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Recent Work

Title

Characterization of emittance in high intensity H- ion sources

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Publication Date

2002-04-15

9th International Symposium on the Production and Neutralization of Negative Ions and Beams

CEA/Saclay (near Paris, France) on May 30 and May 31, 2002.

Organised/sponsored by CEA Saclay, France

“Design, Operational Experiences and Beam Results Obtained with the SNS H⁻ Ion Source and LEBT at Berkeley Lab.”

R. Keller and R. Thoma, E. O. Lawrence Berkeley National Laboratory
M. Stockli and R. Welton, Oak Ridge National Laboratory

The ion source and Low-Energy Transport (LEBT) system that will provide H⁻ ion beams to the Spallation Neutron Source (SNS)** Front End and the accelerator chain have been developed into a mature unit that fully satisfies the operational requirements through the commissioning and early operating phases of SNS. Compared to the early R&D version, many features of the ion source have been improved, and reliable operation at 6% duty factor has been achieved producing beam currents in the 35-mA range and above. LEBT operation proved that the purely electrostatic focusing principle is well suited to inject the ion beam into the RFQ accelerator, including the steering and pre-chopping functions. This paper will discuss the latest design features of the ion source and LEBT, give performance data for the integrated system, and report on commissioning results obtained with the SNS RFQ and Medium-Energy Beam Transport (MEBT) system. Perspectives for further improvements will be outlined in concluding remarks.

* This work is supported by the Director, Office of Science, Office of Basic Energy Sciences, of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098.

** The SNS project is being carried out as a collaboration of six US Laboratories: Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Thomas Jefferson National Accelerator Facility (TJNAF), Los Alamos National Laboratory (LANL), E. O. Lawrence Berkeley National Laboratory (LBNL), and Oak Ridge National Laboratory (ORNL). SNS is managed by UT-Battelle, LLC, under contract DE-AC05-00OR22725 for the U.S. Department of Energy.