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Edge Plasma Dynamics during L-H Transition in the JFT-2M Tokamak

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This is the first report of the spatiotemporal dynamics of edge plasma during L-H transition, which is based on the direct measurement of radial electric field, density gradient and turbulence intensity in the JFT-2M tokamak. The observations with fine spatial- and time- resolutions provide quantitatively clear views of the L-H transition, which enable us to discuss detailed physical mechanism, as follows: (i) At the L-H transition, an abrupt increase [time scale of $O(100 \mu\text{s})$] of strong mean radial electric field (which is localized in radius with FWHM $\sim 7 \text{ mm}$) leads the increase of density gradient and reduction of turbulence intensity. Reynolds stress force remains too small to drive the abrupt increase of the radial electric field. (ii) Rapid inward propagation of the turbulence suppression that makes front is observed at the transition. This might be linked to the fast core-edge coupling seen in global improvement of confinement after the H-mode transition.

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Author: Mr KOBAYASHI, Tatsuya (Interdisciplinary Graduate School of Engineering Sciences, Kyushu University)

Co-authors: Prof. FUJISAWA, Akihide (Kyushu University); Dr IDA, Katsumi (National Institute for Fusion Science); Dr HOSHINO, Katsumichi (Japan Atomic Energy Agency); Dr KAMIYA, Kensaku (Japan Atomic Energy Agency); Prof. ITOH, Kimitaka (NIFS); Prof. ITOH, Sanae (Research Institute for Applied Mechanics, Kyushu University); Dr INAGAKI, Shigeru (Kyushu University); Dr IDO, TAKESHI (National Institute for Fusion Science); Dr NAGASHIMA, Yoshihiko (Kyushu University); Dr MIURA, Yukitoshi (Japan Atomic Energy Agency)

Presenter: Mr KOBAYASHI, Tatsuya (Interdisciplinary Graduate School of Engineering Sciences, Kyushu University)

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