Daily report for 2025-12-23

T. Kobayashi

Date: December 23, 2025
Time: 10:00 – 17:15
Shot#: 199930 - 200064 (135 shots)
Prior wall conditioning: H_2
Divertor pump: Yes
Gas puff: H_2, He, Ne, N_2, Ar
Pellet: IPD

NBI: #1, #2, #3, #4, #5)
ECH: 2-OUR (77GHz), 2-OUL (154GHz), 2-OLL (154GHz)
ICH: No

Topics

1. Geodesic curvature dependence of GAM characteristics (Daiki Nishimura)
2. Investigation of edge impurity transport in detached high-beta plasma with inward-shifted configuration (Erhui Wang) *
3. Exposure of material samples into the LHD edge plasma by means of the manipulator (Chandra Prakash Dhard)

* LHD 200000 shot photo was taken

Geodesic curvature dependence of GAM characteristics

D. Nishimura, T. Tokuzawa, T. Nasu

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 1.375 T, 1.2538, 100%) #199933 - #199963

(R_{ax}, Polarity, B_t, γ, B_q) = (3.6 m, CW, 1.375 T, 1.2538, 150%) #199964 - #199994

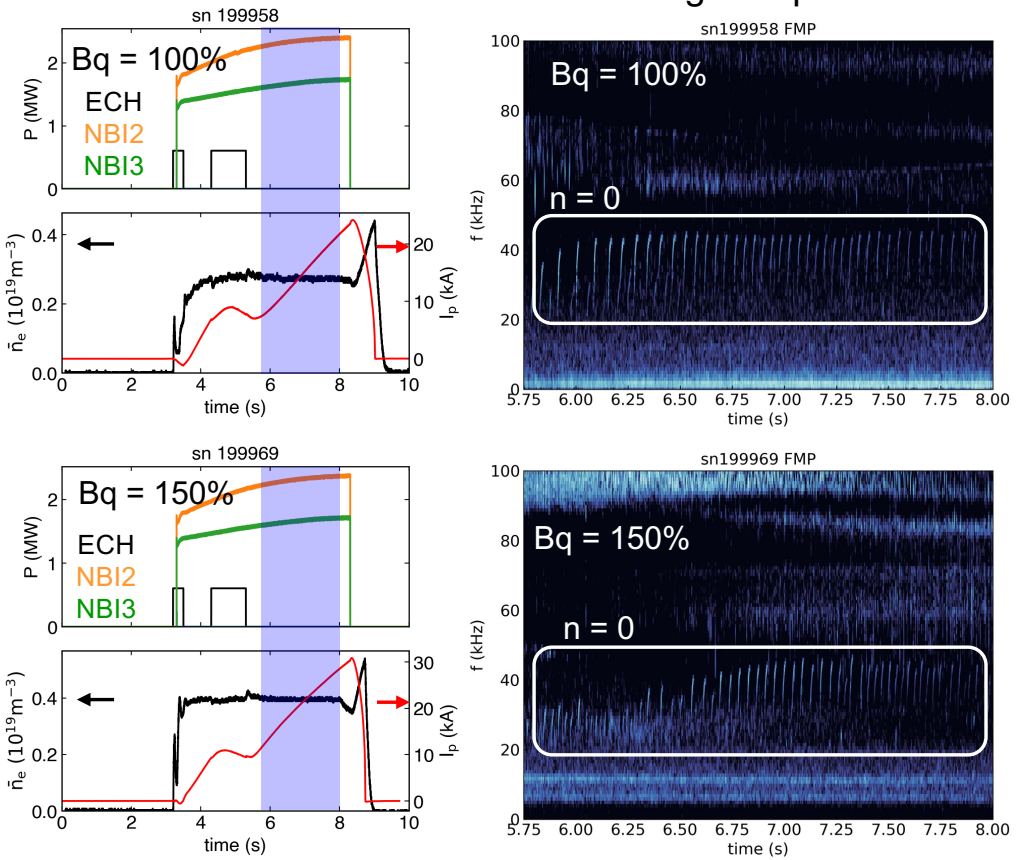
Motivation and method:

- Investigate the dependence of GAM characteristics on geodesic curvature.
- We tried to observe GAMs under different B_q conditions (100 and 150%).

Results:

- The n=0 modes with frequency chirp-up, which are likely GAMs are clearly observed in magnetic probe signals.
- We attempted to obtain HIBP, ECE Imaging, and DBS data. A detailed analysis of GAM characteristics will be performed.

Magnetic probe



Investigation of edge impurity transport in detached high-beta plasma with inward shifted configuration

E. Wang, Y. Liang, M. Kobayashi, et. al.,

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.55 m, CW, 1.375 T, 1.2538, 100.0%)

