(TG 2) Turbulence group report

Jan. 18, 2022 (T. Kobayashi)

Date: Jan. 14, 2022
Time: 14:30 – 16:00, 17:30-18:45
Shot#: 176430 – 176457 (28 shots), 176480 – 176500 (21 shots)

Prior wall conditioning: None
Divertor pump: Yes
Gas puff: H_2
Pellet: TESPEL, C-pellet

NBI#(1, 2, 3, 4, 5) = gas(H, H, H, D, He) = P(4.2, 3.7, 3.9, 3.5, 4.0) 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(723, 799, 825) kW
ECH(56 GHz) = ant(1.5U) = P(-) kW
ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0.86, 0.78, 1.1, 0.46) MW
Neutron yield integrated over the experiment = 1×10^{13} (total)

Topics

1. Cross transport (S. Inagaki (Kyushu University))
2. On the influence of Alfven Eigenmodes in radial electric fields and transport in LHD (C. Hidalgo & J. Rodriguez (CIEMAT))

Cross Transport

S. Inagaki,
T. Tokuzawa

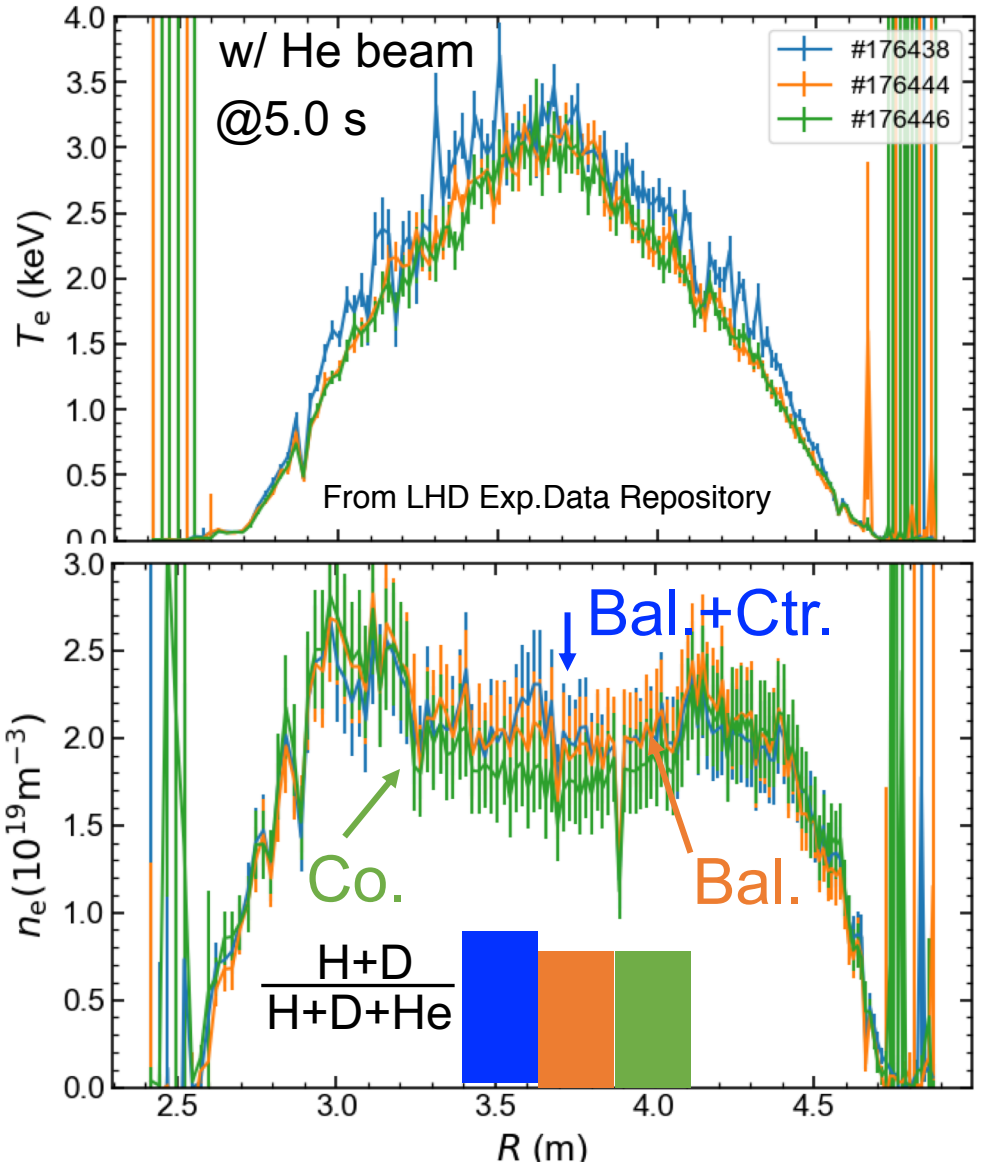
Shot #: 176434 - 176457
Experimental conditions: (R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 2.75 T, 1.254, 100 %)

Motivation

- Outward He and impurity fluxes and inward D and T fluxes are required to sustain stationary burning plasms.
- Understanding of particle flux driven by non-conjugated forces is important to control density profiles in the burning plasma by methods other than direct particle feeding.
- We focus on the cross-transport effects between particle and parallel flow

Results

- Line density was kept constant (2x10^{19} m^{-3}) and total beam power and total parallel momentum input were scanned.
- The He beam was successfully injected once every two shots
- Stationary T_e, T_i, n_e, n_{He}, n_c, V_t, V_p profiles were measured.
- There seems to be a difference in the n_e in the central region.



