

# (Special, MAP) Session Report



Date: Mar. 29, 2024

Time: 10:27 – 14:10

Shot#: 192126 – 192200 (75 shots)

Prior wall conditioning: None

Divertor pump: On

Gas puff: H<sub>2</sub>, Ar

Pellet: No

May. 30, 2024 (G. Motojima)

NBI#(1, 2, 3, 4, 5) = gas(H, H, H, H, H)=P(4.5, 3.1, 4.2, 4.0, 4.0) MW

ECH(77GHz) = ant(1.5-Uo, 5.5-U, 2-OUR)=P(0.689, 0.38, -) MW

ECH(154GHz) = ant(2-OLL, 2-OUL, 2-OLR)=P(-, 0.806, 0.982) MW

ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(-,-,-,-)MW

## Topics

1. Study of hydrogen molecular band emission (S. Brezinsek(FZJ), M. Goto)
2. Micro-trench measurement of incident ion angles and boron deposition at the divertor surface (S. Abe(PPPL), S. Masuzaki)

# Study of hydrogen molecular band emission in LHD: excited and ground state population as function of divertor conditions

S. Brezinsek, M. Goto

## Experimental conditions:

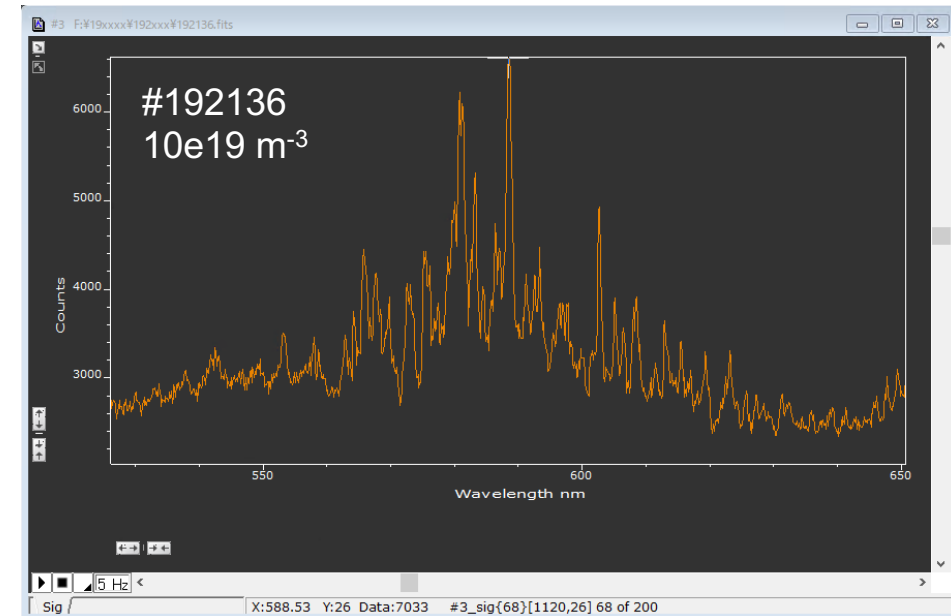
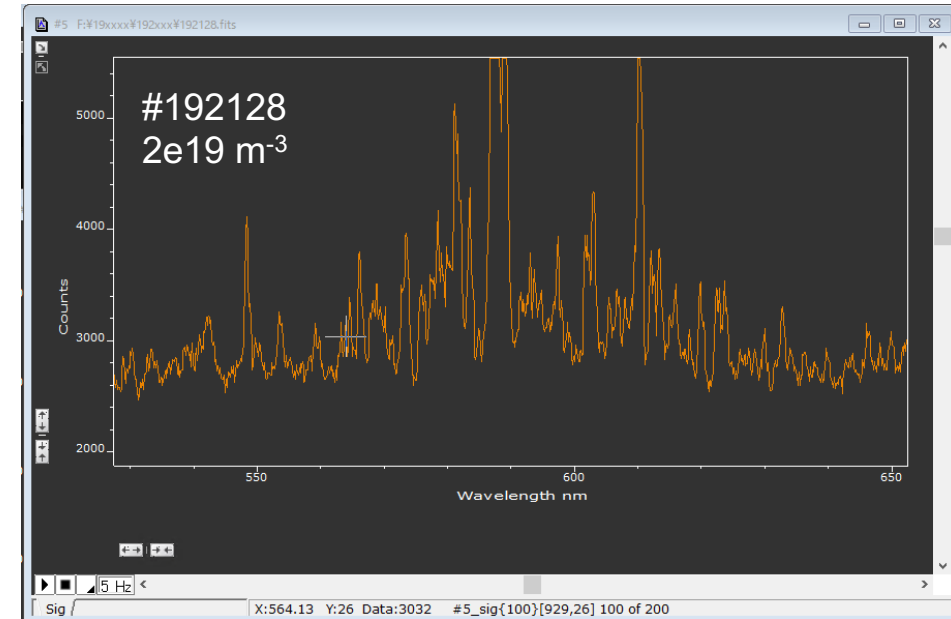
$(R_{ax}, \text{Polarity}, B_t, \gamma, B_q) = (3.6 \text{ m}, \text{CCW}, 2.75 \text{ T}, 1.2538, 100\%)$   
#192126 – #192166

## Motivation and method:

- Hydrogen molecule plays an important role in the divertor detachment through their rotational & vibrational states.
- We aim to construct database of the molecular spectra in various divertor plasma conditions.

## Results:

- NBI (total power) & density scans were conducted.
- $\text{H}_2$  spectrum showed clear change depending on the electron density.
- Some changes in the spatial distribution of line emissions in the divertor region were also observed.



# Micro-trench measurement of incident ion angles and boron deposition at the divertor surface

S. Abe (PPPL), S. Masuzaki

Shot #: 192170 – 192200 (sample exposure: 192177-192180)

$(R_{ax}, B_t, \gamma, B_q) = (3.6 \text{ m}, -2.75 \text{ T}, 1.2538, 100.0\%)$

Working gas: H<sub>2</sub>

$P_{ECH} \sim 3 \text{ MW}$ ,  $P_{t-NBI} \sim 4 \text{ MW/NB}$ ,  $P_{NBI-4} \sim 4 \text{ MW}$  (modulated)

## Objectives

- Measurements on the incident ion angle (IIA) for both polar and azimuthal directions of H and He ions at ITER-relevant magnetic-field incident angle,  $\alpha \sim 86^\circ$  (referenced to the surface normal).
- Measurements on boron gross deposition transported from the impurity powder dropper (IPD).

## Method

- The sample holder designed to have the Si crystal surface and Al-coated Si crystal surface at  $\alpha \sim 86^\circ$  is installed in LHD using the 4.5L manipulator. We expose two micro-trench fabricated Si crystals for each H and He shots.
- Surface analysis using SEM-EDS.

## Results

- Samples were exposed to He dominant plasmas with  $H/(He+H+D) > 90\%$ .
- Surface analysis of the samples will be conducted after retrieving them from the manipulator.

