

# (TG2) Turbulence Topical Group Report

Dec. 23, 2021 (T. Tokuzawa)

Date: Dec. 22, 2021

Time: 9:45 - 13:00

Shot#: 175710 – 175772 (63 shots)

Prior wall conditioning: NO

Divertor pump: ON

Gas puff: D<sub>2</sub>, Ar

Pellet: D<sub>2</sub>, C

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, D, D)=P(3.2, 3.3, 3.8, 6.8, 6.9)MW

ECH(77GHz)=ant(5.5-Uout (or 1.5U), 2-OUR)=P(703, 792)kW

ECH(154GHz)=ant(2-OLL, 2-OUL, 2-OLR)=P(979, 930, 986)kW

ECH(56GHz)=ant(1.5U)=P(-)kW

ICH(3.5U, 3.5L, 4.5U, 4.5L)=P(-, -, -, -)MW

Neutron yield integrated over the experiment =  $2.2 \times 10^{16}$

## Topics

1. Effect of IPD on high Ti plasmas (H. Takahashi)
2. Interstellarator characterization of core turbulence during enhanced performance regimes (D. Carralero)

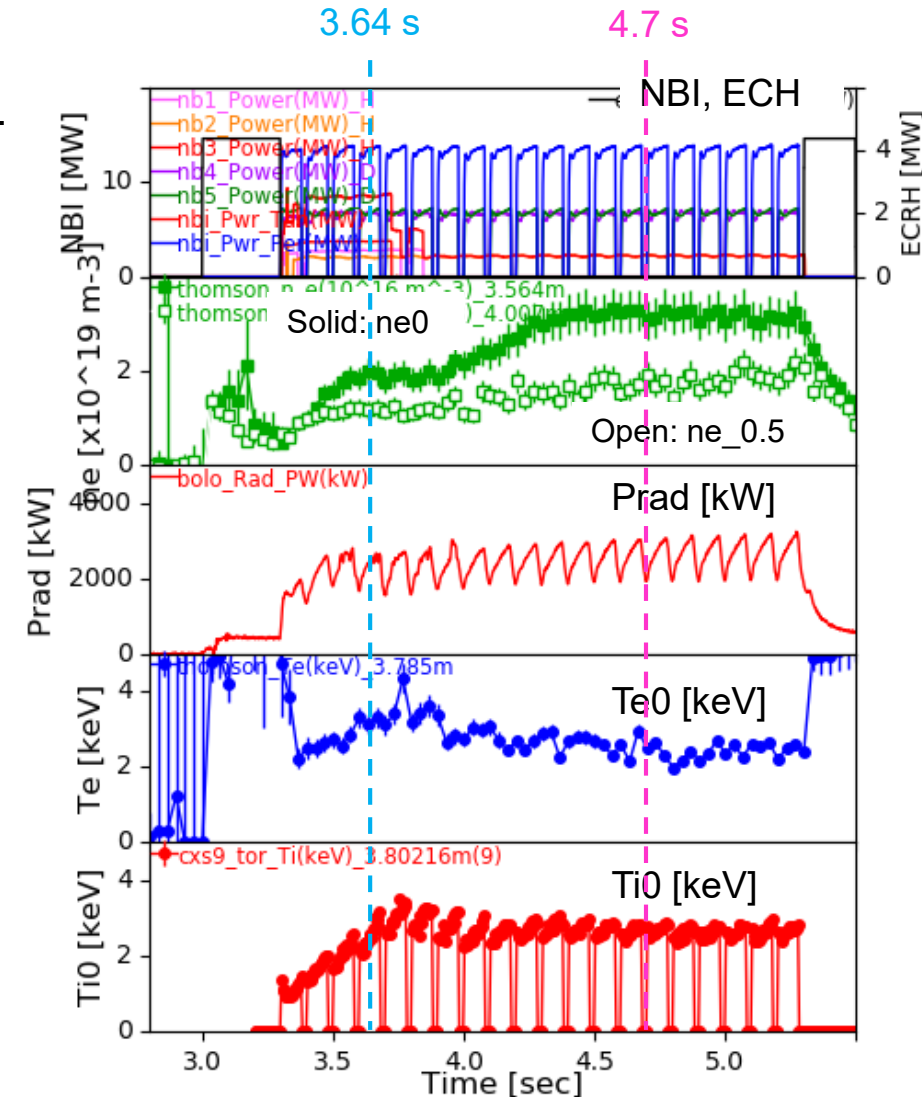
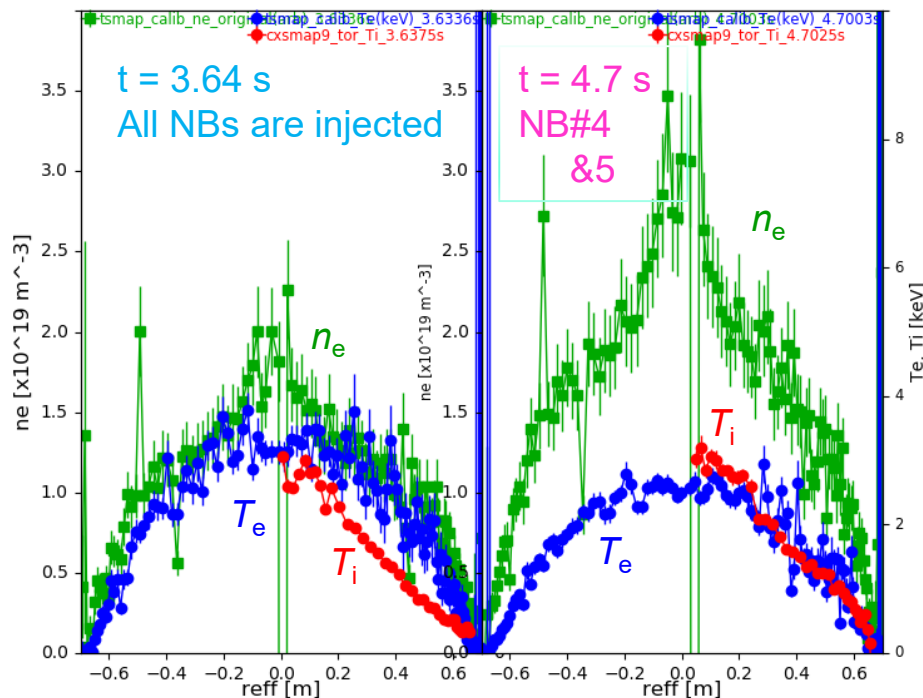
# Effect of IPD on high $T_i$ plasmas (H. Takahashi and S. Masuzaki)

