

LINACS using wide-field profiles in a water phantom.

F. Gómez, L. Franco, A. Iglesias, J. Pardo, J. Pena, A. Rodríguez
Universidade de Santiago, Dpto. de Física de Partículas, Facultade de Física, campus sur s/n, 15706 Santiago de Compostela, Spain
R. Lobato, J. Mosquera, M. Pombar, J. R. Sendón
Hospital Clínico Universitario de Santiago, Travesía da Choupana s/n, 15706 Santiago de Compostela, Spain

ABSTRACT

Based on the well known fact that in-water dose profiles are very sensitive to the different parameters that define the electron beam incident on the target, we have simulated 40cm x 40cm (SSD=100cm) profiles for several SIEMENS PRIMUS photon beams using the BEAMnrc code. The primary electron beam nominal energy was obtained from a fit of the simulated percentage depth dose with experimental data. Also several 5 cm depth in-water dose profiles were calculated varying the FWHM of the electron beam spacial fluence distribution (supposed to be gaussian). This depth was chosen to have a reduced effect of the water phantom scatter contribution. The results show a significant dependence of these profiles on the beam nominal energy. Additionally, wide field dose profiles depend crucially on a correct simulation of the target, flattening filter and primary collimator. Any changes in the material composition or geometry could be detected using this method, that also allows to crosscheck the determined nominal energy and to calculate the FWHM of the primary beam spacial fluence.

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