

AbstractID: 12343 Title: Static Multiple-slit Collimator System for Scatter Rejection in Cone-beam CT

**Purpose:** A design of multiple-slit collimator (MSC) was introduced for scatter reduction in cone-beam CT (CBCT). **Method and Materials:** Monte Carlo (MC) simulations for a virtual phantom were performed to evaluate the effectiveness of the system. Unlike most other collimators, the open and closed septa of the proposed MSC are placed in equi-angular interval on a circular track of the sagittal plane. Therefore, one gantry rotation provides only the half of necessary data set and two gantry rotations are needed. We approximate signals under the closed septa as scatter contributions, then subtract them from signals obtained with the open septa. **Results:** Relative errors based on the primary only radiation of the z-axis of the phantom were within 4 % in every septum of the MSC. The contrast ratio (CR) improvement factor was 1.165 in the 2D projection view, and 1.005 and 1.026 at the central and peripheral slice of the reconstructed CBCT image. **Conclusions:** This preliminary study based on MCNP simulations demonstrated a potential significant scatter reduction in CBCT with the proposed MSC and the imaging process method. Further studies will be performed to investigate the effect of various factors such as reducing the detector size, increasing the number of history of MC simulation, and including many structures with different densities.