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Beam Instability in the Vicinity of Beam Extraction Region of Negative Ion Source

Beam focusing is an important issue for application of negative ion beams. In particular, the beam focusing of RF type negative ion source for ITER has been intensively studied. Recently, the plasma fluctuation in the negative ion source is recognized to be able to affect the beam focusing.
In this study, the sheath stability was investigated both theoretically and experimentally. It is found that the beam instability become unstable in the negative ion presheath. To confirm the effect of beam instability, the fluctuations of source plasma and beamlet were simultaneously measured in the experiment. No significant correlation between the source plasma fluctuation and the beamlet shape was observed. It should be noted that spontaneous fluctuation in the beam extraction region does not affect the beam focusing, and RF field effect in RF negative ion source is the next step of this study.

E-mail for contact person

nagaoka@nifs.ac.jp

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JSPS KAKENHI(17H03002, 18KK0080), NIFS19KLER103

Primary authors: NAKANO, Haruhisa (National Institute for Fusion Science); TSUMORI, Katsuyoshi (National Institute of Fusion Science, SOKENDAI (The Graduate University for Advanced Students)); NAGAOKA, Kenichi (National Institute for Fusion Science, Japan); IKEDA, Katsunori (National Institute for Fusion Science); OSAKABE, Masaki (NIFS); KISAKI, Masashi; Mr NAKAMOTO, Ryoya (Nagaoka University of Technology); Dr YOSHIMURA, Shinji (National Institute for Fusion Science); Mr HAMAJIMA, Taiga (Nagoya University); Dr SASAKI, Toru (Nagaoka University of Technology); Dr FUJIWARA, Yutaka (National Institute for Fusion Science)

Presenter: NAGAOKA, Kenichi (National Institute for Fusion Science, Japan)

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