East Carolina University®
Department of Physics

Colloquium

Friday, April 12th, Room N109, Howell Science Complex
3:15 p.m. (Refreshments at 3:00 p.m.)

Professor Rasha Makkia
Medical College of Georgia

Calculating Skin Dose Following Fluoroscopically Guided Interventional Procedures (FGIPs) using Different Computational Phantoms

Abstract:
Determining the peak skin dose (PSD) accurately during fluoroscopically guided interventional procedures (FGIP) is crucial for assessing potential radiation-induced skin injuries and determining the necessary follow-up care for exposed patients. This study evaluates the accuracy of PSD estimation in FGIPs using geometrical and computational phantoms that mimic the dimensions of the imaged patient. A hybrid computational human phantom (HCHP) was developed using Rhinoceros TM 6.0, and three other computational phantoms with cylindrical, ellipsoidal, and semi-ellipsoidal geometries were created using Matlab software developed to calculate PSD for different computational phantoms. Dose-distribution mapping was performed on all constructed phantoms using Matlab software, adhering to the guidelines outlined in AAPM TG-357. Modeling the FGIP with the use of computational phantoms accurately reflects patient anatomy and can be useful in evaluating radiation PSD from FGIPs. The traditional method yields a greater difference against our fluoroscopy PSD measurements, while the HCHP calculation method resulted in comparable accuracy in calculating PSD to using computational phantoms, with the added computational power and time needed to create a patient-based human model.

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