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120 mA Operation of J-PARC Cesium RF-Driven H⁻ Ion Source

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In NIBS2020, the stable operation of the J-PARC cesiated RF-driven H⁻ ion source (IS) in a test-stand with a 65 keV 110 mA beam and a beam duty factor of 4.5 % (1 ms x 45 Hz), whose transverse emittances were measured to be suitable for the J-PARC radio-frequency quadrupole LINAC, was reported. In the operation, the beam intensity was limited only by the maximum IS terminal voltage of about 66 kV due to the withstand voltage of the 2 MHz RF matching circuit to deliver the 2 MHz maximum 50 kW RF power from the ground level to the plasma. The terminal voltage available for the stable operation was increased to about 70 kV by improving the withstand voltage of the matching circuit. The J-PARC IS operation with a 68.6 keV 120 mA and a beam duty factor of 4 % (1 ms x 40 Hz) is reported in this paper. The measured transverse emittances of the beam are also presented.

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