

AbstractID: 9039 Title: Photoneutron Intensity Variation with Field Size around Radiotherapy Linear , H. Al-Ghamdi, Fazal-ur-Rehman, M. I. Al-Jarallah and N. Maalej

Photoneutron Intensity Variation with Field Size around Radiotherapy Linear Accelerator 18-MeV X-ray Beam

H. Al-Ghamdi, Fazal-ur-Rehman, M. I. Al-Jarallah and N. Maalej*

Purpose:

CR-39 NTDs were used to study the variation of fast and thermal neutron relative intensities around an 18 MeV linear accelerator x-ray beam with the field size

Method and Materials:

The linear accelerator (Varian 2300 CD) was used with maximum x-ray energy : 18 MeV

Fast neutron detection used Bare NTDs

Thermal neutron detection used NTDs were covered with lithium tetra borate(Li₂B₄O₇) converter.

Results:

- Fast neutron relative intensity is symmetrical about the beam axis and exhibits almost an exponential-like drop with distance from the isocenter of the accelerator for all the field sizes.
- Neutron intensities do not change significantly with beam size outside the primary beam.
- At the primary beam (isocenter), the relative fast neutron intensity is highest for 40x40 cm² field size and decreases linearly with the decrease in the field size.

Conclusion:

- The fast neutron relative intensity was found to be symmetrical about the beam axis and exhibits an exponential-like drop with distance from the isocenter of the accelerator for all the field sizes.
- At the primary beam (isocenter), the relative fast neutron intensity is highest for 40x40 cm² field size and decreases linearly with the decrease in the field size.
- Outside the primary beam, the fast neutron intensity does not change significantly with the field size.
- The thermal neutron intensity was found to be almost uniform for all the field sizes.

Conflict of Interest (only if applicable):