

AbstractID: 14162 Title: Evaluation Of The New Varian Trilogy MX Flattening Filter Free 6 MV and 10 MV

## Photon Beams

**Purpose:** The Trilogy MX is a new linear accelerator designed by Varian Medical Systems to provide enhanced treatment delivery options. Among these is a flattening filter free (FFF) photon beam mode that can achieve unprecedented high dose rates of up to 3000MU/min. A preliminary investigation of the high intensity beam properties and treatment capabilities has been performed. **Method and Materials:** PDD, profile and Total Scatter Factor data were measured for the 6MV FFF and 10MV FFF beams and compared to non-FFF data. The modeling of the FFF beam by the Eclipse planning system AAA algorithm was investigated for IMRT and RapidArc treatment modalities. **Results:** The FFF PDDs had a shallower  $d_{max}$  and steeper falloff beyond  $d_{max}$ . The FFF profiles appearing almost triangular in shape and exhibit an advantageous lower profile tail dose. The Total Scatter Factors varied less with field size for the FFF beams than for the filtered beams. Calculated and measured dose distributions agreed to within 2%/2mm for IMRT fields and 4%/2mm for RapidArc fields on average (10% dose threshold, 95%+ pass rate). Measured and calculate dose distribution profiles agreed well. **Conclusion:** A preliminary investigation shows that the Eclipse planning system (AAA algorithm) can accurately model the FFF beam. It is expected that the high dose rate beams will be particularly useful for radiosurgical treatments where large doses are delivered in a given session; for RapidArc treatments where the increased dose rate allows for faster gantry travel and more dose per gantry angle; and also for respiratory gated treatments because the high dose rate will reduce the treatment time and minimize the delivery interruptions. **Conflict of Interest:** Research sponsored by Varian.