03aE54P

GAMMA10における高周波加熱時の高エネルギーイオン輸送
High-energy ions transport due to ICRF heating on GAMMA10

飯村拓真，市村真，平田真史，池添竜也，横山拓郎，齋藤裕希，
岩本嘉章，渡邉和征，岡田拓也，隅田脩平，中嶋洋輔，市村和也，今井剛
T. Iimura, M. Ichimura, M. Hirata, R. Ikezoe, T. Yokoyama, Y. Saito, Y. Iwamoto, K. Watanabe, T. Okada, S. Sumida, Y. Nakashima, K. Ichimura, and T. Imai

筑波大学・プラズマ研究センター
Plasma Research Center, University of Tsukuba

In GAMMA10 which consists of a central cell, two anchor cells, and two plug/barrier cells, a high frequency waves in the Ion Cyclotron Range of Frequency (ICRF) are used for the plasma production and heating. In hot-ion-mode experiments on GAMMA10, divertor simulation experiments are now going on. The enhancement and the control of end-loss particles and heat fluxes are important for the divertor simulation. In the previous report, we described the relation between the AIC mode, which is driven by strong temperature anisotropy, and axial transport of high-energy ions[1]. In order to keep the MHD stability on GAMMA10, a new antenna called Double Arc Type (DAT) antenna, which has an elliptic shape surrounding the plasma cross section, is installed in both east and west minimum-B anchor cells. When ICRF power was injected to the anchor cell by using these antennas, we investigated the relation between the plasma heating in the anchor cell and end-loss ions in the same way as in the previous experiments.

To measure the behavior of end loss ions, eeHED[2] (east-end High-energy Ion Detector), which is covered by aluminum in order to measure the high-energy ions over 6keV and ELIEA[3] (End Loss Ion Energy Analyzer), which can detect end loss ion flux under 3keV, are installed at the east end. Those two detectors are located at z = -1340cm and z = -1330cm, respectively. By using both detectors, it is possible to evaluate the end loss ion flux in the wide energy range.

Figure 1 shows (a) the time evolution of the ICRF input power from the west-DAT antenna to the west anchor cell and end-loss ion signals of both eeHED and ELIEA, (b) end-loss ion signals normalized by DMCC as a function of the ICRF input power. Where DMCC is the diamagnetism in the central cell. The proportional relation between DMCC and both signals has been confirmed. The additional end-loss ions due to the AIC mode in the anchor cell are suggested. When the ICRF input power is increased, it is conceivable that plasmas with strong temperature anisotropy are formed in the anchor cell and the AIC mode is spontaneously excited in the anchor cell.

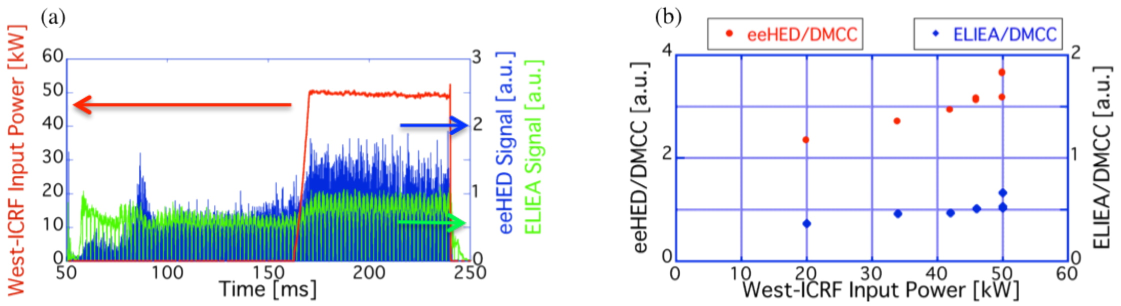

Figure 1 (a) The time evolution of the ICRF input power from the west-DAT antenna to the west anchor cell and end loss signals of both eeHED and ELIEA, (b) end-loss ion signals normalized by DMCC as a function of the ICRF input power.

This work was partly supported by a Grant-in-Aid for Scientific Research from JSPS, Japan (No. 25400531) and by the bidirectional collaborative research program of the National Institute for Fusion Science, Japan (NIFS12KUGM067).

[1] T. Iimura, et al., Fusion Science and Technology., 63, 1T(2013) 271-273.
[2] T. SAITO, et al., Rev. Sci. Instrum., 68, 1433 (1997).
[3] K. Ichimura, et al., Fusion Science and Technology., 63, 1T(2013) 209-212.