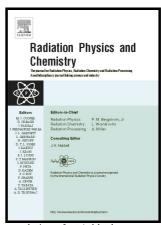
### Author's Accepted Manuscript

Estimation of Dose Rates at The Entrance Surface for Exposure Scenarios of Total Body Irradiation Using MCNPX Code

J.S. Cunha, F.R. Cavalcante, S.O. Souza, D.N. Souza, W.S. Santos, A.B. Carvalho Júnior



www.elsevier.com/locate/radphyschem

PII: S0969-806X(17)30147-0

DOI: http://dx.doi.org/10.1016/j.radphyschem.2017.02.012

Reference: RPC7411

To appear in: Radiation Physics and Chemistry

Received date: 25 September 2016 Revised date: 1 February 2017 Accepted date: 4 February 2017

Cite this article as: J.S. Cunha, F.R. Cavalcante, S.O. Souza, D.N. Souza, W.S Santos and A.B. Carvalho Júnior, Estimation of Dose Rates at The Entrance Surface for Exposure Scenarios of Total Body Irradiation Using MCNPX Code *Radiation Physics and Chemistry* http://dx.doi.org/10.1016/j.radphyschem.2017.02.012

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

#### **ACCEPTED MANUSCRIPT**

# ESTIMATION OF DOSE RATES AT THE ENTRANCE SURFACE FOR EXPOSURE SCENARIOS OF TOTAL BODY IRRADIATION USING MCNPX CODE

J. S. Cunha<sup>1</sup>, F. R. Cavalcante<sup>1</sup>, S. O. Souza<sup>1</sup>, D. N. Souza<sup>1</sup>, W. S. Santos<sup>2</sup>, A. B. Carvalho Júnior<sup>1</sup>

<sup>1</sup>Departamento de Física, Universidade Federal de Sergipe, São Cristóvão, Brazil;

<sup>2</sup>Instituto de Física, Universidade Federal de Uberlândia (INFIS/UFU), Uberlândia, MG, Brazil

#### scjulyanne@gmail.com

#### Abstract

One of the main criteria that must be held in Total Body Irradiation (TBI) is the uniformity of dose in the body. In TBI procedures the certification that the prescribed doses are absorbed in organs is made with dosimeters positioned on the patient skin. In this work, we modelled TBI scenarios in the MCNPX code to estimate the entrance dose rate in the skin for comparison and validation of simulations with experimental measurements from literature. Dose rates were estimated simulating an ionization chamber laterally positioned on thorax, abdomen, leg and thigh. Four exposure scenarios were simulated: ionization chamber (S1), TBI room (S2), and patient represented by hybrid phantom (S3) and water stylized phantom (S4) in sitting posture. The posture of the patient in experimental work was better represented by S4 compared with hybrid phantom, and this led to minimum and maximum percentage differences of 1.31% and 6.25% to experimental measurements for thorax and thigh regions, respectively. As for all simulations reported here the percentage differences in the estimated dose rates were less than 10%, we considered that the obtained results are consistent with experimental measurements and the modelled scenarios are suitable to estimate the absorbed dose in organs during TBI procedure.

#### **Key words:**

Total Body Irradiation, Monte Carlo simulation, dose rate.

#### Download English Version:

## https://daneshyari.com/en/article/5499126

Download Persian Version:

https://daneshyari.com/article/5499126

<u>Daneshyari.com</u>