

AbstractID: 7622 Title: Analysis of the Virtual Wedge implementation by the AAA algorithm in the Varian Eclipse TPS

Purpose: To evaluate accuracy of VW implementation by the Varian Eclipse AAA Calculation Algorithm

Material and Methods: A 6MV Siemens Oncor Linac beam was used to deliver symmetric and asymmetric VW (15, 30, 45, 60) profiles for a range of field sizes (5x5cm² to 15x15cm²). All measurements were performed in absolute dose mode using a 2D diode array (Mapcheck, SunNuclear FL), at 100cm SAD and depth of 5cm under water equivalent conditions. The Varian Eclipse TPS software v.8, AAA calculation algorithm was used to determine the VW fluence maps in a water equivalent phantom. All measured and calculated Linac central axis values were analyzed. A relative and absolute comparison was conducted for all calculated and measured fluence maps using the Mapcheck Software v.3.01.08.00. Theoretical calculations of the VW factors were performed and compared with the ones calculated based one measured data . The measured output factors were compared with the calculated ones using our PennMU software and the Eclipse TPS AAA calculation algorithm.

Results and discussions: All measured and theoretical symmetric VW wedge factors and output factors were in agreement. Differences up to 82% were found for asymmetric VW output comparison between the Eclipse AAA algorithm calculated output factors and the measured ones. The differences increase with the degree of asymmetry of the field and the VW angle. The data analysis suggest that the Eclipse AAA TPS defines the wedge factor to the central axis of the beam rather than to the central of the machine (VW factor definition). The relative fluence map analysis showed that over 95% of the VW measured profile are within 3%/3mm (%Diff/DTA).

Conclusion: We found that the VW clinical implementation for the Eclipse TPS AAA algorithm, v.8, is valid for symmetric fields only and large errors can result for asymmetrical fields.