Daily Report for 2025-12-09

M. Shoji

Date: December 9, 2025
Time: 11:36 − 17:15
Shot: #198778 − #198871 (94 shots)
Prior wall conditioning: No
Divertor pump: No
Gas puff: H_2
Pellet: No

NBI: #1, #2, #3
ECH: 2-OUR (77GHz), 5.5-UO (77GHz), 2-OUL (154GHz) , 2-OLL (154GHz)
ICH: No

Topics

1. Interaction between fast ions and MHD bursts with n=0 (M. Matsuoka)
2. Comparative study and validation of ECH ray-tracing code models (N. Shirokoshi)
   [Piggyback] ECRH power deposition studies using calibrated ECE at LHD (V. Murugesan)
3. Investigation of local and non-local turbulence during thermal pulse propagation by MECH injection (N. Kenmochi)

Interaction between fast ions and MHD bursts with n=0

M. Matsuoka (Nagoya U.), K. Nagaoka

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.65 m, CW, 0.5 T, 1.2538, 100.0%)
#198778 - #198802

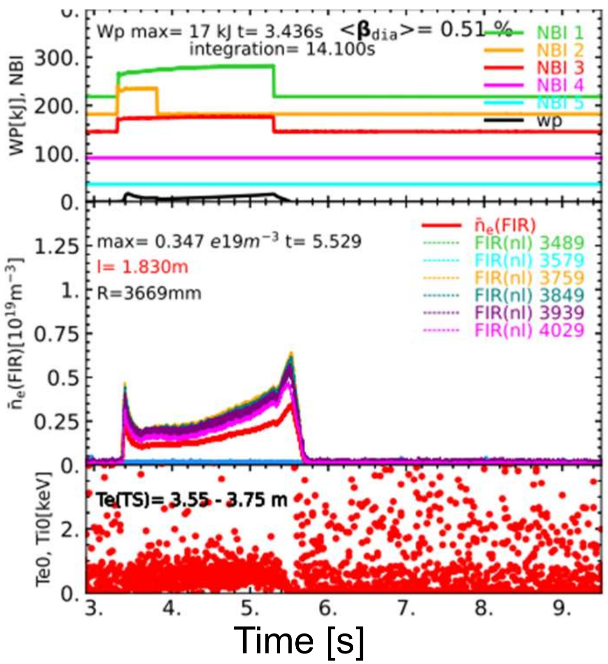
Motivation and method:

- In the 25cyc, bursting activity of toroidal mode number n=0 in the AE frequency range and corresponding increase of fast-ion flux was observed.
- By reproducing the discharge, we try to investigate the interaction between this bursts and fast ions.

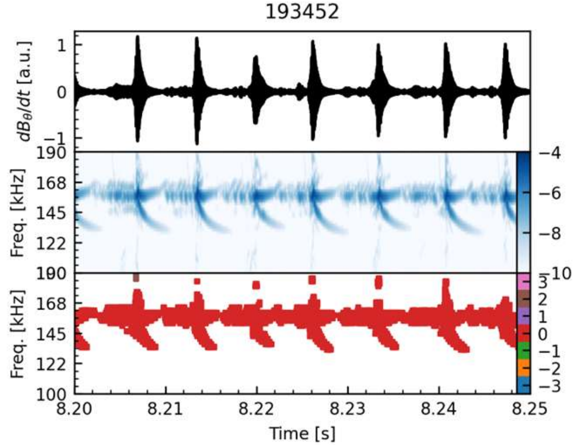
Results:

- Bursting activities in the AE frequency range with n=0 were reproduced.
- Measurement of fast ions was conducted by Si-NPA at 6T port.
  - core/edge region (only edge in 25cyc)
- Relationships between fast-ion flux and n=0 bursts will be analyzed.

