

(TG1) Multi-ion group report



Date: Oct. 12, 2022

Oct. 13, 2022 (G. Motojima)

Time: 16:33-18:43

Shot#: 180273-180303 (31shots)

Prior wall conditioning: YES

Divertor pump: YES (except for 2I)

Gas puff: H₂

H pellet: NO

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

ECH(77 GHz) = ant(5.5-Uout, 2-OUR) = P(703,792) kW

ECH(154 GHz) = ant(2-OLL, 2-OUL, 2-OLR) = P(723,799,825) kW

ECH(56 GHz) = ant(1.5U) = P(-) kW

ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(0.26,0.31,0.13,0.13) MW

Neutron yield integrated over the experiment = 4.4×10^{12} (TG1)

Topics

1. Research of ICRF antenna property by the power modulation in LHD
(D. Du (U. South China), K. Saito+)

Research of ICRF antenna property by the power modulation in LHD

● Shot No:180273-180303

D. Du, K. Saito, J. Kwak, T. Seki, H. Kasahara, R. Seki

● Experiment conditions:

(R_{ax} , B_t , Y , B_q , Polarity)=(3.6m, 1T and 2.75T, 1.2538, 100%, CCW), Working gas: H_2 , $n_e=1\sim 5\times 10^{19} m^{-3}$, Heating system:ICRH(3.5U, 3.5L, 4.5U, 4.5L), ECH (0.3s for start-up), NBI(#1, #2)

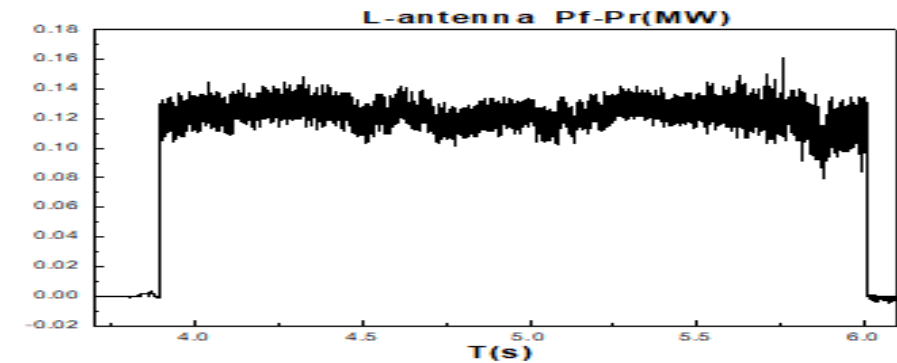
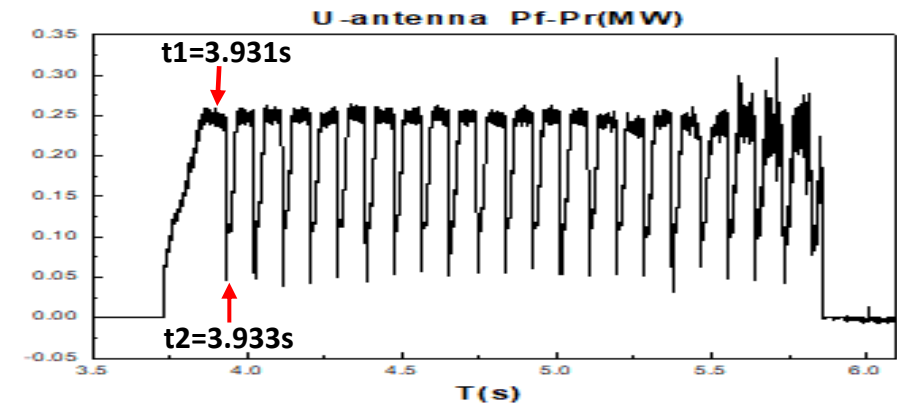
● Experiment purpose:

- 1) Comparing the S matrix (antenna property) of ICRF antenna system with COMSOL simulation
- 2) Designing load resilient system for generalized conjugate-T by S matrix we measure the S matrix with real plasma.

● Experiment results:

- 1) Changing the power of HAS and FAIT antennas within 300KW and measuring the forward and reflected waves with directional couplers in various times, we got S matrix in various densities and two magnetic field strengths.
- 2) Phase scan with fixed ICRF power also conducted to get S matrix.

#180297($B_t=1T$, $n_e=5\times 10^{19} m^{-3}$)



$$S(t \approx 3.9s) = \begin{pmatrix} -0.25252 - 0.23989i & -0.15007 - 0.01810i \\ -0.11244 + 0.06679i & -0.54554 + 0.01334i \end{pmatrix}$$