Feasibility study of Beam Shape Assembly with PHITS on 9Be(d,n)10B reaction

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In order to fulfill the requirement of IAEA recommendation for reactor based BNCT treatment, the flux of epi-thermal neutron is to be larger than 10^9 n/cm2/s. In the mean time, the accelerator-based BNCT (AB-BNCT) has opened the era of in-hospital facilities around the world. The flux of epi-thermal neutron for AB-BNCT does not deviate greatly from the IAEA recommendation. In the analysis of Beam Shaping Assembly (BSA) after bombarding 1.45 deuteron beam on Beryllium thin target at CNEA[1,2], the available performance within 1 hour treatment on the brain tumor was estimated successfully. Since the three closed spaced excited levels at residual nucleus 10B (at 5.11, 5.16 and 5.18 MeV) are preferentially populated in the deuteron beam energy near and above 1 MeV. The CNEA and KIRAMS are supposed to collaborate for the development of AB-BNCT. In this presentation, the feasibility study of BSA is to be shown with various Monte Carlo tool, PHITS version 3.0.2. The optimized BSA geometry and material composition is to be selected on Beryllium target and 1.45 deuteron beam.