198800

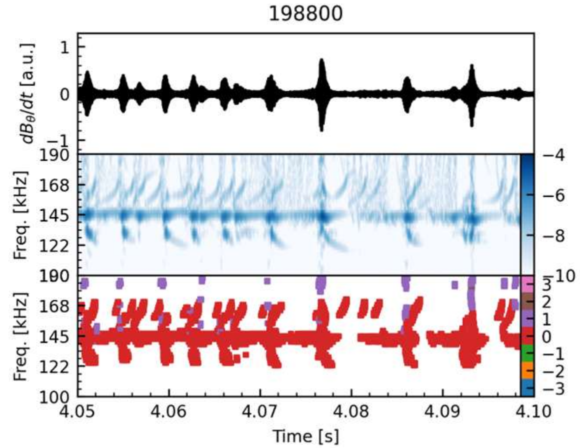


25cyc



n

This experiment



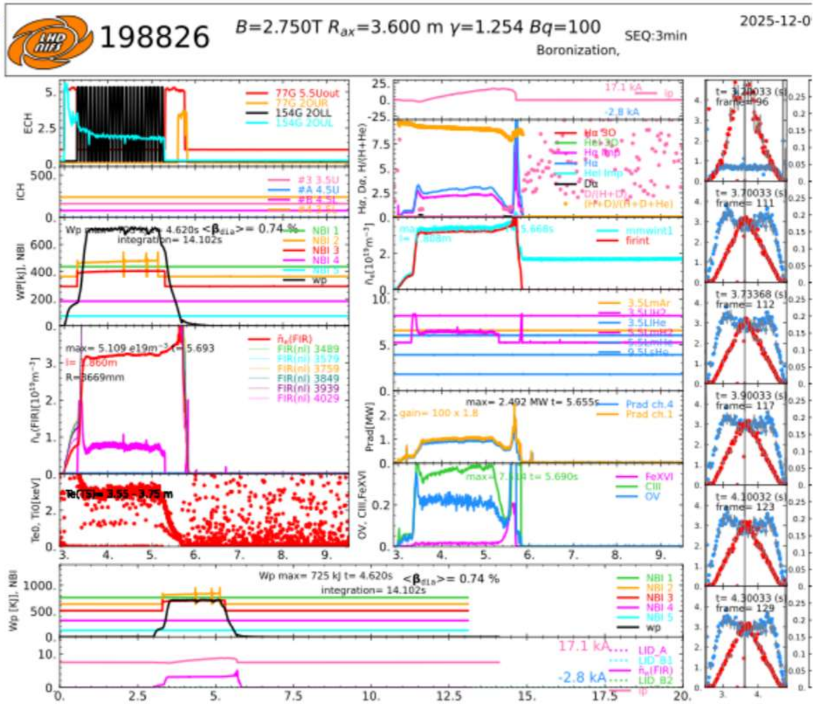
n

Comparative Study and Validation of ECH Ray-Tracing Code Models

N. Shirokoshi, M. Nishiura and R. Yanai

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 2.75 T, 1.2538, 100.0%)
#198809 - #198830

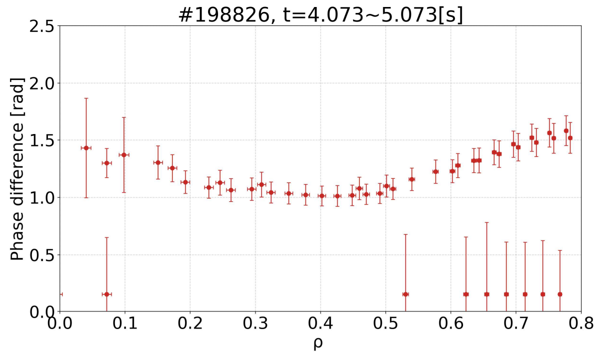


Motivation and method:

- Conduct MECH experiments while varying electron temperature and electron density.
- Evaluate the width of the ECRH absorption distribution and the heat transport coefficient from the experimental data.
- Simultaneously, the potential was measured by HIBP during both on-axis and off-axis heating.

