Commissioning & (TG2) Turbulence Topical Group Report

Oct. 21, 2021 (T. Tokuzawa)

Date: Oct. 20, 2021
Time: 9:30- 11:00, 11:00 - 16:30, 17:30 – 18: 45
Shot#: 170456 – 170485 & 170580 – 170621 (68 shots), 170486 – 170579 (93 shots)

Prior wall conditioning: NO
Divertor pump: ON
Gas puff: H2, He
Pellet: None

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(4.1, 4.3, 3.9, 4.0, 4.9)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(463, 601, 602)kW
ECH(56GHz)=ant(1.5U)=P(-)kW
ICH(3.5U, 3.5L, 4.5U, 4.5L)=P(0.9, 0.75, 0.95, 0.55)MW
Neutron yield integrated over the experiment = 7.1×10^{11}

Topics
1. Heating commissioning (R. Yanai)
2. Core and edge turbulence in modulated ECH (M. Nishiura)
3. Potential and density fluctuation measurement in e-ITB to study isotope effect (A. Shimizu)
4. Investigating ECH beam broadening by density fluctuations (R. Yanai) ➔ cancel

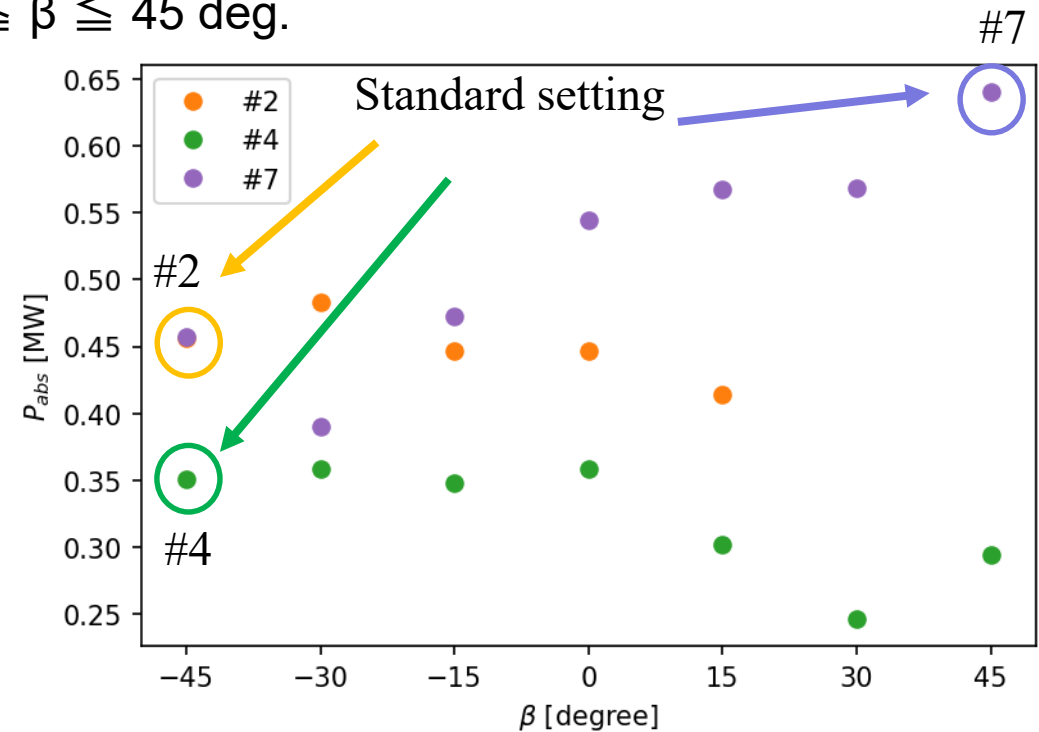**Experimental conditions:** $(R_{ax}, B_t, \gamma, B_q)$ = (3.6 m, 2.75 T, 1.2538, 100.0%)