#199995 - #200027

~~(R_{ax}, Polarity, B_t, γ, B_q) = (3.55 m, CW, 2.7887 T, 1.2538, 100.0%)~~

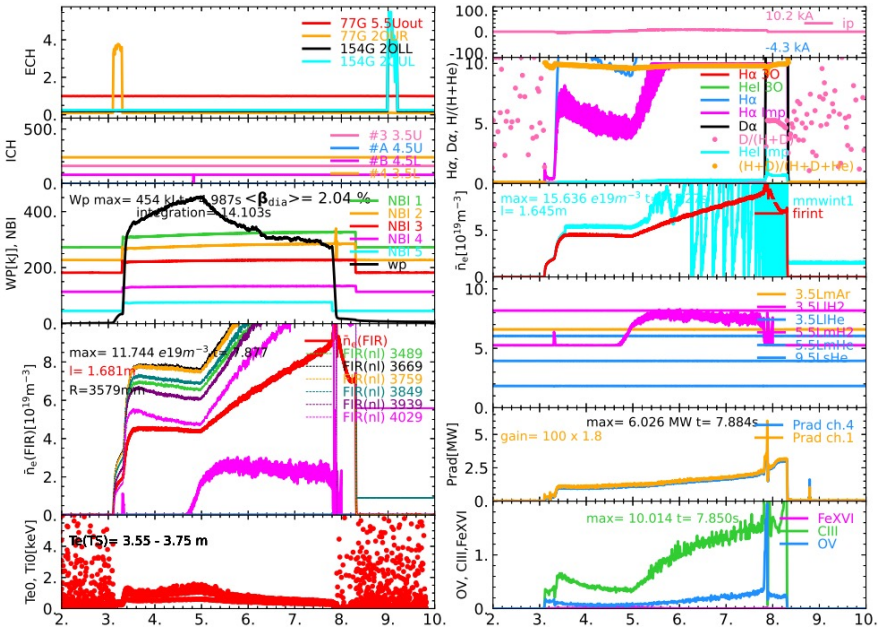
Motivation and method:

- In LHD, recently high sub divertor neutral pressure with volume recombined plasma has been observed in detached plasma with configuration R_{ax} = 3.55m (*U. Wenzel*).
- This proposal aims to interpret the impurity (Neon and IPD) transport behaviors and investigate beta effects on the volume recombination detachment.

Results:

- Power scanning with density ramp, neon puffing and IPD have been conducted.
- Data analysis is undergoing.

#200016,IPD



Exposure of material samples into the LHD edge plasma by means of the manipulator

C.P. Dhard, D. Naujoks (IPP), D. Hwangbo (U. Tsukuba), H. Tanaka (Nagoya U.), S. Masuzaki

Shot #: 200028-200063

(R_{ax}, B_t, γ, B_q) = (3.6 m, 2.75 T, 1.2538, 100.0%)

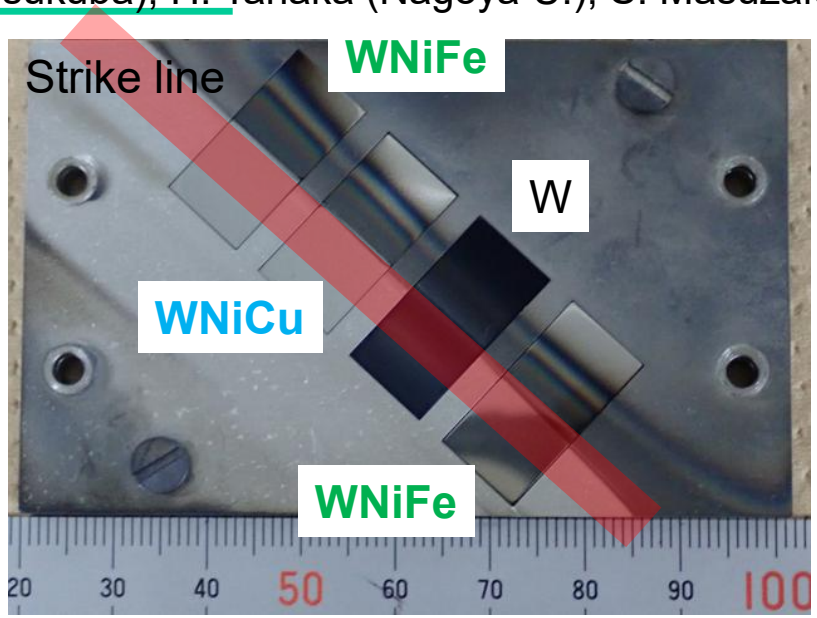
Working gas: H2, Heating: $P_{t\text{-}NBI}$ ~ 2 MW/BL (train-injection), P_{ECH} ~ 2 MW

Motivation

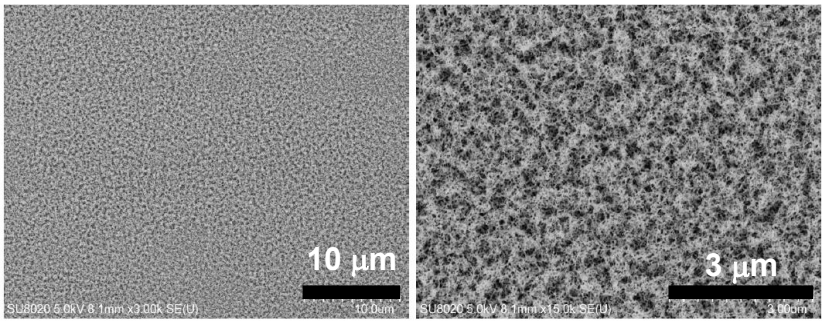
- Tungsten is appearing as a potential material for fusion reactor applications. However, because of its hardness and brittleness, it is not so easy to manufacture. W-alloys are being explored to overcome these problems.
- In this experiment, pure W and W-alloy samples with nanostructure, FUZZ, on their surface are exposed to the LHD divertor plasma to investigate the erosion of them.

Results

- Pure W and W alloy samples (W95%-Cu/Ni, W95%-Fe/Ni, W97%-Fe/Ni) with FUZZ (FUZZ like structure, produced in advance at U. Tsukuba) were exposed to divertor plasma using the manipulator at a 10.5L port.
- Total ~ 400s exposure was conducted.
- Line averaged density was kept to be ~ 3E19/m3.
- Surface analyses will be conducted as soon as possible.



Samples on the holder after plasma exposure



SEM images of the W sample before the exposure (D. Hwangbo)