

Abstract Submitted  
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**Ion Source Development at the SNS<sup>1</sup>** ROBERT WELTON, MARTIN STOCKLI, SYD MURRAY, ORNL-SNS, RICK GOULDING, ORNL-FED, JERRY CARR, ORNL-GIT, JUSTINE CARMICHAEL, ORNL-WPI — The US Spallation Neutron Source\* (SNS) has recently begun producing neutrons and is currently on track to becoming a world-leading facility for material science based on neutron scattering. The facility is comprised of an H<sup>-</sup> ion source, a linear accelerator, an accumulator ring and a liquid-Hg target. Over the next several years the average H<sup>-</sup> current from the ion source will be increased in order to meet the baseline facility requirement of 1.4 MW of beam-on-target power and the SNS power upgrade power requirement of 2+ MW. Meeting these goals will require H<sup>-</sup> currents of 40-80 mA with an RMS emittance of 0.25-0.35  $\pi$  mm mrad and a  $\sim 7\%$  duty-factor. To date, the RF-driven multicusp SNS ion source has only been able to demonstrate sustained operation at 33 mA of beam current at a  $\sim 7\%$  duty-factor. This report details our efforts to develop variations of the current ion source which can meet these requirements: designs and experimental results are presented for source variations featuring helicon plasma generators, high-power external antennas employing Cs, glow-discharge plasma guns supplying supplemental electrons and advanced Cs collars.

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