

(TG3) Spectroscopy group report



Dec. 26, 2022 (T. Oishi)

Date: Dec. 23, 2022

Time: 9:45 –14:55

Shot#: 186990 – 187089 (100 shots)

Prior wall conditioning: NO

Divertor pump: OFF

Gas puff: H₂

Pellet: Fe (impurity pellet)

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(0, 2.2, 2.1, 0, 0)MW

ECH(77GHz)=ant(5.5-U, 2-OUR)=P(0.703, 0)MW

ECH(154GHz)=ant(2-OLL, 2-OUL, 2-OLR)=P(0.723, 0.799, 0.825)MW

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

Neutron yield integrated over the experiment = 3.5×10^{13}

Topics

1. An effect of RMP island on density buildup phenomena triggered by heating power reduction (S. Morita)

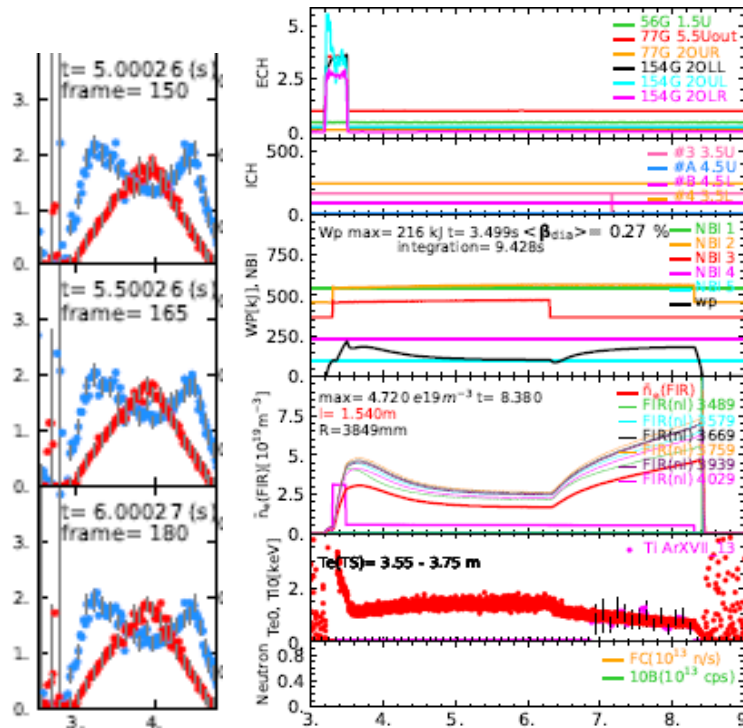
Effect of RMP field on bulk particle transport (I)

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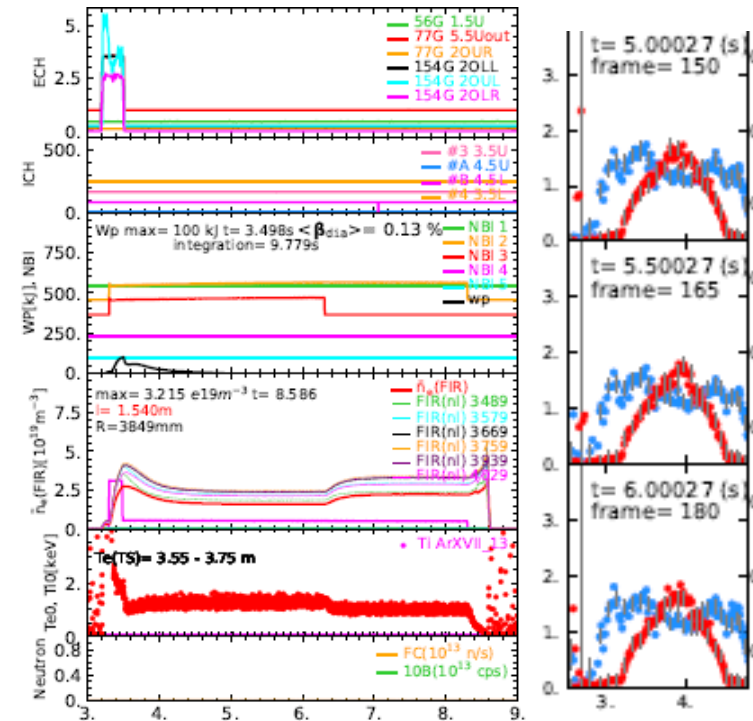
Gas puff: H₂ NBI#(2, 3)=gas(H, H), P_{NBI#2}=2.2MW, P_{NBI#3}=2.1MW, ECH

- Effect of RMP field on the bulk particle transport was examined at R_{ax}=3.75m and 3.85m configurations in NBI discharges.
- Density increase after turning off NBI#3 was suppressed by applying the RMP field with n/m=1/1 mode.

#187066: w/o RMP



#187067: with RMP
(7-O expansion at 3300A)



Effect of RMP field on bulk particle transport (II)

- After turning off NBI#3 the ionization front moves inside because edge T_e decreases. Connection lengths of open magnetic fields where the ionization front locates becomes longer. Source term distribution of bulk particles becomes three-dimensionally uniform. The edge τ_p then improves with lower edge T_e (see left figure below).
- Improved τ_p increases bulk particle influx entering the core plasma region. Resultantly, electron density increases after turning off NBI#3.
- RMP field suppresses impurity influx.
(see right figure below; PradX: radiation at $E \geq 0.5 \text{keV}$ ($\lambda \leq 24 \text{\AA}$)).
- From the present experiment we understand RMP field with $m/n=1/1$ mode located inside LCFS can suppress the bulk particle influx as well as impurity influx.

