

## **A Negative Hydrogen Ion Source for SNS using a Helicon Plasma Generator\***

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The Spallation Neutron Source (SNS) at Oak Ridge National Laboratory is poised to become a world-class facility for materials research based on neutron scattering. It consists of a negative hydrogen (H-) ion source, linear accelerator, proton accumulator ring, and liquid Hg target. A power upgrade is planned for the device, which will require significant improvements in the negative ion source, including the production of H- beam currents of 70-95 mA ( $\sim 2 \times$  the present SNS source value), with a pulse length of 1 ms and duty factor of  $\sim 7\%$ . No H- sources currently in existence meet these combined requirements. Proof-of-principle experiments have begun in which the rf inductive plasma generator in the present source is replaced by a helicon plasma generator. This is expected to produce a factor of three or better increase in the maximum source plasma density at a reduced rf power level, resulting in significantly increased negative ion current with reduced heat removal requirements. At present we are conducting initial tests of the helicon plasma generator itself. The current status of the experiment and future plans will be discussed.

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