

# (TG 2) Turbulence group report

Date: Feb. 8, 2022

Time: 14:10 – 18:45

Shot#: 178476 – 178557 (82 shots)

Prior wall conditioning: None

Divertor pump: Yes

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

Pellet: TESPEL, IPD

NBI#(1, 2, 3, 4, 5) = gas(H, H, H, H, H) = P(1.9, 2.2, 1.8, 3.7, 4.5) MW

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

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

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

ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0.60, 0.60, 0.77, 0.41) MW

Neutron yield integrated over the experiment =  $3.8 \times 10^{11}$

Feb. 9, 2022 (T. Kobayashi)

## Topics

1. Turbulence suppression with impurity powder dropper (F. Nespoli, S. Masuzaki)
2. Robustness assessment of methods to prevent impurity accumulation (N. Tamura)

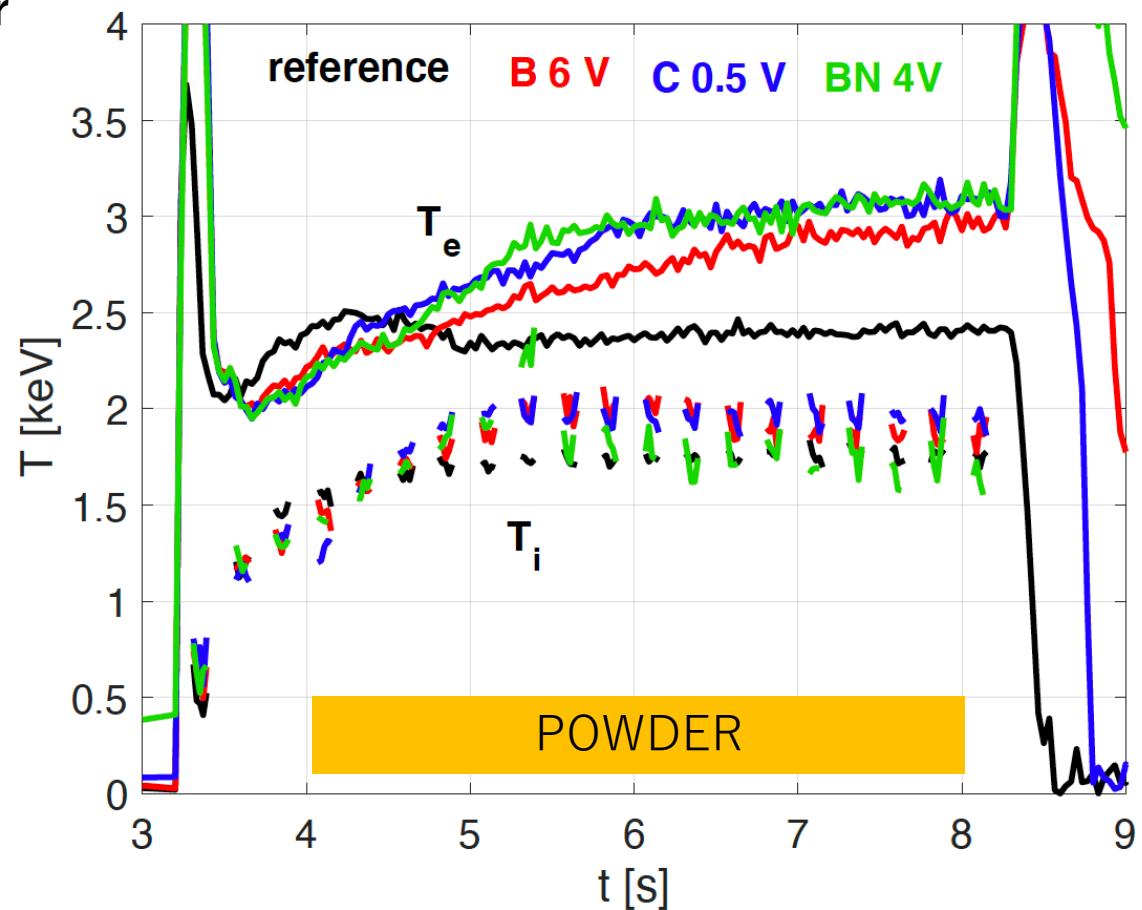
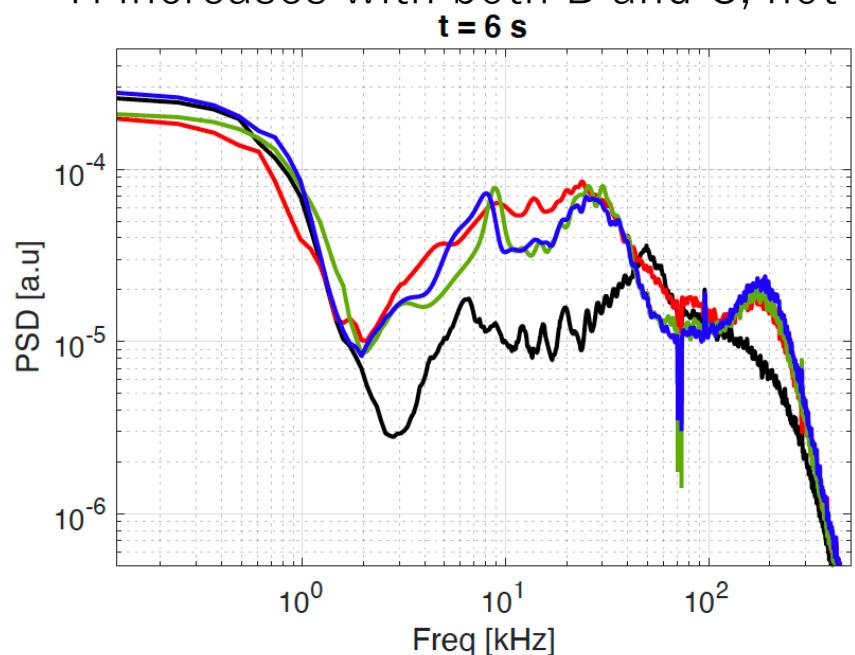
# Turbulence suppression with impurity powder dropper

