Contribution ID: **77** Type: **Poster**

Calculation of optimal shielding thickness for a LINAC-based prototype self-shielded X-ray irradiator for radiotherapy research

Thursday, November 14, 2024 1:00 PM (1h 30m)

To apply the C-band accelerator technology to medical devices in Dongnam Institute of Radiological and Medical Sciences (DIRAMS), a prototype 4 MV X-ray irradiator for preclinical radiotherapy research is developing. This irradiator is characterized by having the entire accelerator structure and irradiation device built into a single square body, and in this study, an optimal shielding structure was designed to minimize external leakage radiations. The leakage radiation dose emitted to the outside of the irradiator body was calculated through MCNPX® code calculations and the optimal shielding thicknesses for important points inside the body were determined. Through this process, the shielding thickness was determined at an appropriate location so that the amount of leakage radiation around the irradiator body was within 0.5% of the irradiated dose to the biological target. (This work was supported by the DIRAMS grant funded by the Korea government (MSIT) (No. 50493-2024).)
Keywords: x-ray irradiator, leakage radiation, shielding

Paper submission Plan

Yes

Best Presentation

No

Contribution track

ICABU WG4. Applications of Particle Beams

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Session Classification: ICABU Poster Session

Track Classification: ICABU: ICABU WG4. Applications of Particle Beams