03aE43P

ストキャスティゼーションによるコア温度平坦化現象
Core Temperature Flattening by Stochastization on ITB plasma in LHD

土屋隼人，居田克巳，長壁正樹，高橋裕己，永岡賢一，長山好夫
TSUCHIYA Hayato, IDA Katsumi, OSAKABE Masaki, TAKAHASHI Yuuki, NAGAOKA Kennichi, NAGAYAMA Yoshio

核融合研
NIFS

It is widely recognized that the magnetic topology has strong influence on the state of magnetized plasma and the magnetic structure is not only determined by the external coil but also plasma current [1, 2]. Measurement of magnetic structure leads to the understanding of plasma characteristic directly. Recently structure of internal magnetic field has been measured with the Faraday effect in the reversed-field pinch plasmas [3]. We have been suggested the heat pulse propagation [4] method as a tool to measure the magnetic structure [5] in Large Helical Device (LHD). This method using the radial velocity of heat pulse can clearly indicate the stochastic field area or islands.

The central flattening ion-temperature (T_i) profile is often observed in the high ion temperature oriented discharge, and the flattening prevents the higher T_i temperature as shown in fig.1. While the heat pulse propagate outward from the ECH deposition point at the discharge with Ti peaking profile At flattening profile discharge, we measured the quite fast radial propagation of heat pulse in core region as shown in Fig.2. This heat pulse analysis indicates the formation of stochastic magnetic field. The stochastization is considered to be derived by the weak magnetic shear at rational surface. It is also observed that plasma current driven by tangential neutral beams change before the stochastization. The stochastization cases the core flattening profile, and prevents the higher Ti in core region. So a scenario of higher T_i discharge with ITB can be developed by avoiding the stochastization, i.e. the weak shear in core region.

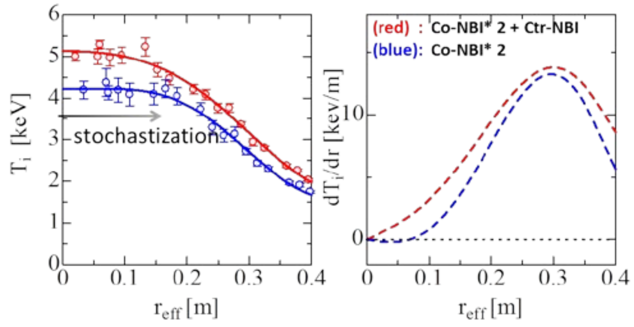

Fig.1 Comparison of Peaking / Flattenig Ti proifile

[1] T.E. Evans *et al.*, Nature Phys. **2**, (2006) 419.
[2]M. Hirsch *et al.*, Plasma Phys. Control. Fusion **42** (2000) A231.
[3]W.F. Bergerson *et al.*, Phys. Rev. Lett. **107** (2011) 255001.
[4]S. Inagaki *et al.*, Phys. Rev. Lett. **92** (2004) 055002.
[5]K. Ida *et al.*, N.J. Phys. **15** (2013) 013061.

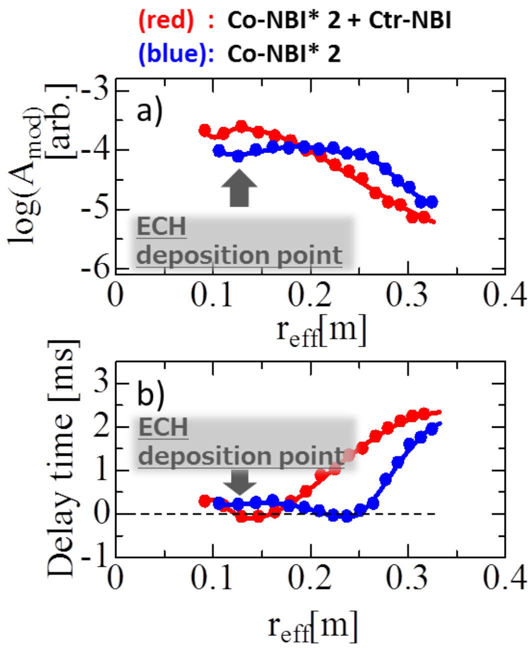

Fig.2 The aspect of the heat pulse propagation. a) amplitude of heat pulse, b) delay time of heat pulse.