

# (TG4) Plasma instability group report



Feb. 15, 2022 (R. Seki)

Date: Feb. 15, 2022

Time: 15:45 - 18:45

Shot#: 179010 –179054 ( 45 shots)

Prior wall conditioning: OFF

Divertor pump: On (w/o 2I and 8I)

Gas puff: H<sub>2</sub>, Pellet: No

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(4.5,2.0,4.1,3.9, 4.9)MW

ECH(56GHz)=ant(1.5-U)=P(0.0, 0.0)MW

ECH(77GHz)=ant(5.5-U, 2-OUR)=P(0.0, 0.0)MW

ECH(154GHz)=ant(2-OLL, 2-OUL, 2O-LR)=P(0, 0, 0)MW

ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0, 0, 0, 0)MW

Neutron yield integrated over experiment = (3.4E+10)

## Topics

1. Mode structure of MHD instability with collapse. (Y. Takemura)

# Mode structure of instability with collapse (Y. Takemura)

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Experimental conditions: ( $R_{ax}$ , Polarity,  $B_t$ ,  $\gamma$ ,  $B_q$ ) =  
(3.70/3.725/3.75/3.775 m, CCW, 0.6 T, 1.2538, 100%)

## Background and motivation:

- The collapse event due to the  $m/n=1/1$  MHD instability is observed in the low magnetic hill regime with the outward-shifted configuration.
- However, when  $R_{ax}$  is larger than 3.80 m, the collapse event does not occur. Line-averaged  $n_e$  fluctuation profile measured by CO<sub>2</sub> laser interferometer shows the peak value decreases with the increase of  $R_{ax}$ . This result suggests that internal mode structure is related to the onset mechanism of the instability with collapse.
- In order to clarify the relationship between local  $T_e/n_e$  fluctuation profile and the onset mechanism, the fast TS system with 1 kHz interval (30 ms) is used. Also, the event trigger based on the magnetic fluctuation amplitude and frequency is used because the timing of the collapse is not fixed.

## Results:

- In the different  $R_{ax}$  configuration, local fluctuation profile was obtained. In addition, the change of the fluctuation profile during the collapse was successfully obtained.