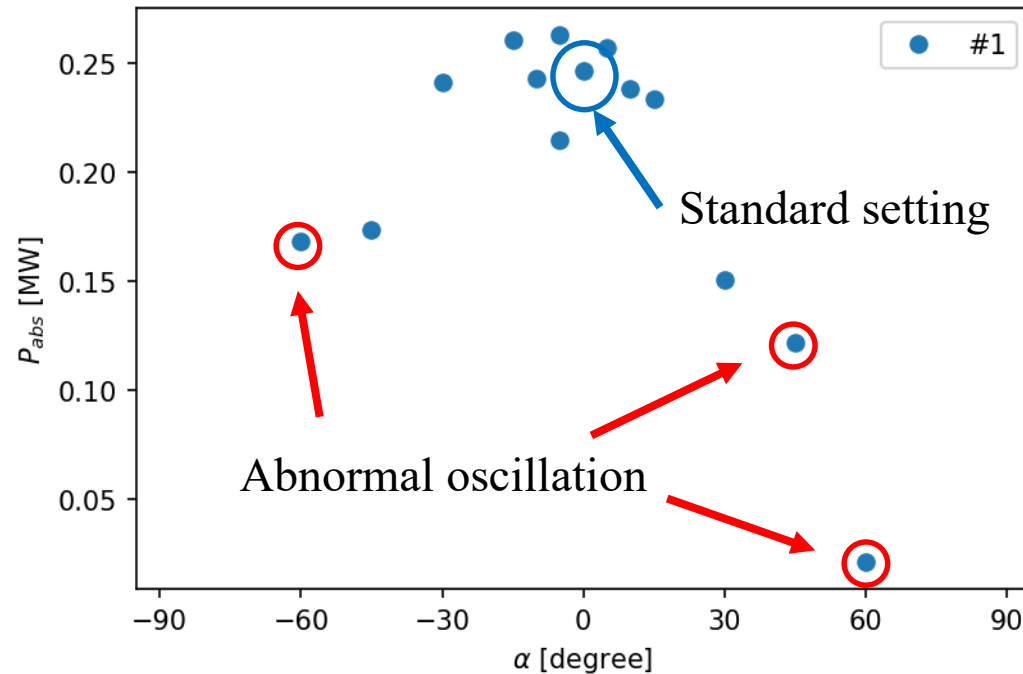- Scanning the beam polarization:

  #1 77 GHz 1.5UO (0.33 MW): β=0, -60 deg. $\leqq$ α $\leqq$ 60 deg.

  #2 77 GHz 2-OUR (0.79 MW): α = 0, -45 deg. $\leqq$ β $\leqq$ 15 deg.

  #4 154 GHz 2-OLL (0.46 MW): α = 0, -45 deg. $\leqq$ β $\leqq$ 45 deg.

  #7 154 GHz 2-OLR (0.60 MW): α = 0, -45 deg. $\leqq$ β $\leqq$ 45 deg.

The absorbed power of each ECH was estimated using the time derivative of Wp and was maximized around each standard setting. Abnormal oscillations of #1 ECH were observed at the non-optimum setting probably because the ECH beam was reflected to the gyrotron.

