

# An Assessment to Determine Total Scatter Factors for Photon Beam Linear accelerators

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## ABSTRACT

**Objectives:** To explore a simple and effective way to determine the total scatter of a C-Series linear accelerator.

**Methodology:** Measurements for this study were acquired using a Varian C-Series linear accelerator, with a 6MV photon beam, a Blue water phantom, 2 IBA CC13 ion chambers and an IBA CCU electrometer. Measurements were acquired for field sizes ranging from 5cm x 5cm to 40cm x 40cm, increasing field size by an increment of 5cm. Three readings were collected for each field size and averaged. All readings were done at a depth of 10cm to reduce the probability of measuring electron contamination in the photon beam. Measurements for Sc calculation were acquired in air using a build-up cap with a 3cm diameter.

**Results:** The average radiation dose measured increased as the field sizes increased. The maximum dose recorded for Sc was 2.33cGy while that for Scp was 7.96cGy. There was a non-linear direct relationship between radiation dose measured, Scp and Sc calculated and field size. The maximum standard deviation in charge readings for Sc measurement was 1.18% which was recorded for the 35cm x 35cm field. The minimum standard deviation was 0.70% obtained with the 20cm x 20cm field. The proportion of the phantom scatter contribution to the total scatter, decreased exponentially with increases in field size. The largest contribution was identified with the 10cm x 10cm field while the lowest was identified with the 40cm x 40cm field.

**Conclusion:** It can be concluded that this method was effective in assessing the total scatter factor and its derivatives for field sizes ranging from 5cm x 5cm to 40cm x 40cm.

## Biography

I am a final year PhD candidate at the University of the West Indies (UWI), Mona Campus, Kingston Jamaica doing research in Applied Physics. I am also pursuing a Post Graduate Certificate in University Teaching and Learning. I possess a Diploma in Sports Therapy, BSc in Diagnostic Imaging and an MSc in Medical Physics. I am currently employed as a Senior Medical Physicist and Radiation safety Officer at the Kingston Public Hospital

and adjunct assistant lecturer at UWI. I am actively involved in radiation therapy treatment planning, and perform diagnostic and therapeutic quality assurance for radiation generating equipment. I conduct staff training and sensitize patients about their procedures. I have been involved in the medical use of radiation for the past 13 years; I have a passion for radiation safety and management and have published 6 research papers about same..

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