

AbstractID: 13098 Title: Monitor Unit Verification of Proton scattering beam using a generic beam data

Purpose: We have developed an empirical algorithm to calculate patient specific monitor unit (MU) for Proton Scattering Beams. We examine the accuracy of MU verification using generic beam data for proton beams generated by the same vendor (IBA).

Method and Materials: The algorithm is based on a well-established formula for proton output calculation. It adds additional data for a broad range of SSD, depth, and especially field size defined by the cutout. Pristine percentage depth doses (*PDD*) for several ranges and off-axis ratio (*OAR*) at several depths of the pencil proton beam are used. This algorithm adopts the concept of proton head-scatter factor, $H_p(r,f)$, to characterize the proton fluence variation with lateral distances (r) and source-to-detector distance (f). A universal nozzle and a multi-leaf collimator (MLC) is used to replace multiple snorts to define field sizes.

Results: Input beam data for the empirical program, *PDD* and *OAR* are examined for the proton energies and ranges suitable for the scanning proton beam. *OAR* is the dose measured in water at depth d and r is the lateral distance of the pencil-beam. H_p is the energy fluence for the same conditions. The program can import DICOMRT plans from the treatment planning system. MU agreements for clinical sites (e.g., prostate) are evaluated and is found to be within 5%.

Conclusion: A generic beam data seems suitable for patient-specific MU verification for scattering proton beams from the same vendor.