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Recent Advancements in the H- Injector Performance for the Spallation Neutron Source Operation and Upgrade

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The Spallation Neutron Source (SNS) located at the Oak Ridge National Laboratory is an accelerator-based, pulsed neutron scattering facility utilized for a broad range of scientific research applications. For the past decade, the facility has operated at its original design beam power of 1.4 MW, and it is currently undergoing an upgrade to double its power to 2.8 MW within the next several years. A 65-keV H- injector, which comprises an rf-driven H- ion source and an electrostatic low energy beam transport system, delivers the required high-current, time-structured H- beam to the accelerator. At present, the H- injector can reliably provide 50-60 mA beam current at 6% duty-factor (1 ms, 60 Hz) for a 3-4 month service cycle on the accelerator front-end. To ensure sufficient operational margins for the SNS routine production runs and ongoing upgrade requirements, the injector system has been continuously improved on the R&D test facility. This paper presents the recent advancements in the injector system performance including enhancing the ion source beam output capability to 80 mA, improving the low energy beam transport and diagnostics, and upgrading the beam chopper system.

Funding Agency

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