# AbstractID: 9125 Title: Effect of CT Truncation Artifacts to Proton Dose Calculation


**Purpose:**

When a patient body part is out side of the CT scan field of view, truncation artifacts generally occur in the images leading to inaccuracy in the CT number (HU) in these affected images. In proton therapy treatment planning, CT numbers are converted to stopping powers to calculate dose, beam range and range compensators for the treatment fields to cover the target volumes. We have evaluated the effects of these artifacts on proton dose calculation accuracy and on range uncertainty for spinal fields used for cranial spinal irradiation.

**Method and Material:**

A thoracic phantom was imaged on a GE 16 slice CT scanner using a standard body protocol. Two RMI bone tissue blocks simulating patient arm/or shoulder was placed outside of the scan field of view. Two sets of scans were obtained with and without the bone tissue blocks. Proton treatment plans were generated using Eclipse treatment planning system. Then, treatment plans were compared to each other to determine the dose and range differences.

**Result:**

There is an overall of 20-30 HU difference in the target area due to the image truncation artifacts. This creates a 2-3mm difference in the range of the proton beam at 50% dose line between the plans with and without truncation artifacts.

**Conclusion:**

The image artifacts cause uncertainty in dose estimations in the distal edge of the treatment target. The difference between the corrected plan and the truncated plan is on the order of 2-3mm, which is comparable to the distal margin normally used to account for the range uncertainty for the spine field proton therapy treatment planning.