

§14. Power Balance Analysis for Combined Heating of NBI and ICRF

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In the combination heating experiments, the increase of energy does not simply ensure the additional heating effect of ICRF because the increase of density and the broadening of its profile give higher absorption of NBI power. The power balance analysis is necessary to get the net heating effect of ICRF. The analysis was made based on the measured profiles of T_e , n_e and T_i with a profile analysis code PROCTR-mod.

Figure 1 shows time traces of plasma parameters. Times of profile measurements are indicated by arrows. Thermal energies are shown in Fig. 2 for these four measurement points. The calculated absorption power from NBI to both electrons and ions based on their profile measurements are also shown.

As a limiting case that the ICRF does not give a net heating effect, the energy confinement times are calculated with the heating power only from NBI (Fig. 3). When the ICRF power input is included in the calculation, the calculated confinement times are more reasonable as shown in Fig. 4. The measured ICRF radiation power 300 kW is used in the calculation and the equal deposition to electrons and ions is assumed.

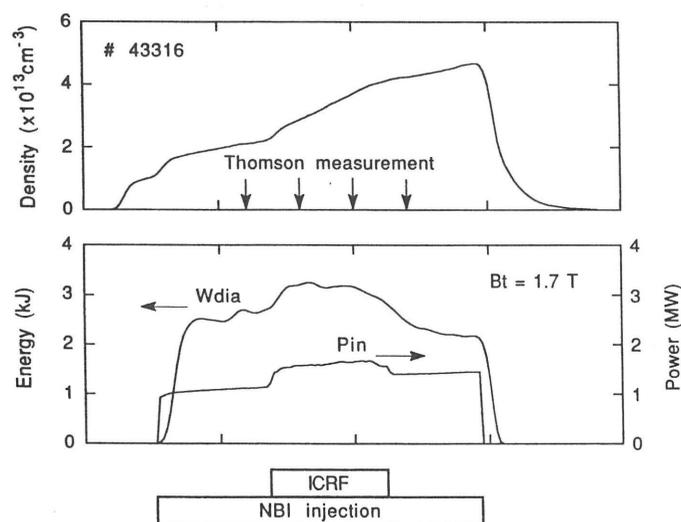


Fig. 1 Time traces of combined heating discharge

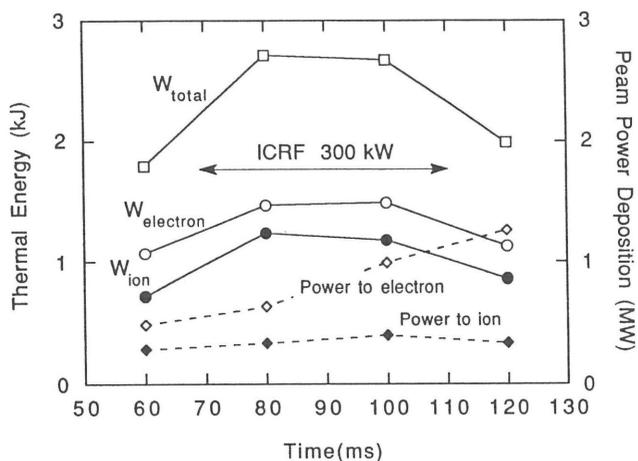


Fig. 2 Thermal energy of electron and ion with NBI absorption power

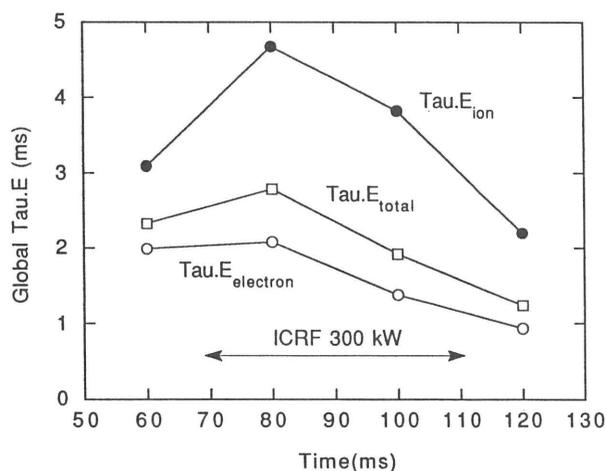


Fig. 3 Confinement times with no ICRF power net input assumed

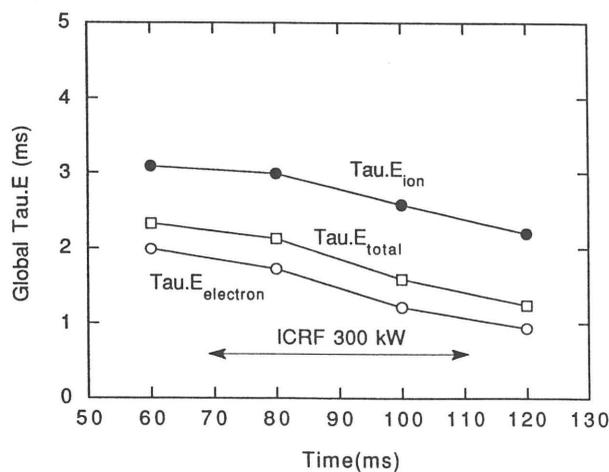


Fig. 4 Confinement times with ICRF power net input included