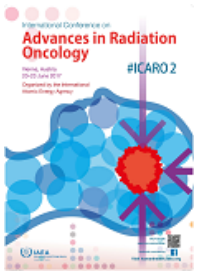

Contribution ID: **36** Type: **Poster**

Development of a BNCT facility based on axial Deuterium–Deuterium (D–D) neutron generator using MCNP code

Wednesday, 21 June 2017 10:40 (5 minutes)

The Boron Neutron Capture Therapy (BNCT) is a promising method to treat malignant brain tumors. The basic principle of this technique is to irradiate the boron-containing tumor with epithermal neutrons. Optimization of the Beam Shaping Assembly (BSA) assembly for BNCT has been performed using the Monte Carlo N-Particle Transport Code (MCNP6) to shape the 2.45 MeV neutrons that are produced in the axial Deuterium-Deuterium (D-D) neutron generator developed at Adelphi Technology, Inc with a radio frequency (RF) driven ion source and nominal yield of about 1010 fast neutrons per second. Different materials and Beam Shaping Assemblies (BSA) are investigated and an optimized configuration is proposed. The feasibility of using low enrichment uranium as a neutron multiplier is investigated to increase the number of neutrons emitted from D-D neutron generators, TiF3 and Al2O3 as moderators, Pb as reflector, Ni as shield and Li-Poly as collimator to guide neutrons toward the patient position. Also a simulated Snyder head phantom was used to evaluate dose profiles due to the irradiation of designed beam. The neutron beam quality is defined by the standard free beam parameters, calculated averaging over the collimator aperture. The results are discussed and compared with the performances of other facilities.

Country

Tunisia

Institution

National Center of Nuclear Sciences and Technologies

Primary author: BERGAOUI, kaouther (National Center of Nuclear Sciences and Technologies)

Co-authors: GARY, Charles (Adelphi Technology Inc); BROWN, Craig (Adelphi Technology Inc); PIESTRUP, Melvin (Adelphi Technology Inc); REGUIGUI, Nafaa (National Center of Nuclear Sciences and Technologies)

Presenter: BERGAOUI, kaouther (National Center of Nuclear Sciences and Technologies)

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