depths = 2.5 and 4 cm). **Results:** For abutting 9 and 16 MeV fields, Gaussian edge feathering reduced the standard deviation of dose in the PTV from 5.6% to 3.5%. The treatment plan with edge feathering delivered 90% of the prescription dose to 94% of the PTV, while the treatment plan with no feathering delivered 90% of the dose to 88% of the PTV. **Conclusions:** An eMLC was found to improve dose homogeneity in the 2-step PTV for segmented-field ECT through 1D edge feathering of the leaf positions for the higher energy electron field.