**Experimental conditions:**  $(R_{ax}, B_t) = (3.55 \text{ m}, 2.789 \text{ , CCT})$ ,  $\gamma = 1.2538$ , and  $B_q = 100 \%$ , #175710-734

**Motivation and objective:** Increase of  $T_e$  and/or  $T_i$  have been observed due to the IPD injection. The objective is whether the same effect can be observed in improved confinement plasmas.

## Results:

- Unfortunately, the IPD had a trouble and did not recover during the experiment.
- We reconfirmed the achievable  $T_{i0}$  of 6 keV using C pellet and stable 5 keV even without He wall conditioning.
- We unexpectedly observed the characteristic peaked  $n_e$  profile like a  $T_e$ -ITB. This kind of the  $n_e$  shape was emphasized in perp. NB dominant condition.



# Interstellarator characterization of core turbulence during enhanced performance regimes (D. Carralero [Ciemat] /T. Tokuzawa)

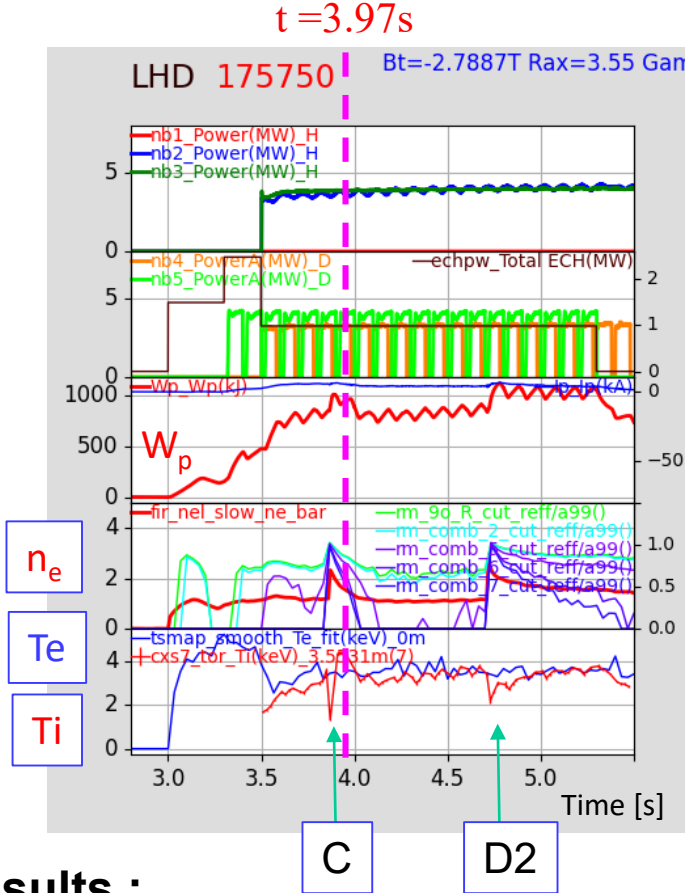
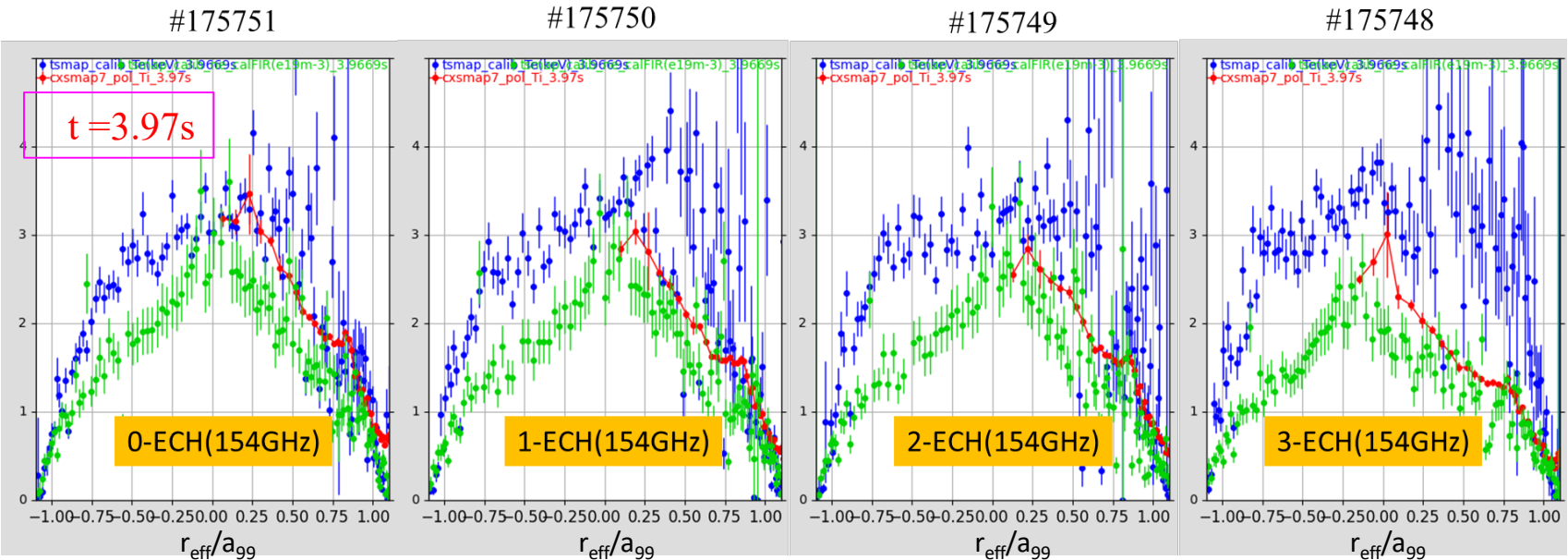
## Experimental conditions: (#175735 - #175772)

1. ( $R_{ax}$ , Polarity,  $B_t$ ,  $\gamma$ ,  $B_q$ ) = (3.55 m, CCW, 2.7887T, 1.2538, 100.0%)

## Objects:

- Experimental characterization of core turbulence during enhanced confinement regimes
- Evaluation of experimental results using state-of-the-art GK simulations
- Comparative analysis between LHD and W7-X results

$n_e$ ,  $T_e$ ,  $T_i$  profiles during ECH power scan



## Results :

- Carbon pellets of three different sizes and D2 pellets were injected to investigate the characteristics of high Ti plasmas.
- ECH power scan to vary the  $T_e/T_i$  ratio and a deposition scan to control the density profile were performed.