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Monte Carlo Dose Estimation from Linac Photon Beam using GATE/GEANT4

During the last few years, Monte Carlo simulation is considered to be the gold standard method for radiation dose calculations. Thanks to the accuracy and the flexibility that it supplies, MC method is the most used for dose prediction in external radiation therapy. This work aims to set up a full geometrical model of an 18 MV Varian Clinac 2100C medical linear accelerator in photon mode, using Gate/Geant4 Monte Carlo simulation platform. The simulation contains the major components of the linear accelerator (LINAC) and a homogeneous water phantom. The Phase Space approach was used in order to reduce the CPU calculation time. To validate the 18 MV photon-beam linear accelerator model, measured and calculated relative depth-dose data for several radiation field sizes ranging from 6x6 cm2 to 40x40 cm2 along the central-axis and dose profile at different depths, were compared. A good tuning was found between the calculated and measured dose distributions in the water tank.

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