Contribution ID: 17

Type: Poster

## Deposited dose during a radiological examination: Monte Carlo simulations

Wednesday 2 July 2025 18:50 (20 minutes)

Radiological examinations are essential for medical diagnostics, but understanding dose deposition is crucial for patient safety. This study employs Monte Carlo simulations with MCNP to analyze photon dose deposition in biological tissues. Additionally, a self-developed Fortran program is validated through comparison with MCNP results. A cylindrical phantom representing a child's thorax is modeled using water as a tissue-equivalent material, then refined with an HCNO-based composition for greater accuracy. The study examines dose variations across different tissues, considering their atomic composition, density, and photon interaction mechanisms. Results highlight the significant impact of tissue heterogeneity on radiation dose distribution. The strong agreement between the Fortran program and MCNP confirms the accuracy of our approach, emphasizing the need for material-specific dosimetric calculations to optimize radiological protocols and improve patient safety while maintaining imaging quality.

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Session Classification: 9. Poster Session

Track Classification: Section 7. Nuclear medicine.