

# AbstractID:9461Title:Dose Reduction in CBCT via In-tensity Weighted Region of Interest Imaging

**Purpose:** Reporting preliminary evaluation results of an in-tensity weighted region of interest (IWROI) imaging technique that utilizes recent developments in cone-beam CT (CBCT) reconstruction theory to reduce patient exposure and detected scattered radiation. **Method and Materials:** Patient dose can be reduced by decreasing the x-ray source fluence, however this comes with the cost of a decreased signal-to-noise ratio (SNR) resulting in lower image quality. IWROI imaging introduces filters into the x-ray beams such that the central ROI receives the full beam intensity, and thus maintains SNR level while the periphery of the field-of-view (FOV) is illuminated by a reduced intensity, filtered beam. Reconstruction is done with the recently developed chord-based BPF algorithm, which has been shown to be robust against some forms of truncation and to have favorable noise propagation properties. This algorithm enables IWROI to be used more flexibly to yield higher image quality. Experimental studies were carried out by constructing aluminum and copper filters which could be attached directly to the CBCT source. Scans were taken with 125 kVp, 80 mA and 15 ms pulse length exposures. Dose measurements were made using LiF TLDs 10 cm deep in a 20 cm stack of 30 cm X 30 cm solid water slabs. **Results:** For the 3 mm copper filter case the measurements showed a 7% dose reduction in the central ROI and a 37% reduction for the low intensity region of the image. The coefficient of variation for the full intensity ROI after BPF reconstruction was 0.053 and 0.100 in the filtered region indicating a relative noise level. **Conclusion:** IWROI imaging can reduce radiation exposure to sensitive regions of the anatomy while still producing high image quality in the region of interest. The filtered region also contains enough information for comparison of the gross anatomy with the planning scan. **Conflict of Interest:** Work supported by Varian Medical Systems, Inc.