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Effect of each component of a LINAC therapy head on neutron and photon spectra

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Abstract

Linear accelerators (LINACs) are widely applied in radiotherapy for their versatility and flexibility. Monte Carlo simulations were made to find the neutron and photon spectra at the isocenter (IC) of a LINAC operating at 10, 15, 18, and 24 MV by the MCNPX code. A detailed model of the LINAC head, consisting of flattening filter, secondary collimator, primary collimator, and multi-leaf collimator were used in the calculations. The effect of eliminating any of these components on contamination of a neutron spectrum and a photon spectrum was assessed. Photon and neutron ambient equivalent doses were found, and comparisons were made for the various structures. Lethargy neutron spectra at the IC were compared with spectra computed with the function reported by Tosi et al., which describes well neutron spectra for the

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