AbstractID: 1418 Title: Enhanced Dynamic Wedge Commissioning using 2D MAPCHECK Detector Array

Enhanced Dynamic Wedge (EDW) commissioning in linacs could be efficiently performed with a 2D array of diodes MAPCHECK. Unlike the physical wedge, the EDW does not cause any beam hardening, and therefore the array calibration should remain approximately the same for the open and wedged fields. 2D transverse dose profile, measured by the MAPCHECK, gives an opportunity to better evaluate the dose distribution at off-axis locations. We performed the dose profile measurements in a solid water phantom, at depths of 5, 10, and 20 cm, for 10^o, 15^o, 20^o, 25^o, 30^o, 45^o, and 60^o EDW, using 15×15 cm^2 (maximum square size fully encompassed by the array at the SSD of 100 cm), using 6 and 18 MV beams. Most measured profiles were in 1-3% agreement with calculations. The biggest discrepancy up to 8% for 18 MV and up to 5% for 6 MV, found in the corners of a field with a 15^o wedge at a depth of 5 cm, was due to the "horns" from the open beams. The profile sagging in non-wedged direction was noticeably smaller than for the physical wedges. For the absolute dosimetry, the MAPCHECK readings should be independently verified by measurements with a small ion chamber at the central axis and a few peripheral locations. Overall, MAPCHECK appears to be a useful tool for the EDW commissioning, making this task significantly easier. Commissioning of the EDW is especially important for treatment planning systems automatically generating the EDW calculations and not requiring preliminary EDW measurements.