# 29D14P

ヘリオトロン J における ECH 及び NBI プラズマにおける
TV トムソン散乱計測による温度・密度分布計測

# Measurements of electron temperature and density profiles of ECH and NBI plasmas by using TV Thomson scattering system in Heliotron J

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In order to investigate the improved confinement plasmas in the ‘reheat’ phenomena [1], the electron temperature and density profiles are measured with the TV Thomson scattering system in Heliotron J in relation to the magnetic configuration or particle fueling method for the NBI-only or ECH+NBI plasmas. Time traces of ECH + NBI plasma parameters and heating power are shown in Fig.1 where electron cyclotron resonance heating (ECH) is overlapped with neutral beam injection (counter and co) heating, and a supersonic molecular beam injection (SMBI) is applied at 228ms. Reheat phenomena is observed at 280ms. The timing where SMBI is applied is shown as the rapid jumped signal of Hα#11.5, where #11.5 means the port number of Heliotron J. Figure 1 shows that the stored energy has two local maximal values for this plasma evolution. Figures 2 and 3 show the results of Thomson scattering measurements at 245ms and 280ms when the stored energy reaches each local maximal value. The Langmuir probe data are illustrated in the plasma boundary region. The line averaged density estimated from the Thomson scattering and is 30% higher than a microwave interferometer data at most, which is within the measurement error range of the obtained density profile.

The electron density profile in the central region at 280ms is flatter than that at 245ms and line averaged density at 245ms is higher than that at 280ms. The electron temperature in the center region at 245ms is higher than that at 280ms. This result is consistent with the decrease of stored energy from 245ms to 280ms and also with the electron pressure at 245ms , which is higher than that at 280ms (Fig 3). Besides, the gradient of temperature in the range from 0.2 to 0.6 of ρ at 245ms is larger than that at 280ms. Density at in the same region 245ms is also larger than that at 280ms.From these observations, it is found that confinement performance at 245ms is better than that at 280ms.

It is also to be reported that in the low toroidicity configuration plasma, the electron temperature and density have different properties from those of other configuration. The density can be achieved almost twice as that in the other configurations with the about same stored energy, whereas the temperature is reduced to be about a half.

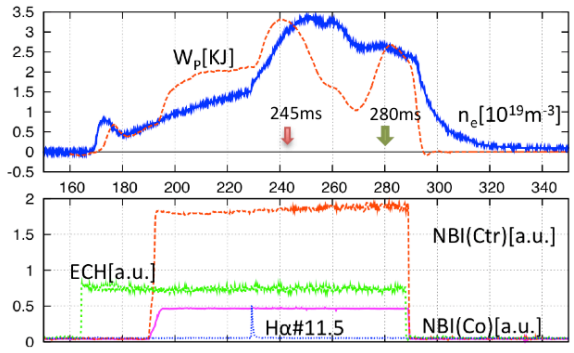


***Fig.1**: Time traces of NBI+ECH plasma*

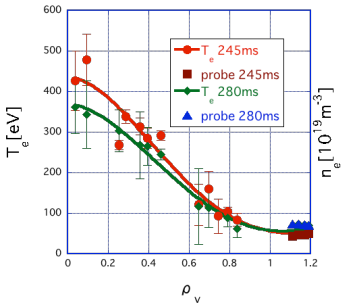


***Fig.2** : Electron temperature profile*

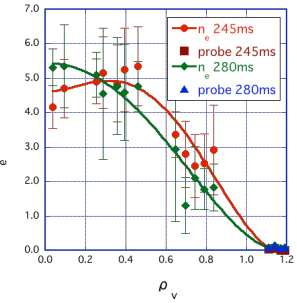


***Fig.3** : Electron density profile*

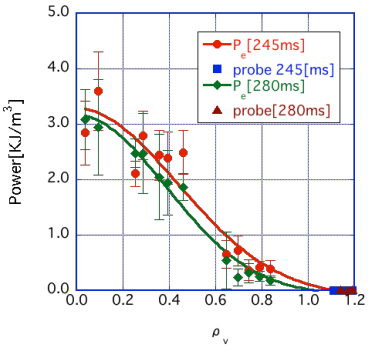


***Fig. 4** : Electron pressure profile*

**Reference**

[1] T.Minami “Formation of High Density Edge Transport Barrier during Reheat Confinement Improvement Mode on CHS ”