

AbstractID: 9557 Title: Effect of Range Compensators on Entrance Doses in Proton Therapy

**Purpose:** To investigate the effect of the range compensator on the entrance dose in proton therapy. **Methods:** A proton field with a range of 12 cm in water and a modulation width of 9 cm was delivered using our double scattering system (IBA). Measurements of depth dose curves were performed in a water phantom using a PPC05 parallel-plate ionization chamber. Various thickness (0.5 cm and 2.0 cm) of 30 cm x 30 cm solid water were attached at the end of snout. Different air gaps (7.5 cm, 15.5 cm and 40.5 cm) were achieved by retracting snout to different locations. Variation in relative dose at depth 2.6 mm was evaluated to determine the effect of the range compensator. **Results:** Without any compensator, no change was observed between measured depth dose curves at different air gaps. For protons passing through 0.5 cm thick solid water at various air gaps, minimal variation was observed at 2.6 mm depth, or at any other position in the PDD. However, with a 2.0 cm solid water compensator, the entrance doses are 82.1%, 83.6% and 84.6% for air gaps of 40.5 cm, 15.5 cm and 7.5 cm respectively. **Conclusion:** With 2 cm solid water, the entrance dose increases by 2.5% by changing the air gap from 40.5 cm to 7.5 cm. The increase of entrance dose is likely due to the secondary particles produced by primary protons.