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RF-plasma H- ion sources as driver for high power accelerators¹

BAOXI HAN, MARTIN STOCKLI, ROBERT WELTON, SYD MURRAY JR., TERRY PENNISI, CHRIS STINSON, SARAH COUSINEAU, Oak Ridge National Lab — RF-plasma H- ion sources have become the preferred choice for driving high power accelerators that utilize accumulator rings to provide intense, time-structured beams for a variety of applications. Advancements in this technology have enabled proton accelerators to cross the megawatt threshold in beam power. The Spallation Neutron Source (SNS) at Oak Ridge National Laboratory employs an RF-driven, Cesium-enhanced H- ion source for the present operational beam power of 1.4 MW and for the future upgrades up to 2.8 MW. This type of RF-plasma H- ion source was initially developed at Lawrence Berkeley National Laboratory and then further developed at SNS to a highly reliable, long lifetime (several months), high current (>50 mA) H- ion source operated with 1 ms pulses at 60 Hz. The Japan Proton Accelerator Research Complex (J-PARC) is operating an RF-plasma H- ion source using SNS-type RF antenna for its beam power goal of 1.0 MW. The LANSCE accelerator at Los Alamos National Laboratory is adopting the SNS ion source to boost its beam current and availability. This talk will present the outstanding performance of the SNS ion source and discuss the advantages of RF-plasma H- ion source technology.

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