

SARDJONO-1: Optimization System Beam Shaping Assembly of Cyclotron 30 MeV for Boron Neutron Capture Therapy

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Cancer is a global disease that must be considered for treatment. Boron Neutron Capture Therapy is one of the applications of nuclear technology using the principle of nuclear radiation interaction. By optimizing the neutron output needed in cancer therapy, it is also necessary to optimize the design of the BNCT system using Beams Shaping Assembly (BSA). The objectives of this study is knowing the parameter values of the BSA design used with a target of ⁷Li. This research is based on simulation using the PHITS program by modeling the geometry and BSA components that function as collimators from the 30 MeV neutron accelerator generator with a current of 2 mA. The independent variable of this research is the material of BSA components used in the system. The results of this study indicate a BSA design with 37 cm MgO₂ as a reflector, 20 cm MgF₂ as a moderator, Bismuth as a neutron thermal filter, and Li-polyethylene as a gamma filter. So that in this design the IAEA parameters are appropriate for the Boron Neutron Capture Therapy system.

Keywords: BNCT, BSA, neutron flux, lithium target