(TC) Report

Apr. 9, 2024 (T. Tokuzawa)

Date: Apr. 5, 2024
Time: 13:00 - 16:45
Shot#: 189028 – 189102 (75 shots)

Prior wall conditioning: NO
Divertor pump: ON
Gas puff: H2, Ar , Pellet: NO, IPD: ON

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(-, -, 4.1, 3.4, 5.4)MW

ECH(77GHz)=ant(5.5-Uout (or 1.5U), 2-OUR)=P(698, 380)kW
ECH(154GHz)=ant(2-OLL, 2-OUL , 2-OLR)=P(705, 1055, 976)kW
ECH(56GHz)=ant(1.5U)=P(-)kW
ICH(3.5U, 3.5L, 4.5U, 4.5L)=P(-, -, -, -)MW

Remarks

Topics --

1. Joint Experiment on Effect of Impurities on Stellarator Performance (F. Nespoli(PPPL), S. Masuzaki)
   [#189028 - #189073]
2. Study of electron temperature fluctuation behavior in e-ITB plasmas (R. Yanai) [#189074 - #189102]

Joint Experiment on Effect of Impurities on Stellarator Performance

F. Nespoli et al.

2024.04.05 #189029-189072 R_{ax}=3.6 m

Extended ECH operation 2s

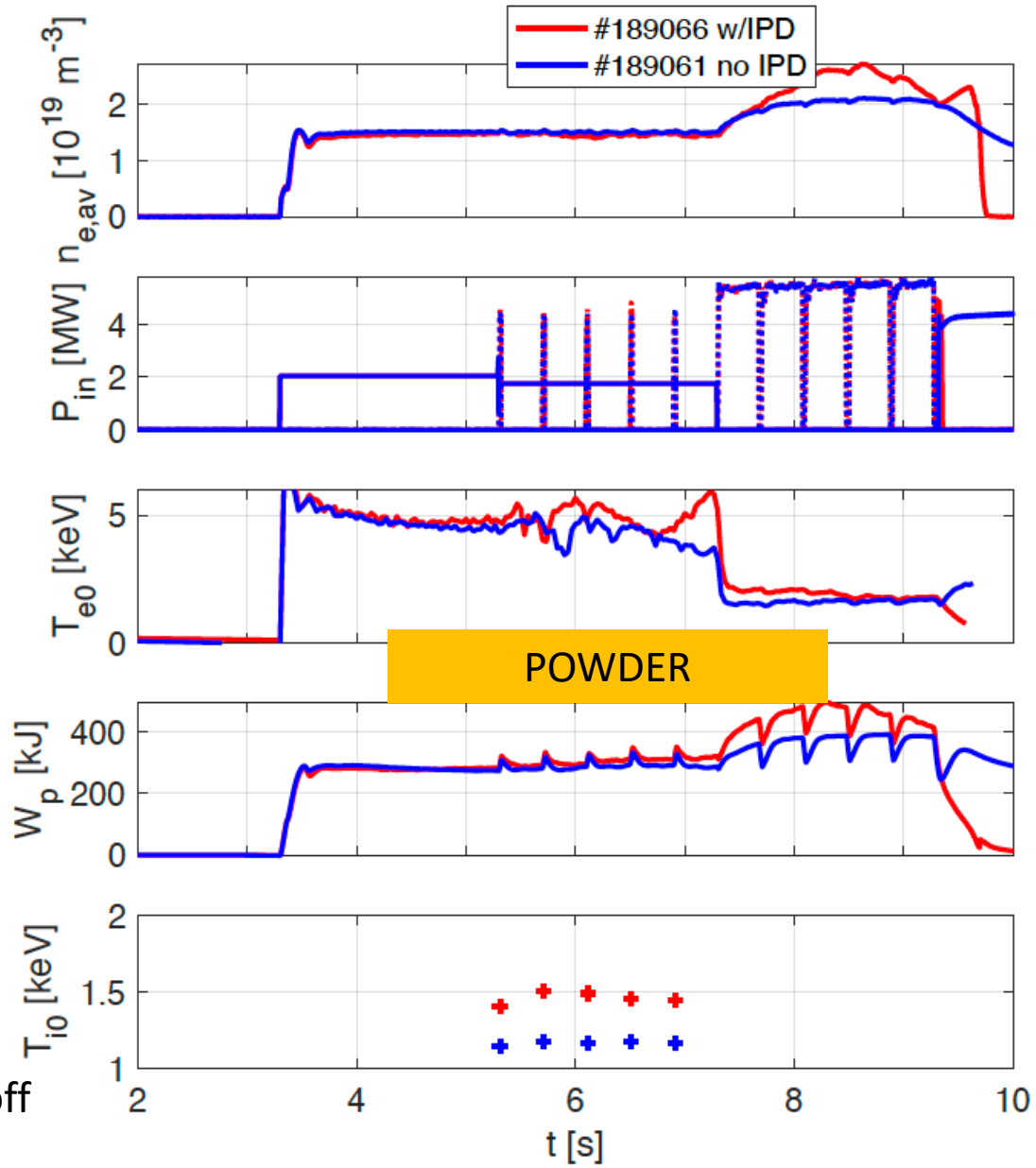
Goal: compare effect of powder injection across different machines (W7-X, TJ-II, HSX)

- B powder injected in plasmas
- 3 scenarios:
  - W7-X Warmer PRL n_e=1.5e19 P=2MW
  - TJ-II n_e=0.5e19 P=0.7MW
  - W7-X Lunsford PoP n_e=5.2e19 P=4MW