- Core and edge turbulence in modulated ECH (M. Nishiura)
- Potential and density fluctuation measurement in e-ITB to study isotope effect
  (A. Shimizu)   Collaborator: T. Ido from Kyushu Univ.(remote)
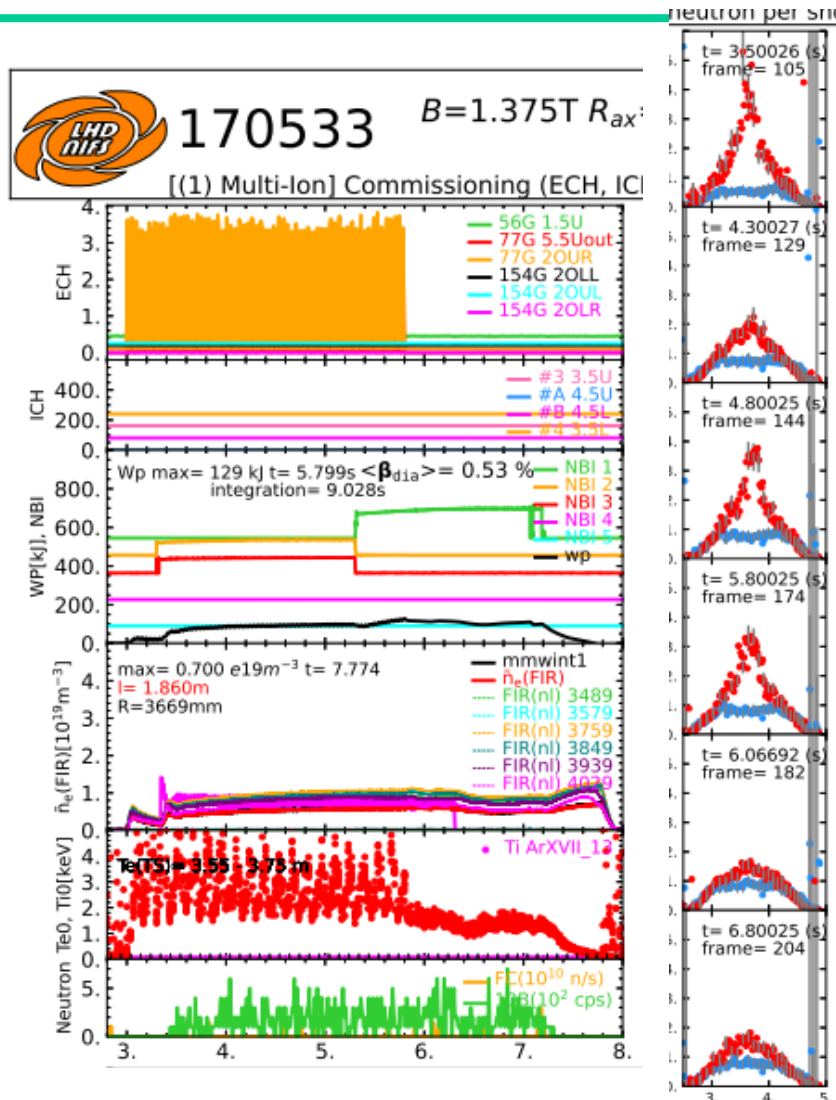

Figure 1 typical shot

We measured the plasma potential by modulating an ECH to study the role of the electric field in plasmas with electron ITB formation.
The measured locations of the plasma potential are fixed at rho = 0 and 0.5. The change in the potential was synchronized with the ECH waveform and was observed at both locations.
In addition, we have obtained the potential profiles for the electron density dependence.
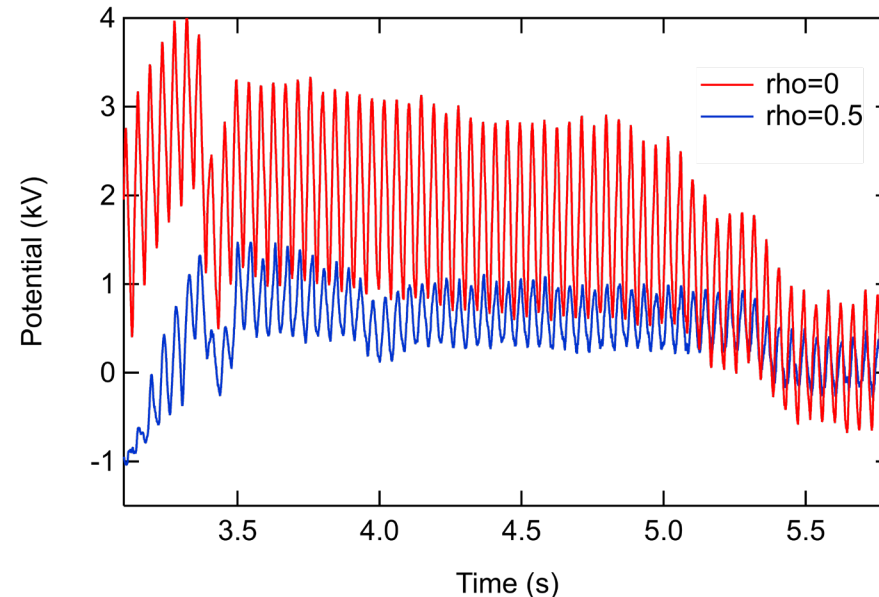

Figure 2. Measured plasma potential by modulating the ECH power at rho =0 and 0.5.