



# (TG3) Spectroscopy group report

Date: Feb. 15, 2022

Feb. 15, 2022 (T. Kawate)

Time: 9:45 – 10:55

Shot#: 178906 – 178930 (25 shots)

Prior wall conditioning: No

Divertor pump: ON

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

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(3.2, 2.0, 4.2, -, -)MW

ECH(77GHz)=ant(5.5-U, 2-OUR)=P(0.703, 0.792)MW

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

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

Neutron yield integrated over the experiment =  $3.6 \times 10^{10}$

## Topics

1. Validation of density diagnostics by Mg lines (N. Kambara, I. Murakami, T. Kawate)

# Mg spectrum measurements by Mg pellet injection

Feb. 15, 2022  
N. Kambara



## Target intensity ratio:

$$\text{Mg VII } 280.74 \text{ \AA} / 278.41 \text{ \AA}$$

$$2s^2 2p^2 \text{ } ^1D_2 \text{ -- } 2s 2p^3 \text{ } ^1P_1 / 2s^2 2p^2 \text{ } ^3P_2 \text{ -- } 2s^2 2p^3 \text{ } ^3S_1$$

## Background & Objectives:

Intensity ratio of Mg VII line pairs are tools for the electron density diagnostics of solar atmosphere of temperature  $10^{5.8}$  K (Transition region). Electron density dependence of the line ratio is calculated with a collisional-radiative (CR) model. For the accurate electron density diagnostics, we need the experiment to evaluate the CR model.

## Experimental condition:

Mg pellet injection:  
#178910-178926  
Mg pellet injection at  $t=4.5$  s

## Result:

- Mg lines were clearly observed.
- Observed spectrum were similar to calculation result of CHIANTI v.9 (CR-model which are commonly used by solar physicists).

