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Dose Modelling and Characterization of a 6 MV Linear Accelerator Photon Beam

Linear accelerator (LINAC) photon beams are widely used in radiation therapy. Understanding the characteristics of a LINAC photon beam is important to ensure accurate and effective treatment delivery. Photon beams interact with matter in dierent forms (i.e photoelectric eect, compton scatter and pair production) depending on the energy of the photon beam. All these interaction mechanisms cause ionization in matter which results biological damage and death of cancerous cells in the human body. In this study, a 6 MeV together with 3 and 18 MeV linear accelerator photon beams were modelled using the Monte Carlo N-Particle eXtended code (MCNPX). The photon flux was studied at dierent source to surface distances. The attenuation of photons with source to target distance was observed to obey the
inverse square law. A theoretical study was made on depth dose characteristics. Percent depth dose characteristics change with parameters as energy,field size and source to surface (target) distance. The choice of energy used in a linear accelerator depends on the intended use on the patient. A 6 MV is considered a low energy photon beam, thus used to treat many shallow target tumors.

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