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H-Ion Source Operational Performance and Latest Development at the Spallation Neutron Source

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The Spallation Neutron Source (SNS) at Oak Ridge National Laboratory is the world most powerful accelerator driven pulsed neutron source. A H- injector feeds the accelerator with the required high current (>50 mA) time structured (1ms, 60 Hz) H- beam. The injector consists of an RF-driven, Cs-enhanced H- ion source and an electrostatic low energy beam transport section. In the recent three run cycles, the H- source operated ˜4 months for each run without intrusive maintenance. Post-service inspections revealed no significant wear or damage that would have limited further operation of the source. A single dose of cesiation conducted in the startup of a run maintained the beam current for the entire run period with just minor adjustments of operation parameters. Lately, we have tested a solid-state RF power system to replace the vacuum-tube type RF supply to further improve the ease of operation and system availability. Significant progress has also been made on the continued development of the external-antenna RF ion source including its plasma ignition scheme and stability.

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