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Downsizing Study of SMASHI LEBT for Higher Beam Transmission

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Performance of ECRIS SMASHI (Superconducting Multi-application Source of Highly-charged Ions) has been steadily improved since 2015. As one approach of the improvement we investigated the ion beam transport in the LEBT (Low Energy Beam Transport) beamline. In the last commissioning experiment we found that the extracted beam loss is quite high (>50 %) in the LEBT, especially in the inlet of the dipole magnet [1]. Here, we tried to analyze the causes of the beam loss by way of systematic beam profile measurements and beam envelope analyses. With various extractions and beamline condition such as extraction-Einzel lens field, slit size, and the beamline length before the dipole magnet, the changes of the beam profiles have been intensively investigated. Based on the analysis, we also suggest a newly upgraded LEBT layout improved in its size and beam transmission efficiency.

[1] H. J. You, S. O. Jang, and W. I. Choo, Proc. of the 4th Int. Beam Instrumentation Conference, 113 (MOPB035), 2015, Melbourne, Australia

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