

**AbstractID: 7149 Title: Feasibility of estimating multidetector CT dose using BEAMnrc code**

**Purpose:**

Most of Monte Carlo based methods estimating radiation dose in computed tomography (CT) were performed using MCNP or EGS codes. The BEAMnrc code, one of Monte Carlo codes, was usually used to simulate radiation therapy accelerators, and has fine graphic interfaces and various component modules. The purpose of this work was to verify the feasibility of using BEAMnrc code to estimate radiation dose in a multidetector CT (MDCT) scanner.

**Method and Materials:**

A Siemens Somatom Sensation 64 MDCT scanner system was used in our simulations to achieve the study objective. Detailed MDCT inner structures were constructed by component modules in the BEAMnrc code to describe the x-ray tube, filtrations, bowtie filter, collimators and geometry factors. Further more, a pencil-type ionization chamber and a batch of TLDs were used to measure the lateral dose distribution. The beam quality, referred to half value layer (HVL), was measured with the chamber and high-purity aluminum sheets.

**Results:**

The simulated x-ray spectra has been compared with those in Xcom5 calculations and they agree with each other. Comparisons between experimental measurements for the lateral in-air dose profile and half value layer measures, and the absolute dose values derived from the Monte Carlo simulations for the body filter demonstrate agreements with 0.6% .

**Conclusion:**

This work illustrates the feasibility to extend the BEAMnrc code for modeling from radiotherapy sources to CT sources. Future work will be extended to estimate doses within voxelized patient models using DOSXYZnrc.