

§8. Electron Density and Temperature Profiles of ICRF Heated Plasma in CHS

Yamada, I., Iguchi, H., Kumazawa, R.,
Nishimura, K., Masuda, S.

Electron temperature and density profiles have been measured in the CHS ICRF heating experiments by a single channel ruby-laser Thomson scattering.

In the course of ICRF experiments, four P- and one U-antennas have been installed to CHS. In the experiments, boronization onto the wall of the vacuum vessel of CHS has been carried out for the suppression of the radiation loss due to impurity ions [1]. Profile measurements of the ICRF heated plasmas have been made at $B_T=1.7$ T and $R_{ax}=92.1$ cm both before and after boronization.

Fig.1 shows the measured electron temperature and density profiles. The upper left-side three and right-side four cases are the results before and after the boronization, respectively. The legend means the used antenna and total radiated power in MW. In the experiments in which both P- and U-antennas are used after boronization, more peaked temperature and hollow density profiles have been observed. In addition, the temperature at the plasma center has been increased by about 1.5-2 times after boronization. Low and high density discharge experiments have been done after boronization (PU0.6L and PU0.6H in the figure legend, respectively). In both cases, total radiated power of 0.6 MW are introduced from the P- and U-antennas. The electron temperature of the high density plasma is lower than that in low density discharge, resulting in nearly same profiles of the plasma pressure. According to the similar pressure profiles, the stored energy of about 2.2 kJ is obtained in both cases. Since the radiation loss has been significantly reduced, good plasma performances have been achieved in the experiments after boronization. The hollow density profiles which have been observed in NBI heated plasmas after boronization are thought to be due to the reduction of radiation loss at the outer and edge regions.

We have installed a new YAG Thomson scattering. Further information on the temperature and density profiles observed in the experiments will be obtained by the new Thomson scattering.

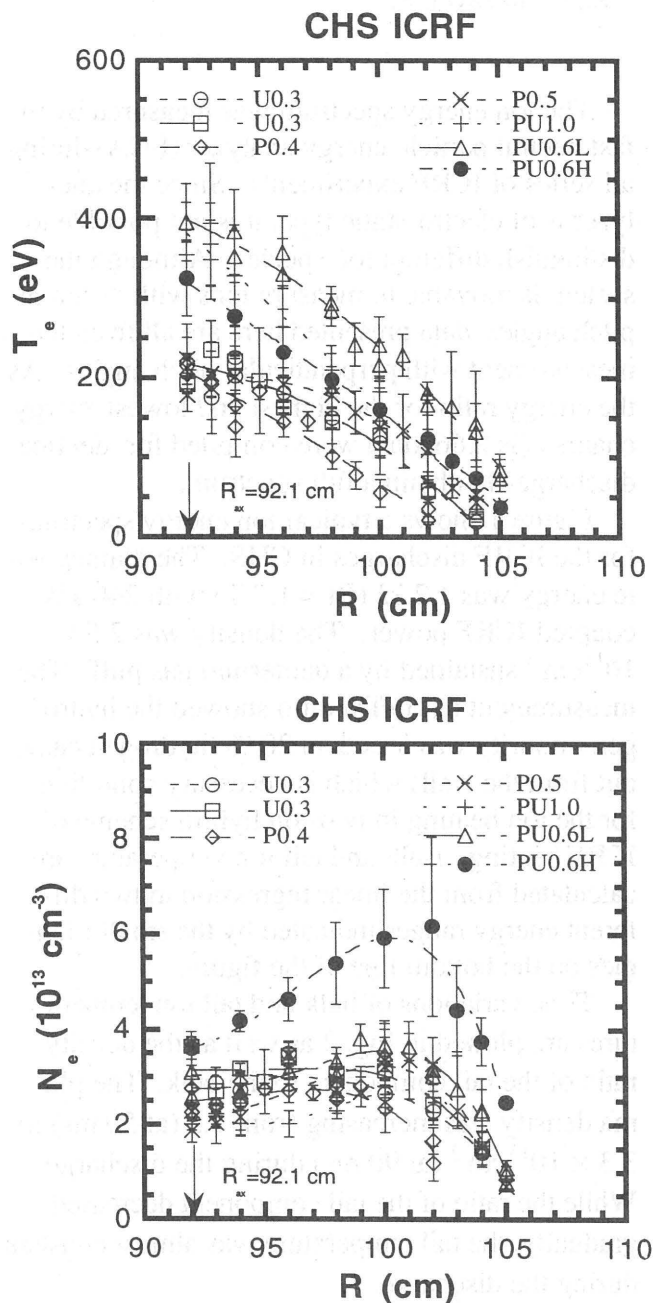


Fig.1. Electron temperature and density profiles of the ICRF heated plasmas in CHS. The left-side three and right-side four cases are the results before and after boronization, respectively.

Reference

- 1) Yamada, H. *et al.*, Jpn. J. Appl. Phys. **33** (1994) L1638.