- 1) T_e and T_i increase
- 2) T_i increases but T_e decreases. n_e increases (no density control)
- 3) T_e increases, T_i not clear more analysis needed

- Additional heating phases require more analysis

- Compared continuous to pulsed powder injection, 0.2s on/0.2s off (2.5 Hz) to compare to W7-X PMPI exps
- Powder pulses spread as they fall down to the plasma, quasi-continuous powder flow, but lower amount



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Effect on turbulence:

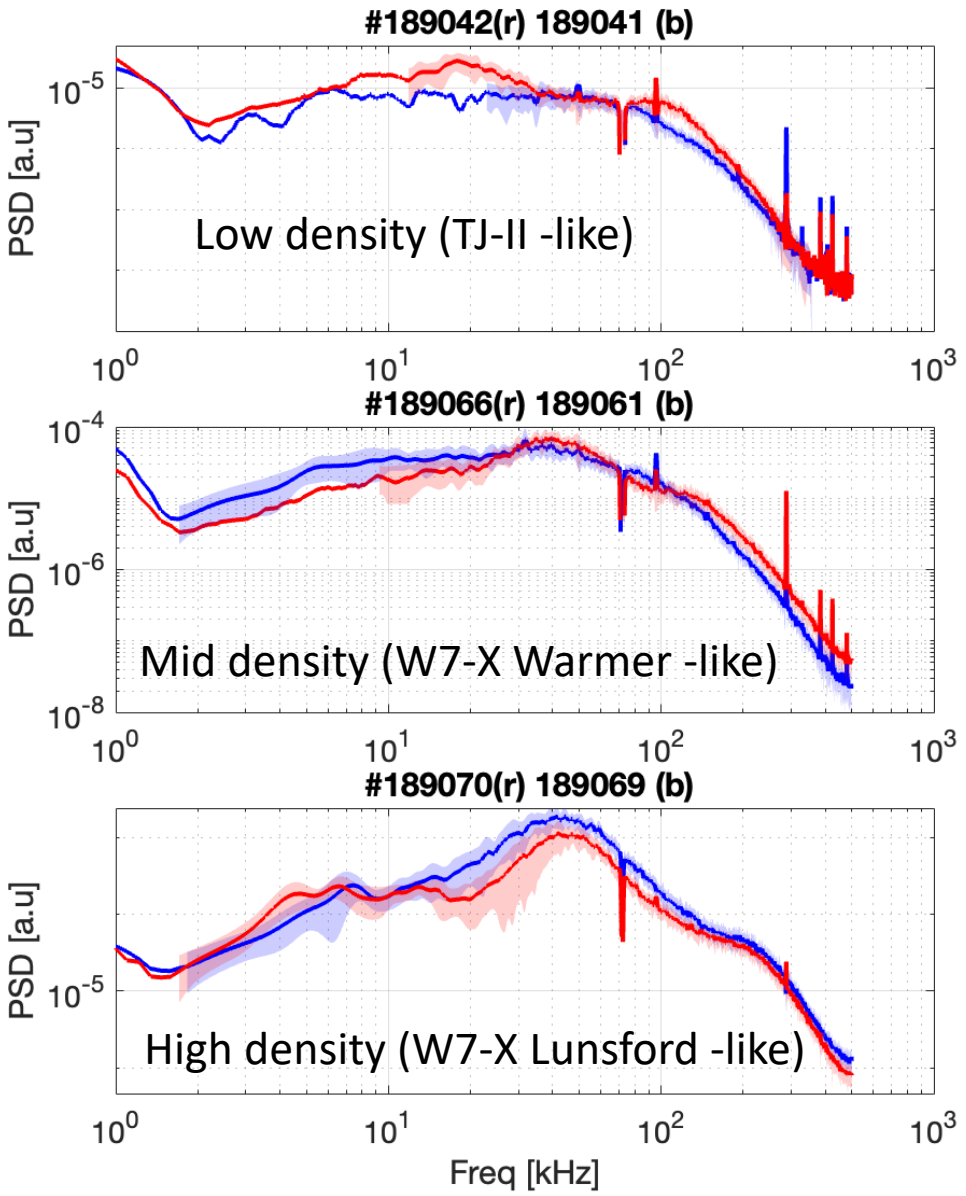
Low density scenario: turbulence increased

Mid-density scenario: turbulence spectrum changed

High density scenario: turbulence reduced

Somewhat in line with previous experiments in LHD

Additional heating phases require more analysis



PPPL PRINCETON PLASMA PHYSICS LABORATORY

NIFS

Study of electron temperature fluctuation behavior in e-ITB plasmas (R. Yanai et al.)

Experimental conditions: (R_{ax}, Polarity, B_t, γ, B_q) = (3.60 m, CW, 2.75 T, 1.2538, 100.0%)
Shot: 189073-189102

Goal of this experiment:

- Investigating the electron temperature fluctuations of e-ITB plasma using the CECE in LHD.

Results:

- We tried to measure the variation of temperature fluctuations of e-ITB plasma by changing the injection ECH power.
- The CECE measurement using a CTS receiver did not seem to work due to the RF circuit problem.
- The CECE measurement from 9-O also did not seem to work well during our experiment due to the circuit problems.
- We could not measure the temperature fluctuations on this day for these reasons. We will try to measure the fluctuations by piggyback experiments.