Results:

- The experiment covered nearly the entire planned parameter of electron temperature and density.
- NBI#5 was not injected, so Ti measurement was not conducted.
- Using Te measured by ECE, the ECRH power deposition profile and heat transport coefficient will be calculated to evaluate their temperature and density dependencies.

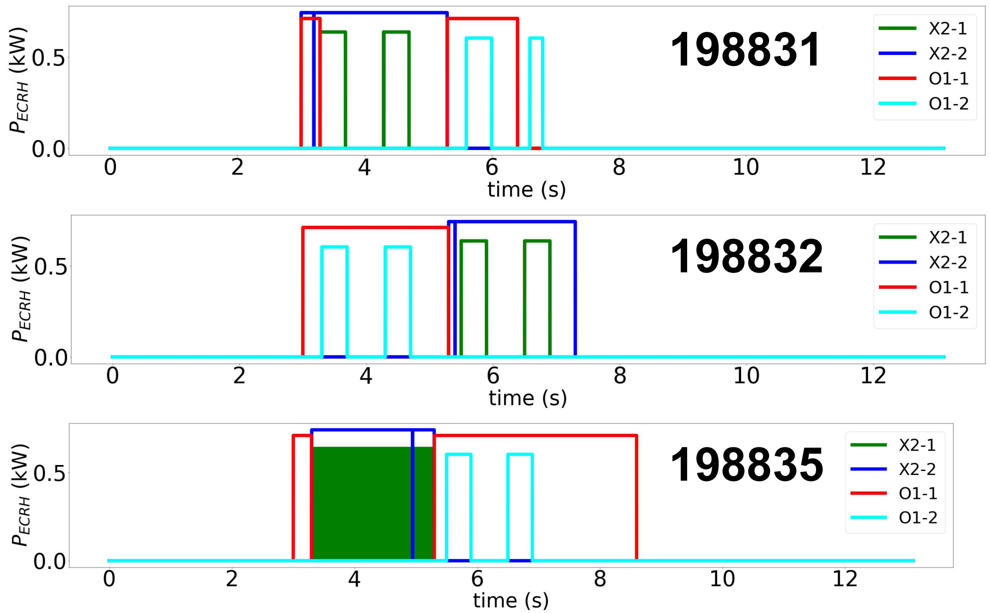


ECRH power deposition from ECE phase delay

ECRH power deposition studies using calibrated ECE at LHD

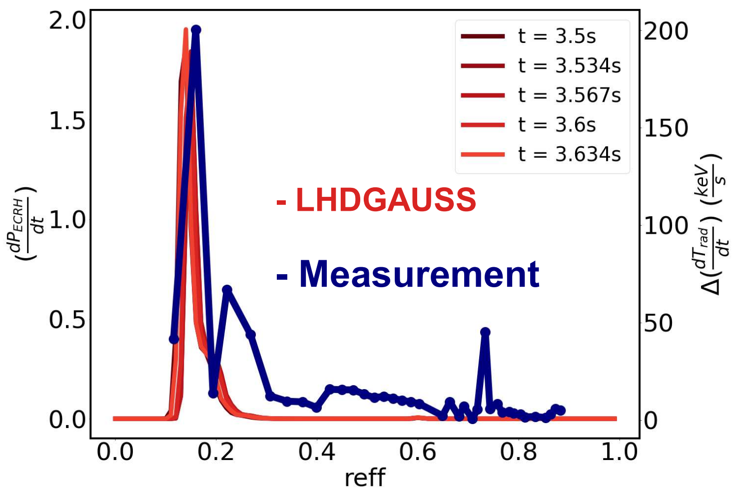
V. Murugesan, T. Tokuzawa,
M. Hirsch, H. Igami, and R. Yanai

Experimental conditions:
(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 2.75 T, 1.2538, 100.0%)
#198831 - #198835 (+Piggyback on Shirokoshi-san's experiments)



Motivation and method:

- Experimentally measured ECRH deposition profiles tend to be different from numerical ones, affecting plasma control & transport.
- During ECRH switching and fast modulation, ECE signals in the vicinity of heating resemble the ECRH beam properties.



