

Beam Shaping Assembly for BINP Neutron Source

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Beam Shaping Assembly consisting of moderator, reflector and absorber, is used in accelerator neutron sources for forming of therapeutic neutron beam for Boron Neutron Capture Therapy. For the first time it is proposed to use BSA composite moderator: magnesium fluoride near neutron generating target and aluminum fluoride near the outlet, to use a composite reflector graphite in the front hemisphere and lead in the rear hemisphere, and to generate neutrons in the reaction ${}^7\text{Li}(p,n){}^7\text{Be}$ with energy 2.3 MeV proton beam, rather than 2.5 - 2.8 MeV, usually considered. The method of numerical modeling of neutron transport and γ -radiation shows that the proposed solutions allow generating a therapeutic beam of neutrons that meets the requirements of BNCT to the greatest extent. The report presents and discusses BSA design manufactured for BINP epithermal neutron source based on vacuum insulation tandem accelerator.