Daily Report for 2025-11-28

K. Mukai

Date: November 28, 2025
Time: 10:00 – 17:15
Shot: 198108 – 198243 (136 shots)
Prior wall conditioning: No
Divertor pump: On
Gas puff: H_2, He
Impurity gas puff: Ne, Ar, CH4

NBI: #1, #2, #3, #4, #5
ECH: 2-OUR (77GHz), 5.5-UO (77GHz), 2-OUL (154GHz), 2-OLL (154GHz)
ICH: 3.5UL, 4.5UL

Topics

1. Heavy element atomic data toward decoding infrared spectra of neutron star mergers (Daiji Kato)
2. Improved heating scenarios by enhancing ICRH + NBI coupling (Jacobo Varela Rodríguez, Kenichi Nagaoka)
3. Direct observation of bulk phase space dynamics during the energetic particle driven Geodesic Acoustic Mode (Yuichi Kawachi, Tatsuya Kobayashi)

Heavy element atomic data toward decoding infrared spectra of neutron star mergers

D. Kato

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 2.75 T, 1.2538, 100.0%), #198110- #198124, ECH (for start 3.2-3.4s), NBI#1-3 (3.3-5.3s), NBI#4-5(5.3-7.3s), H2 gas

Objectives

Measurements of high-resolution visible spectra of ablation cloud of La III and Ce III

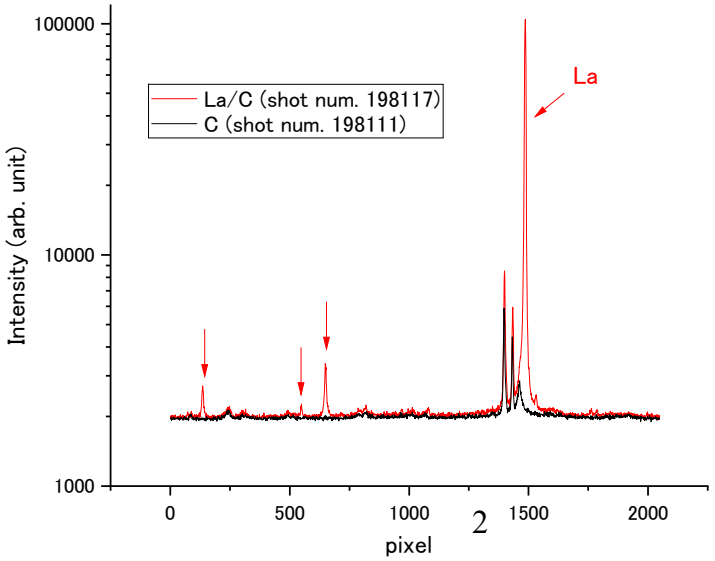
Experiments

- Carbon pellets (2 mg) containing each of LaHx (400 μg) and Ce (700 μg) powder were injected by impurity pellet at 4.0s.
- Visible spectrometers (50cmVis2), central wavelength: 315nm for La and 308nm for Ce, grating: 1800 grooves/mm, slit width: 25um, exposure time: 5 ms (50 ms for 198123 and 124).
- Ne and Ar gas puff for wavelength calibration.

Preliminary results

Before the pellet injection Te0=3 keV and ne=1e19 m-3. Te0 and ne changed to 2 keV and 3e19 m-3 after the pellet injection, and recovered to the initial values in 400 ms.

Emission lines from La and Ce in the pellet ablation clouds were observed. Detailed line identification is undergoing.



Improved heating scenarios by enhancing ICRH + NBI coupling

J. Varela, K. Nagaoka, R. Seki , H. Nuga and K. Ogawa

Experimental conditions:

