Multi-scale turbulence response during L-H transition in LHD

T. Tokuzawa[1,2,3,*], T. Nasu[2], D. Nishimura[1], K. Ida[1], M. Yoshinuma[1],
T. Kobayashi[1,2,3], K. Tanaka[1,3], S. Inagaki[4], A. Fujisawa[3,1], I. Yamada[1]
and LHD Experiment Group

[1]*National Institute for Fusion Science, National Institutes of Natural Sciences, Toki 509-5292, Japan,*
[2]*The Graduate University for Advanced Studies, SOKENDAI, Toki 509-5292, Japan*
[3]*Research Institute for Applied Mechanics, Kyushu University, Kasuga 816-8580, Japan*
[4]*Institute of Advanced Energy, Kyoto University, Gokasho, Uji 611-0011, Japan*

* Email address of submitting author: tokuzawa@nifs.ac.jp

The response of multi-scale turbulence during the L-H transition has been observed at the same location in the LHD, where the plasma density is gradually increased by NBI heating to induce the H-mode transition. The following results were obtained.

- DBS (measured $k_\perp \sim 7.5$ cm^{-1}) [1] and BS (measured $k_\perp \sim 30$ cm^{-1}) [2] were able to observe the respective turbulence at approximately the same location ρ=0.9 (pedestal region). This could be investigated for the first time by combining DBS with spatial multipoint measurements and BS with movable antennas.
- Exactly opposite responses were observed during the L-H transition for low and high wavenumbers. That is, with the L-H transition, turbulence in the low wavenumber region decreased in intensity, while turbulence in the high wavenumber region increased.

Such phenomena are similar to the results of predicted theoretical simulations [3, 4]. We would like to include the effect of radial electric field and the turbulence anisotropy in the discussion at the workshop.

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