

Observation of turbulence suppression after electron-cyclotron-resonance-heating switch-off on the HL-2A tokamak

Y. Liu,^{*} Z. B. Shi, Y. B. Dong, H. J. Sun, A. P. Sun, Y. G. Li, Z. W. Xia, W. Li, X. T. Ding, W. W. Xiao, Y. Zhou, J. Zhou, J. Rao, Z. T. Liu, Q. W. Yang, and X. R. Duan

Southwestern Institute of Physics, P.O. Box 432, Chengdu 610041, China

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The formation of a transient internal transport barrier (ITB) is observed after the electron-cyclotron-resonance-heating (ECRH) switch-off in the HL-2A plasmas, characterized by transient increase of central electron temperature. The newly developed correlation reflectometer provided direct measurements showing reduction of turbulence in the region of steepened gradients for the period of ITB formation triggered by the ECRH switch-off. Furthermore, the reduction of core turbulence is correlated in time with the appearance of a low-frequency mode with a spectrally broad poloidal structure that peaks near zero frequency in the core region. These structures have low poloidal mode number, high poloidal correlation, and short radial correlation and are strongly coupled with high-frequency ambient turbulence. Observation indicates that these structures play important roles in the reduction of the core turbulence and in improvements of the core transport after the off-axis ECRH is turned off.