Reconstruction of two-dimensional structure by using conditional techniques near the edge transport barrier in Compact Helical System

Y. Nagashima[1], K. Nagaoka[2], A. Fujisawa[2], K. Itoh[2], S.-I. Itoh[1], K. Ida, T. Akiyama[2], M. Isobe[2], T. Minami, S. Nishimura[2], A. Shimizu[2], C. Suzuki[2], C. Takahashi[2], Y. Yoshimura[2], S. Okamura[2], K. Matsuoka[2] and CHS group[2]

E-mail address: nagashi@riam.kyushu-u.ac.jp

[1]*Research Institute for Applied Mechanics, Kyushu University, Japan*

[2]*National Institute for Fusion Science, National Institutes of Natural Sciences, Japan*

Attractive attention has been focused on two-dimensional structures of electrostatic potential in improved confinement studies [1]. By using conditional techniques, we reconstruct two-dimensional distributions of plasma parameters (i.e., the floating potential) near the edge transport barrier region in Compact Helical System. Edge measurements were performed by the Hybrid probe [2]. In reconstruction of DC parameter distribution, interval of H_α drop is used as a trigger for the conditional analysis. In reconstructed maps of the DC floating potential, a few interesting features are observed. Firstly, outside of the last closed flux surface (LCFS), the floating potential increases immediately just after the H_α drop (labeled as the *L-H* transition here). Next, the floating potentials decrease gradually into negative values near the LCFS. In third, fast potential spikes, preceding the *L-H* transition, are observed near or inside the LCFS and have some poloidal potential structures. The preceding fast potential spikes could play an important role in the *L-H* transition. We also observe some interesting fluctuation properties before and after the *L-H* transition [3]. In this presentation, we would provide mainly results from the conditional analysis as well as linear and nonlinear analyses of the fluctuations near the *L-H* transition.

Reference

[1] N. Kasuya and K. Itoh, *Physical Review Letters* **94** (2005) 195002

[2] K. Nagaoka, et al., *Plasma and Fusion Research* **1** (2006) 005

[3] Y. Nagashima, et al., *Plasma and Fusion Research* **1** (2006) 041