Date: Jan. 19, 2022, Time: 13:00~16:30, Shot#: 176677~176772(96 shots)
Prior wall conditioning: No, Divertor pump: On (except for 2-I)
Gas puff: H2, Pellet: D2, H2, IPD: C, B, SiB6
LID: No
NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(3.53, 4.39, 4.14, 5.24, 4.78)MW
ECH(77GHz)=ant(5.5-U, 2-OUR)=P(0.70, 0.79)MW,
ECH(154GHz)=ant(2-OLL, 2-OUL, 2O-LR)=P(0.98, 0.93, 0.99)MW
ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0, 0, 0, 0) MW
Neutron yield integrated over the experiment = 3.0x10^{12}

Topics
1. Hydrogen wall recycling after deuterium pellet (G. Motojima)
2. Impact of impurities at non-trace concentration on the background plasma (N. Tamura, J.M. Garcia Regaña)
3. Isotope effects in high-density ECH plasma after hydrogen isotope ice pellet injections (T. Tsujimura, postponed due to a false fire alarm)

False alarms happed in the fire alarm system, the cause was the equipment failure. Substituted with a down-graded alternative.
Failure of the nitrogen heater system in the closed divertor plate occurred.
Hydrogen wall recycling after deuterium pellet (G. Motojima)

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

Shots: 176678-176698 (22 shots)

- An increase in the deuterium fraction is observed immediately after the D pellet, reaching \(D/(H+D)=0.5-0.6\). However, this deuterium fraction decreases within 100 ms; the D pellet does not affect the final deuterium fraction after pellet injection.
- At base density of \(n_e\approx 0.3\times10^{19} \text{ m}^{-3}\), the density did not get back to its original value. On the other hand, at \(n_e\approx 1\times10^{19} \text{ m}^{-3}\), the density is decayed to initial density. This suggests that wall recycling after the pellet varies with the base density.
Impact of impurities at non-trace concentration on the BKG plasma (J.M. García Regaña, N. Tamura et al.)

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

Shots: #176702-#176722

Goal of this experiment

- Understanding the role of non-trace impurities on the transport of the main plasma
- Validating the gyrokinetic turbulent transport simulations, that predict reduction of main species heat fluxes (stella as main numerical tool) discerning the impact through modification of ion density dilution and profile tailoring

Main results of this experiment

- We have injected C and B impurities into NBI-sustained plasmas (C: C-IPD or C pellet, B: B-IPD or SiB_6-TESPEL)
  - C-IPD: 0.6V \(\rightarrow\) 0.7V \(\rightarrow\) 0.8V (collapsed)
  - B-IPD: 3V \(\rightarrow\) ... \(\rightarrow\) 8V (nearly collapsed)
- Core Te, Ti seem to be improved with a larger amount of B powder (see figures)
- Edge Te decreased and ne increased
- Impact of impurities at non-trace concentration on the background plasma will be investigated by using the gyrokinetic turbulent simulations
  - Necessary parameters have been collected, such as \(n_e/Te/Ti\), \(Z_{eff}\)