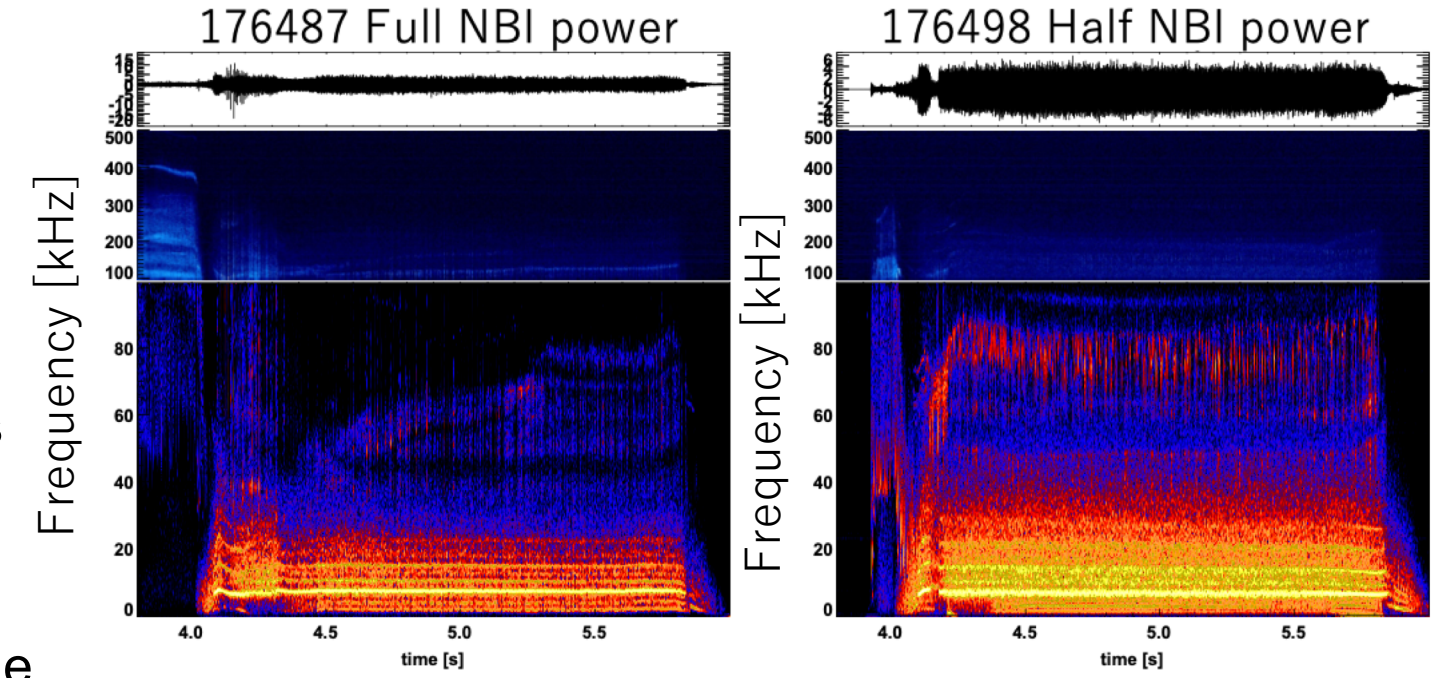
On the influence of Alfven Eigenmodes in radial electric fields and transport in LHD

(C. Hidalgo, Jacobo Rodriguez (Ciemat))

Experimental conditions: (R_{ax}, B_t) = (3.6 m, 0.8 T, CW), γ = 1.2538, and B_q = 100 %,

Shot#: 176481 – 176500 (20 shots)

