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## Proposal for muon and white neutron sources at CSNS

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摘要

The China Spallation Neutron Source (CSNS) is a large scientific facility with the main purpose of serving multidisciplinary research on material characterization using neutron scattering techniques. The accelerator system is to provide a proton beam of 120 kW with a repetition rate of 25 Hz initially (CSNS- I), progressively upgradeable to 240 kW (CSNS- II) and 500 kW (CSNS- II'). In addition to serving as a driving source for the spallation target, the proton beam can be exploited for serving additional functions both in fundamental and applied research. The expanded scientific application based on pulsed muons and fast neutrons is especially attractive in the overall consideration of CSNS upgrade options. A second target station that houses a muon-generating target and a fast-neutron-generating target in tandem, intercepting and removing a small part of the proton beam for the spallation target, is proposed. The muon and white neutron sources are operated principally in parasitic mode, leaving the main part of the beam directed to the spallation target. However, it is also possible to deliver the proton beam to the second target station in a dedicated mode for some special applications. Within the dual target configuration, the thin muon target placed upstream of the fast-neutron target will consume only about 5% of the beam traversed; the majority of the beam is used for fast-neutron production. A proton beam with a beam power of about 60 kW, an energy of 1.6 GeV and a repetition rate of 12.5 Hz will make the muon source and the white neutron source very attractive to multidisciplinary researchers.

关键词

[high power proton beam](#), [pulsed muon source](#), [white neutron source](#), [muon science](#), [nuclear data measurements](#)

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