

A Spallation Target and Neutron Source Test Facility at LANSCE

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Abstract

As facilities which utilize spallation-driven cold and ultracold neutron sources become a major facet of the materials research capability in the U.S., Europe, Japan and elsewhere, the imperative to provide a path to refine and optimize the neutronic performance and operational parameters becomes increasingly important. Aspects of this optimization can be realized at low power facilities (such as the LENS facility in Indiana) tailored to characterize the neutron scattering properties of materials. However, to mitigate risk in next-generation design and to provide realistic engineering data characterizing the integration of moderator, reflector, cryogenics and target in a stable system, a high power test facility is required. No such facility exists at present. In addition, development for other applications of high power targetry such as isotope production, high energy neutron beams for nuclear physics, ADS and remote interrogation systems should also be possible. We describe a concept for a facility which should combine the capability for flexible delivery of up to roughly 200 kW of proton beam at 800 MeV and full cryogenic support to pursue aspects of target and source development, coupled to a remote-handling system to permit high power tests on multiple targets during the yearly run cycle at LANSCE.