BSA design

Beam Shaping Assembly for Boron Neutron Capture Therapy

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The accelerator-based neutron source VITA has been proposed and developed at Budker Institute of Nuclear Physics (Novosibirsk, Russia) for boron neutron capture therapy, which includes a vacuum-insulated tandem accelerator for proton beam production, a lithium target for neutron generation through the $^{7}Li(p,n)^{7}Be$ reaction and a number of beam shaping assemblies (BSA) for therapeutic beam generation.

The report provides a description of beam shaping assemblies that were designed and manufactured: Beam shaping assembly with MgF_2 moderator to generate epithermal neutrons for treatment of deep seated tumors and beam shaping assembly with hydrogenous moderator with impurities of Bi atoms for thermal neutrons beam generation for BNCT researching on cells cultures and laboratory pets. Beam parameters of both BSA meet IAEA requirements and supported by the results of measuring using developed neutron and γ-ray detectors with cast polystyrene scintillators, one of which was enriched in boron.

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