High Flux Accelerator-based Neutron Source

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In the Budker Institute of Nuclear Physics an accelerator based epithermal neutron source was proposed and designed to the development of the perspective cancer treatment, which is the Boron Neutron Capture Therapy. The source consists of a vacuum-insulated tandem accelerator, which produces a 2MeV proton or deuterium beam, a lithium target in which neutrons are generated in the 7 Li(p, n)7 Be threshold reaction and beam shaping assembly (BSA) which forms a neutron beam An epithermal-neutron beam suitable for boron neutron capture therapy was obtained and successful biological studies were carried out with the source. To generate a powerful flux of fast neutrons, we use the reaction Li (d,n), The operating mode with the deuteron beam is attractive for radiation testing of materials, fast neutron therapy, and other applications. At proton energies below the neutron generation threshold, the reaction of inelastic proton scattering by lithium can be used to generate a monochromatic 478 keV line. The report gives a description of the neutron source and the results obtained at the facility

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