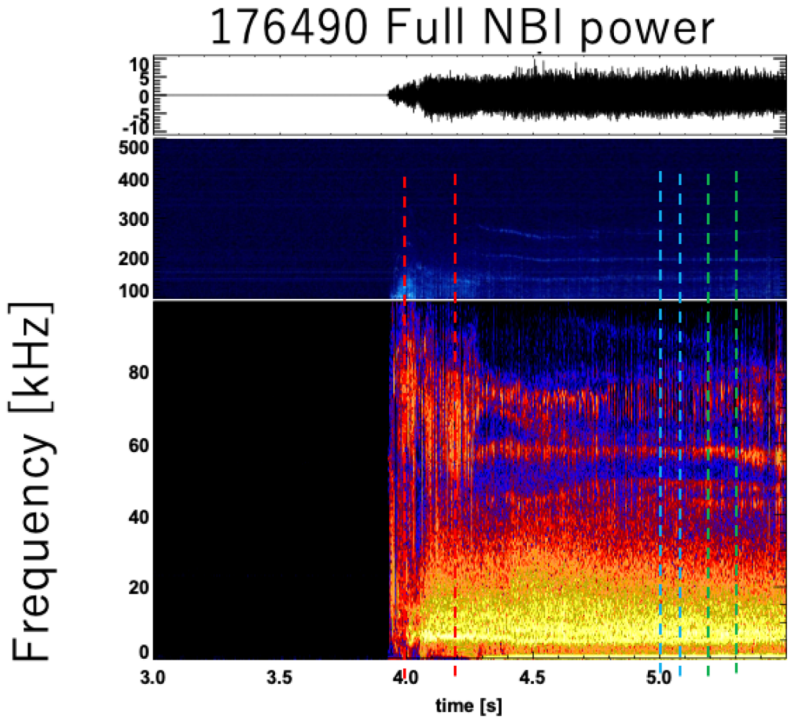
- Compare balanced NBCD discharges with full and half NBI power injection.
- Shots with robust AE activity at 80, 100, 150 200 kHz in discharges with $n_e = 1 \times 10^{19}$ m^{-3} .
- HIBP and MSE data do measure electrostatic potential and iota profile.

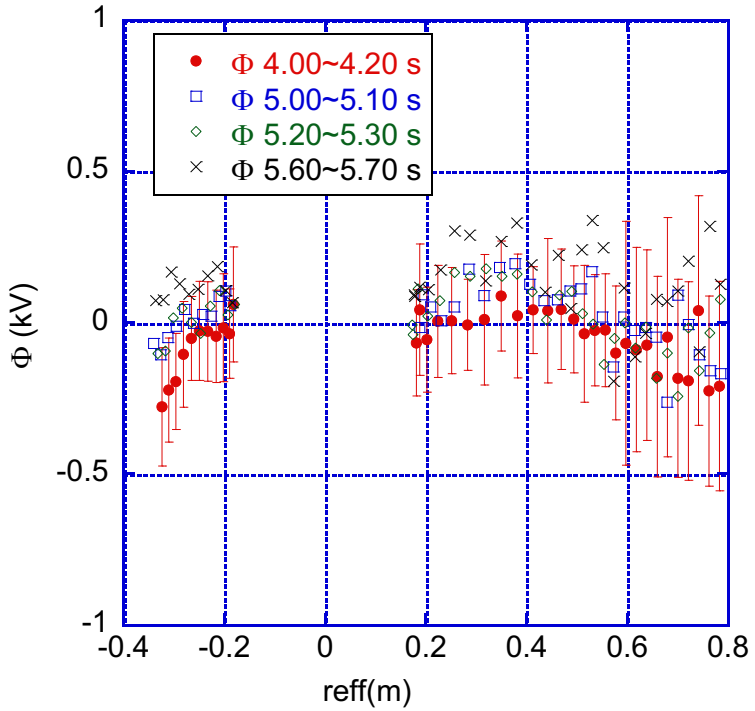


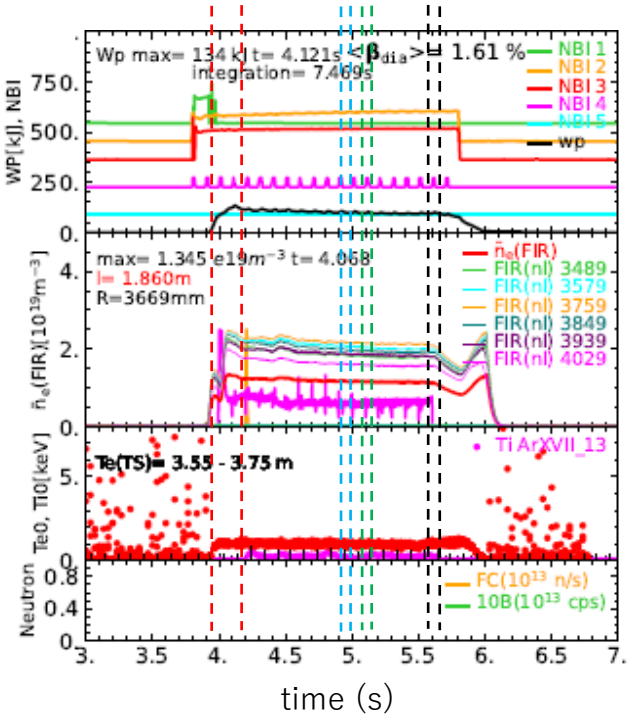
- Discharges with full and half power NBI must lead to a different AE activity. If the AEs have an influence in the radial electric fields, HIBP data should show different electrostatic potential data.
- Experimental results will be reproduced by FAR3d non linear simulations.

On the influence of Alfven Eigenmodes in radial electric fields and transport in LHD

(C. Hidalgo, Jacobo Rodriguez (Ciemat))







- Shot 176490: ctte plasma density and fixed NBI heating pattern.

- First HIBP data analysis indicates a variation of the electrostatic potential along the discharges that could be linked to the AE activity.