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Dose determination by PET nuclides using virtual anthropomorphic phantoms in different postures

W Belinato^{1,2}, W S Santos³, A P Perini⁴, L P Neves⁴, L V E Caldas³ and D N Souza²

¹ Instituto Federal de Educação, Ciência e Tecnologia da Bahia (IFBA), Av. Amazonas, 3150, 45.100-000, BA, Brasil.

² Departamento de Física, Universidade Federal de Sergipe (UFS), Rod. Marechal Rondon, s/n, 49.100-000, SE, Brasil

³ Instituto de Pesquisas Energéticas e Nucleares, Comissão Nacional de Energia Nuclear (IPEN-CNEN/SP); Av. Prof. Lineu Prestes, 2242, 05508-000, SP, Brasil.

⁴ Instituto de Física, Universidade Federal de Uberlândia (UFU), Av. João Naves de Ávila, 2121 Santa Mônica 38400-902, Uberlândia, MG, Brasil.

The number of diagnostic exams and medical monitoring using Positron Emission Tomography (PET) combined with computed tomography (CT) has increased in the last years. The dose to the patient due to the nuclide used in PET depends on their physical and biological aspects; the type of nuclide used and administered initial activity. The aim of this study is to determine the dose deposited by six major positron emitters (¹⁸F, ¹¹C, ¹³N, ¹⁵O, ⁶⁸Ga, ⁸²Rb) in internal organs of two adult virtual anthropomorphic phantoms called MASH and FASH in both standing and lying down positions. The simulations were performed utilizing the Monte Carlo MCNPX code using the MIRD method. Two scenarios were considered for each patient, one in standing posture, nearby room wall and another with the patient lying on a bed. The preliminary results showed that the doses on the patients depend on the nuclide, due to different energy spectra, and also is related to the posture of the patient after administration, since there are variations in the positions of the internal organs due to the gravitational effect.