

Investigation of Charge Strippers for High Intensity Uranium Ions

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Recently, simulation studies for U beam acceleration at J-PARC has been in progress aiming to provide the world's highest intensity U beam [1, 2]. A planned new booster synchrotron would realize multi charge acceleration applying a charge stripping injection technique. Charge stripping section is installed at the booster injection and U beams are injected and stripped simultaneously enhancing their charge states from U^{30+} - U^{35+} to around U^{60+} [3]. The U charge states are distributed after the charge stripper according to the charge distribution determined by the stripper material and the ion velocity. The distribution width is very important and should be as narrow as possible because the beams with the charge states beyond the acceptance lead to beam loss in the booster during acceleration. In general, distribution widths would be narrower in carbon foil (solid) than in gases [4], however, we are afraid that foil strippers could withstand heat load by the high intensity beam irradiation. In this study, we investigate the possibility to deal with heat deposition by the high intensity U beam in the cases of applying flowing liquid as well as solid foil strippers.

References

- [1] P.K. Saha, H. Harada, M. Kinsho, M. Yamamoto, and H. Sako, "First Simulation Results of Heavy-Ion Acceleration in the RCS of J-PARC", Proceedings of HIAT'15, (2015), TUM2CO2, pp. 127-129.
- [2] H. Harada et al., to be published.
- [3] H. Kuboki et al., "Investigation of Charge Stripping Scheme for Uranium Ions at 1–20 MeV/nucleon", AIP Conference Proceedings 1962, (2018) 030006.
- [4] H. Kuboki et al., "Charge-state distribution of ^{238}U in nitrogen gas and carbon foil at 14 and 15 MeV/nucleon", Phys. Rev. Accel. Beams 14, (2011) 053502.

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