

# Daily Report for 2025-11-25

R.T. Ishikawa

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**Date:** Nov 25, 2025

**Time:** 10:44 – 17:15

**Shot:** 197717 – 197822 (106 shots)

**Prior wall conditioning:** No

**Divertor pump:** No

**Imp. Gas puff:** No

**Pellet:** No

**NBI:** #1, #2, #3, #4, #5

**ECH:** 2-OUR (77GHz), 5.5-UO (77GHz), 2-OUL (154GHz), 2-OLL (154 GHz)

**ICH:** No injection

## Topics

1. Causality of potential and temperature response on local electron heating (M. Nishiura)
2. Turbulence nT cross-phase study (B. Vanovac/ R. Yanai)
3. Characteristics of millimeter wave vortex on heating, current drive, and propagation in high-density plasmas (S. Kubo/ M. Nishiura)

# Causality of potential and temperature responses on local electron heating

M. Nishiura, R. Yanai, and T. Ido

## Experimental conditions:

$(R_{ax}, \text{Polarity}, B_t, \gamma, B_q) = (3.9 \text{ m, CW, 1.375 T, 1.2538, 100.0\%}) \#197716 - \#197762$   
 $(3.6 \text{ m, CW, 2.75 T, 1.2538, 100.0\%}) \#197763 - \#197777$

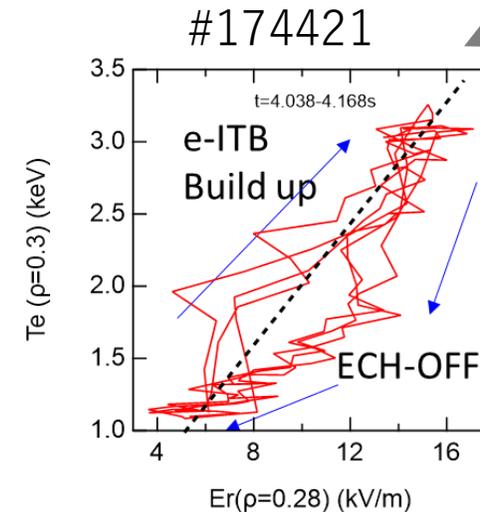
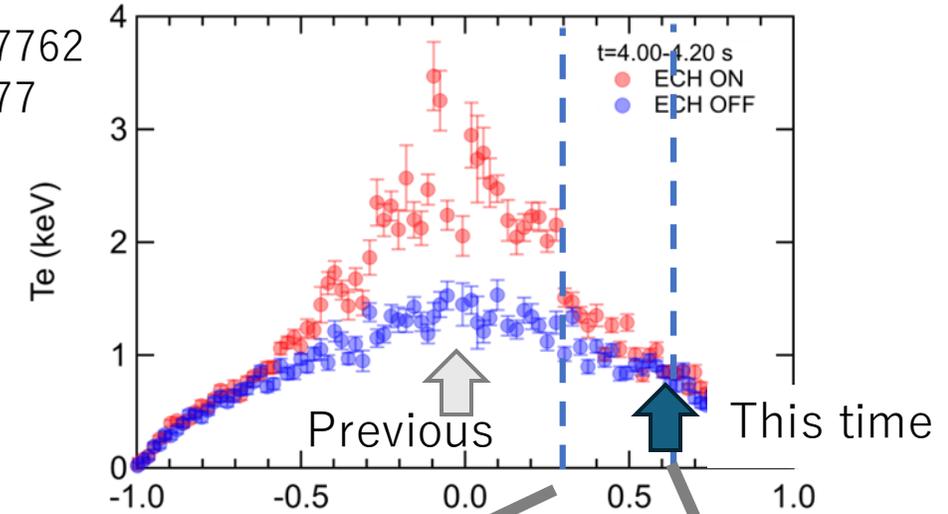
## Motivation and method:

The power threshold to form e-ITB has been reported in hydrogenic isotope plasmas. We observed the different dynamical behavior of Te and Er inside and outside of e-ITB during modulated ECH. To verify this behavior which only occurs inside e-ITB or not, off axis ECH was applied.

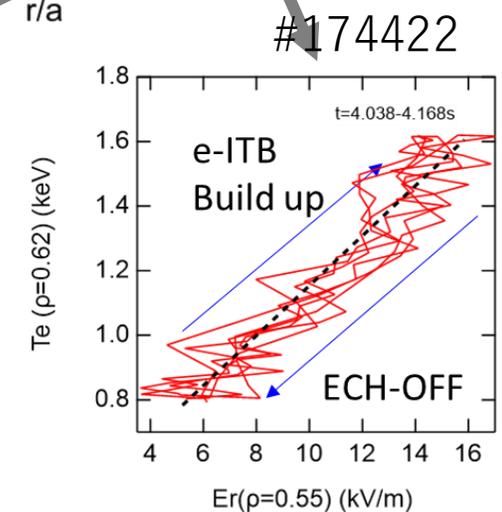
## Results:

- Modulated ECH with off-axis was applied to analyze the effect of radial electric field on particle and heat transport. As shown in the right figures, we will analyze the HIBP data for a local Er response.
- HIBP measured the plasma potential profiles for the neoclassical analysis.