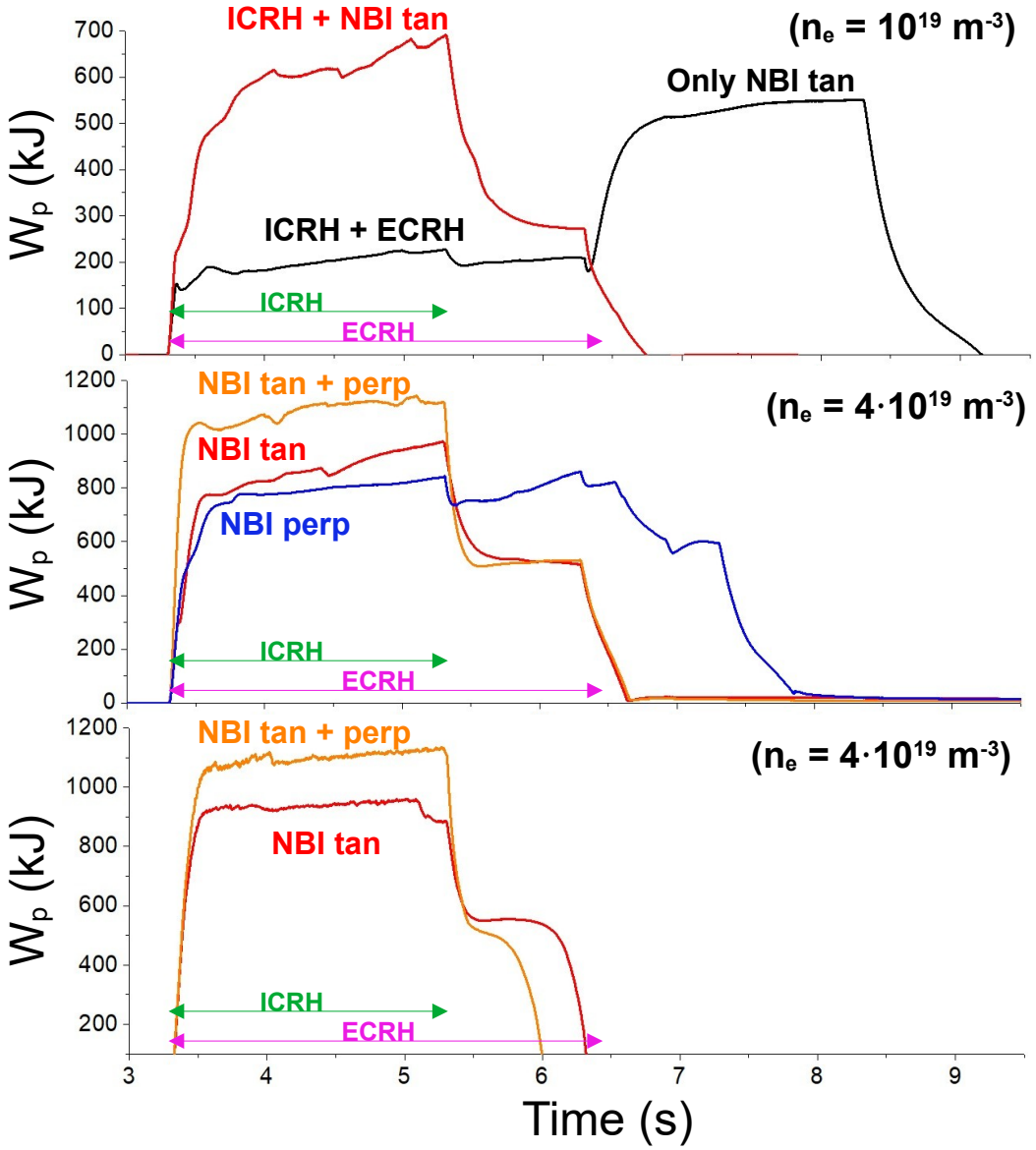
(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 and 3.75 m, CW, 2.75 and 2.65 T, 1.2538, 100.0%)
#198137 – #198175

Motivation and method:

- Identify operation scenarios with improved heating performance by coupling NBI + ICRH.
- Explore configurations with efficient ICRH power coupling with different NBI heating patterns.

Results:

- Multiple configurations analyzed with ICRH and different NBI patterns, including tangential and perpendicular NBIs.
- Plasma density and Rax scan performed.
- No evident ICRH + NBI coupling identified in the configurations with Rax = 3.6 m.
- Rax = 3.75 m cases under investigation.



Direct observation of bulk phase space dynamics during the energetic particle driven Geodesic Acoustic Mode

Y. Kawachi(Nagoya Univ.)
T. Kobayashi (NIFS)

Experimental conditions:
(R_{ax}, Polarity, B_t, γ, B_q) = (3.75 m, CCW, .1375 T, 1.2538, 100.0%)
#198176 – #198243

Motivation and method:

- Verification of GAM channeling, where EGAMs are expected to heat bulk ions
- Fast CXS **directly measures** the ion velocity distribution with sufficient temporal resolution

Results:

- Various types of EGAMs were observed
- Fast CXS worked well
- HIBP and NPA diagnostics also worked well
- We obtained ensembles of EGAM data with 20 shots per condition

We are now ready to reveal the GAM channeling and further nonlinear process.