

Highly Charged Ion Beam Transport with Space Charge Compensation Conditions,

S. KONDRASHEV, B. SHARKOV, ITEP; G. HALL, H. KUGLER, R. SCRIVENS, R. SHERWOOD, J. TAMBINI, CERN, - The experimental results of highly charged ion beam transport with space charge compensation by electrons are presented. A tungsten thermionic cathode has been used as a source of electrons for beam compensation. An enhancement factor in ion current density of 8-10 is obtained for an extraction voltage of 40 kV, while a factor of 3-5 is obtained for an extraction voltage of 60 kV. The transport distance was 1.2 m. Special attention is given to recombination processes in an ion beam with a high degree of compensation. Charge states and energy distributions were deduced from the beam distributions measured with a micro-channel plate (MCP), with a phosphor screen and CCD-camera, after the bending magnet. Significant recombination, for highly charged ions, was observed due to the thermoelectrons. The experimental work was performed at CERN.