(Previous exp. #174430)



Te response is faster than Er



Te response is proportional to Er

# Cross phase angle between density and temperature fluctuations (nT cross-phase)

B Vanovac (MIT), R Yanai (NIFS) and X Wang (MIT),  
T Tokuzawa (NIFS), M Nishura (NIFS)

## Motivation and method:

- ❑ Measure turbulence quantities with CECE, Reflectometers and HIBP at the plasma edge

## 1. Experimental conditions for Ref & CECE:

$(R_{ax}, \text{Polarity}, B_t, \gamma, B_g) = (3.6 \text{ m, CCW, 2.75 T, 1.2548, 100.0\%})$  #197778 - #197786

## 2. Experimental conditions for HIBP:

$(R_{ax}, \text{Polarity}, B_t, \gamma, B_g) = (3.9 \text{ m, CCW, 2.5385 T, 1.2548, 100.0\%})$  #197787 - #197795

## Strategy:

- ❑ Conduct power scans with various ECRH/NBI combinations to vary  $T_e/T_i$  ratios at low density
- ❑ Measure turbulence quantities and correlate heat flux measurements from HIBP with nT cross-phase measurements from the coupled CECE/Reflectometer

## Current Results:

- ❑ Overall, experiment conducted as planned
- ❑ Some discharges had higher density than requested and no steady state - challenge for the Reflectometer and HIBP
- ❑ Gy #5 was dropping out - only 2 Gyrotrons available
- ❑ Quality of turbulence data is not yet known - this will determine the success of the experiment

# 77-GHz Optical Vortex (OV) injection re-trial (S. Kubo)

## Experiment conditions:

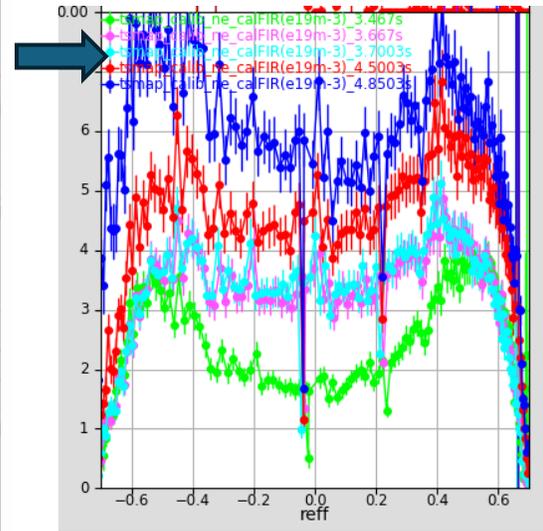
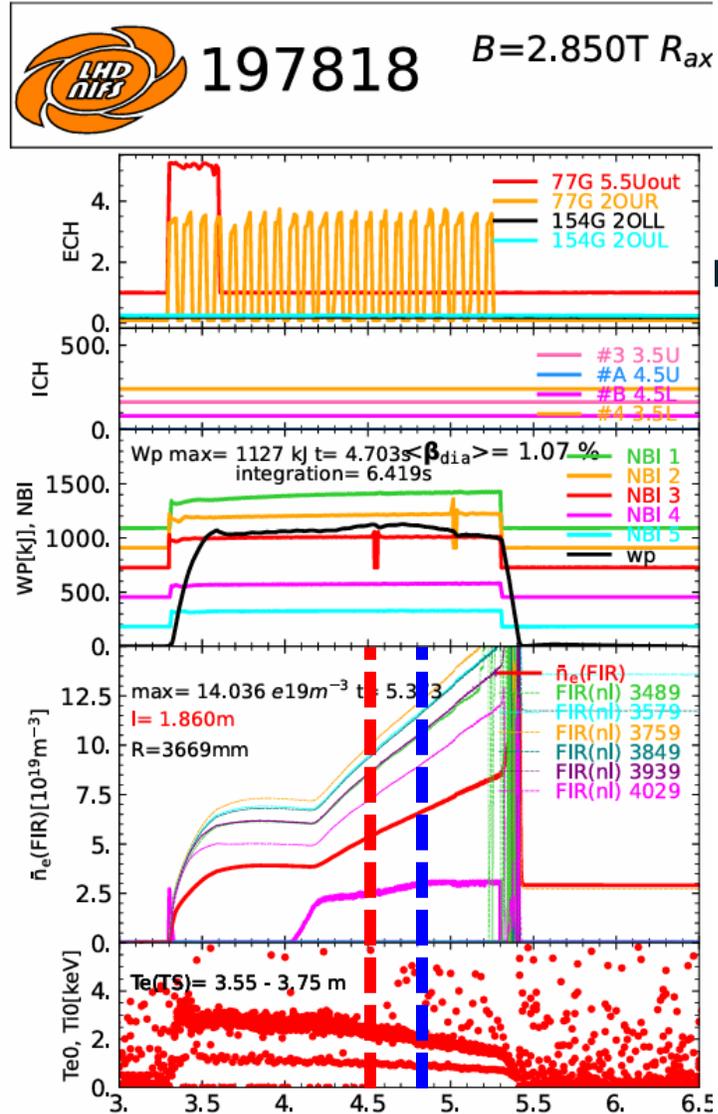
$(R_{ax}, \text{Polarity}, B_t, \gamma, B_q) = (3.60 \text{ m}, \text{CW}, 2.85 \text{ T}, 1.2538, 100.0\%)$  #197796-#197821

## Motivation:

- The ( $\neq 2$ ) optical vortex(OV) injection is a possibility for producing an overdense plasma. Therefore we find out the difference in the power deposition profile. The spiral mirror was implemented at the final miter bend of ECH#2 line, because the mode purity of OV can be affected by long-waveguide transmission(from the previous experiment).

## Results:

- N-NBIs with #1+#2+#3 and P-NBIs with #4+#5 were sustained for density ramp-up discharges from  $1$  to  $8 \times 10^{19} \text{ m}^{-3}$ .
- 600 kW OV/normal O-mode with 11 or 23 Hz modulation were injected into identical ramp-up discharges.
- The power absorption of OV of ECH#2 is analyzed from the response of ECE.



An overdense plasma is formed at  $t=4.85\text{s}$  and later.