Results:

- Different heating methods like X2 and O1 at 2.75T were employed. Both switching and modulation experiments conducted.
- ECRH switching and its ECE response resulted in deposition profiles resembling the calculated LHDGAUSS deposition profile.

Investigation of local and non-local turbulence during thermal pulse propagation by MECH injection

N. Kenmochi

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.75 m, CW, 2.64 T, 1.2538, 100.0%)
#198837 - #198871

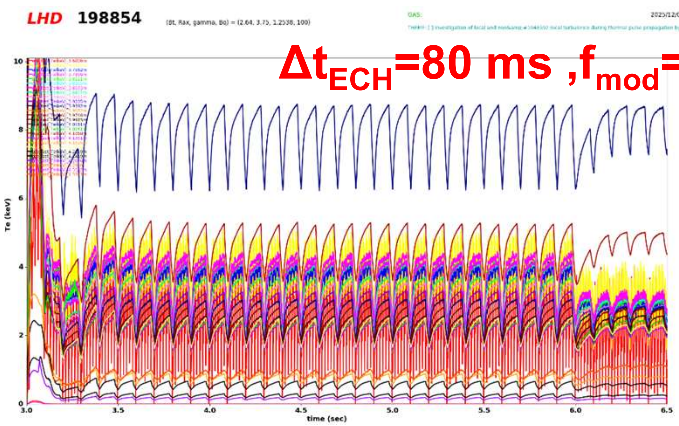
Motivation and method:

- Investigate the characteristics of non-local turbulence revealed in the previous cycle by conducting more detailed turbulence measurements and experiments under different magnetic field configurations.
  (25th cycle: R_{ax}=3.6 m, B_t=2.75 T)

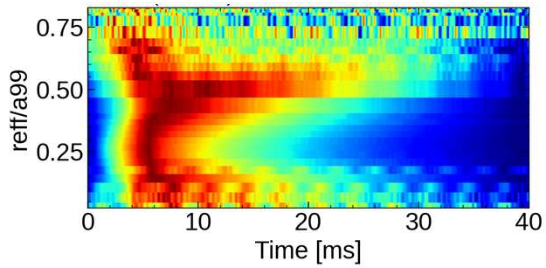
Results:

- ✓ Heat propagation was observed.
- ✓ Positional scan data of BS and HIBP measurements have also been successfully taken.
- ✓ Based on the results of temperature and turbulence measurements, the effects of magnetic field configuration on local/non-local turbulence will be clarified.

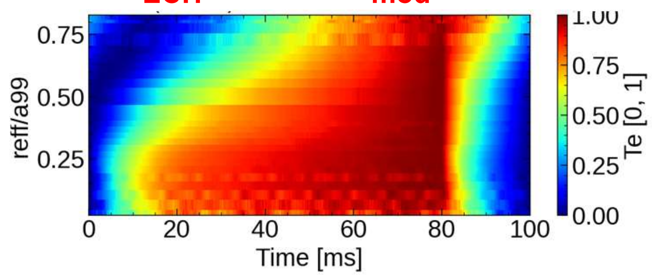
Δt_{ECH}=80 ms ,f_{mod}=10 Hz



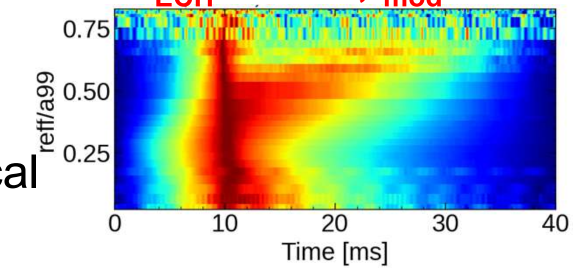
Δt_{ECH}=5 ms,f_{mod}=25 Hz



Δt_{ECH}=80 ms,f_{mod}=10 Hz



Δt_{ECH}=10 ms,f_{mod}=25 Hz



Δt_{ECH}=320 ms,f_{mod}=2.5 Hz