

Peripheral Plasma Turbulence Measurement of Heliotron J plasmas

N. Nishino, T. Mizuuchi¹⁾, S. Kobayashi¹⁾, K. Nagasaki¹⁾, H. Okada¹⁾, F. Sano¹⁾,

S.Yamamoto²⁾, K. Kondo³⁾, M. Takabatake³⁾

Graduate school of Engineering, Hiroshima University, Hiroshima 739-8527, Japan

1) Institute of Advanced Energy, Kyoto University, Kyoto 611-0011, Japan

2) Kyoto University Pioneering Research Unit for Next Generation, Kyoto 611-0011, Japan

3) Graduate School of Energy Science, Kyoto University, Kyoto 611-0011, Japan

nishino@hiroshima-u.ac.jp

Heliotron J is medium sized helical-axis heliotron device (Major radius is about 1.2m, and minor radius is 0.1-0.12m, and it has L/M=1/4 helical coil, two types of toroidal coils), and it realize a wide range of configurations by changing the coil current ratios. Moreover its field configuration is widely changed due to small plasma current (~kA). Therefore, the peripheral turbulence measurement in Heliotron J is very important for understanding the edge confinement physics.

Since several years ago peripheral plasma turbulences were observed in Heliotron J [1] using fast cameras. In our previous work, using a combination method of a fast camera (Ultima-SE, Photron) and a small movable carbon target, a structure of a low frequency (5-6 kHz) edge plasma oscillation in high electron density ECH discharges were discussed [2]. This was related to high confinement mode [3]. Also the spatial profile of turbulent burst was observed in the edge plasma with a combination of other fast camera with 105,000 FPS (fx-K4, NAC image technology) and a short pulse of directional gas puff in Heliotron J [4-6].

Recently the turbulent structures during ICRF were observed by new fast camera (Ultima-SA1.1 Photron). It seemed that the spatial structure of peripheral turbulence during ICRF was different from the other period, and during ICRF ECE signal increased. However, images from the fast camera were dark due to the low electron density ($0.5 \times 10^{19} \text{m}^{-3}$), therefore, the effect of ICRF on peripheral turbulence is under investigation. In this paper the recent measurement results of Heliotron J plasmas by the fast camera are reported.

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