F. Nespoli et al.

2022.02.08 #178476-1784513  $R_{ax}=3.6$  m

Extended NBI, ECH and ICH operation 5s

- B, C, BN powder injected in plasmas
- Comparison repeated for
- 4 Different heating: 3 NB, 2 NB, 3 NB +ECH+ICH, ECH+ICH
- 3 different densities: 1.5, 2.7, 4e19 m<sup>-3</sup>
- Te increases with all 3 powders
- Ti increases with both B and C, not much with BN



- PCI turbulence spectrum changes (TEM peak destabilized?) but turbulence suppression not clear
- Apparently B wall conditioning effect not needed for Te, Ti increase? What about turbulence suppression?
- More analysis needed!

# Robustness Assessment of Methods to Prevent an Impurity Accumulation (N. Tamura et al.)

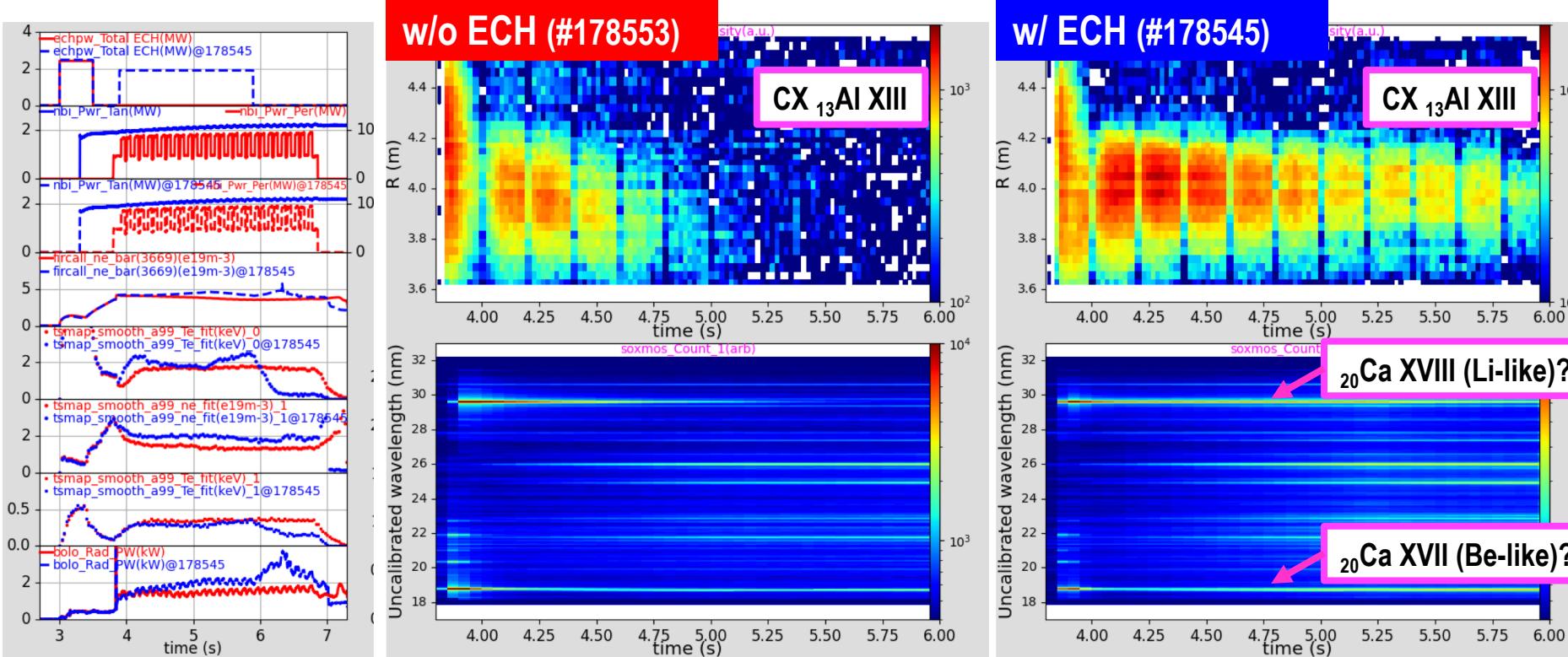
**Magnetic Configuration:** ( $R_{ax}$ , Polarity,  $B_t$ ,  $\gamma$ ,  $B_q$ ) = (3.60 m, CW, 2.75 T, 1.2538, 100.0%)

**Shots:** 178517-178557

**Goal of this experiment:** We investigate the applicability of schemes (ECH) to prevent impurity accumulation in the core region of LHD plamas for different Z impurities

## Main results of this experiment

- We have injected TESPELs containing compound-tracers ( $\text{Li}_2\text{TiO}_3$ ,  $\text{CaAlO}_4$ ,  $\text{SiB}_6$ ,  $\text{NaCl}$ ) to study a (lower-Z sided) Z-dependence of the impurity transport, and We have applied **2.0 MW 154 GHz ECH** additionally ( $t = 3.895 \text{ s} - 5.895 \text{ s}$ , for 2.0 s) immediately after the TESPEL injection ( $t = 3.845 \text{ s}$ )
- Contrary to expectations, a longer impurity decay time has been observed in the case with the additional ECH



- It should be noted that perp-NBIs power (up to ~10 MW) is much higher than tang-NBIs power (~2 MW).
- We will investigate the reason why the plasma with additional ECH can show the longer impurity decay time

✓ Er data to be checked