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Low-energy charged particle extraction from an RF-driven negative hydrogen ion source

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We have been investigating the optical emission spectra of hydrogen plasma in a cesiated RF-driven negative hydrogen ion source [1] and the time dependent behavior of the extracted H^- beam from the ion source [2-6] for utilization in particle accelerators. A new diagnostic method that measures electrical current flowing from the ion source to the extraction electrode was tested. The ion/electron current characteristics in both with and without cesium cases were measured by scanning the bias voltage between the plasma electrode and the extraction electrode of the ion source. The measured I-V characteristics for cesiated operation conditions exhibited substantially lower negative charge current compared with those for operations of the source prior to the Cs introduction. When an adequate quantity of cesium is introduced for the purpose of high H^- beam current extraction, the I-V characteristics manifest formation of an ionic plasma [7]. Dynamic change of the extraction current measured by the method may suggest outflow of high energy electrons in the ignition phase of ion source discharge.

References
[1] T. Shibata et al., AIP Conf. Proc., Vol. 2011, 020008 (2018).
[2] K. Shinto et al., AIP Conf. Proc., Vol. 2011, 080016 (2018).
[3] M. Wada et al., Rev. Sci. Instrum., Vol. 91, 013330 (2020).
[4] T. Shibata et al., AIP Conf. Proc. Vol. 2373, 050002 (2021).
[5] M. Wada et al., J. Inst., Vol. 19, C02019 (2024).
[6] M. Wada et al., J. Phys.: Conf. Ser., Vol. 2743 012031 (2024).
[7] Y. Takeiri et al., AIP Conf. Proc., Vol. 1655, 060004 (2015).

Primary author: SHINTO, Katsuhiro (J-PARC center/Japan Atmic Energy Agency)

Co-authors: SHIBATA, Takanori (KEK); OHKOSHI, Kiyonori (JAEA); NANMO, Kesao (J-PARC/KEK); TOBITA, Kentaro (NECO); WADA, Motoi (Doshisha University)

Presenter: SHINTO, Katsuhiro (J-PARC center/Japan Atmic Energy Agency)

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