

MCMEG: InterComparison exercise on radiotherapy assessment prostate dose

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The Monte Carlo Modelling Expert Group (MCMEG) is an expert network specializing in Monte Carlo radiation transport and modelling and simulation applied to the radiation protection and dosimetry research field. In 2016, the WG launched its first inter-comparison exercise to model and simulate a 6 MV LINAC photon beam using different Monte Carlo codes [1]. The validation of the results were done by comparing to the experimental measurements carried out in the National Cancer Institute (INCA) in Rio de Janeiro, Brazil. Now, the MCMEG has launched the second inter-comparison exercise for modelling and simulating a case of radiotherapy protocol of prostate cancer. The goal is to obtain the dose distribution in the target volume and the neighbouring organs. This study will describe a comparative analysis of dose distribution for the Alderson-Randon phantom and its segmented CT images with prostate cancer treated with ionizing radiation. The intensity-modulated radiation therapy (IMRT) will be used as protocol and the experimental process will be done at the Radiotherapy Section of the HCL/UFMG in BH/MG and the organs at risk will be assessed are the urinary bladder, rectum and heads of the femur, as well as the volume of normal tissue. The following features is been compared to the simulations performed by different research groups around the world using MCNPx, MCNP6, EGSnrc and GEANT4 Monte Carlo codes. The main parameters to be used in the comparison are dose in the target volume, mean doses and standard deviation in organs at risk, and organ volumes for each particular dose.

Keywords: MCMEG, Monte Carlo, Radiotherapy

[1] Fonseca TC, Mendes BM, Lacerda MA, Silva LA, Paixão L, Bastos FM, et al. MCMEG: Simulations of both PDD and TPR for 6MV LINAC photon beam using different MC codes. Radiat. Phys Chem 2017;140:386-391