

Dec. 7, 2021 (N. Kenmochi)

Date: Dec. 3, 2021 Time: 9:40 - 12:20 Shot#: 174145 – 174194 (50 shots) Prior wall conditioning: No Divertor pump: On except for 2-I Gas puff: D2, Pellet: No NBI#(1, 2, 3, 4, 5)=gas(D, D, D, D, D)=P(2.2, 2.0, 2.1, 8.1, 8.2)MW ECH(77GHz)=ant(5.5-Uout (or 1.5U), 2-OUR)=P(0, 0)MW ECH(154GHz)=ant(2-OLL, 2-OUL, 2-OLR)=P(0, 0, 0)MW ECH(56GHz)=ant(1.5U)=P(0.29)MW ICH(3.5U, 3.5L, 4.5U, 4.5L)=P(0, 0, 0, 0)MW Neutron yield integrated over experiment = 4.2×10^{15}

Topics Investigation of topological bifurcation(Y. Suzuki)

TG4: Study of topological bifurcation Y. Suzuki (Hiroshima Univ.)

- Study of island dynamics in RMP screening or amplification.
- Internal current density, **j**, distribution is a key.
- For LHD, direct measurement of *j* is difficult.
 Instead of direct measurement of *j*, we measure by the potential, Φ, by HIBP, because

 $\frac{\partial \tilde{B}}{\partial t} = \nabla \times \tilde{E} = \nabla \times \nabla \tilde{\Phi}$

- For the standard configuration, HIBP cannot cover the plasma edge region, that is, 1/1 rational surface cannot be measured.
- Thus, HIBP measurement is tried for the low- γ configuration of $\gamma=1.13$



Configuration:

- $R_{ax} = 3.6$ m, B = 1T (CW), $\gamma = 1.13$, D plasma Results:
- The density scan was conducted.
- For medium-beta cases, the island was amplified. But, for low-beta case, the magnetic island was healed.

Difference of two saddle loops (@-105 deg.) at 2-0 and 7-0



TG4: Investigate topological bifurcation --- potential measurement by HIBP M. Nishiura, A. Shimizu, T. Ido (Kyushu Univ.)



- LHD was operated at Rax = 3.6 m and Bt = 1 T. This condition should operate the HIBP at a low beam energy 0.844MeV for Au⁺. (We could not obtain a sufficient beam current at 2.64MeV for Cu⁺.)
- This low energy beam was the first trial for HIBP that consumed time for the beam setting.
- The potential profile was obtained in the case of LID off (without a magnetic island).



Figure. Potential profile at Rax = 3.6 m Bt = 1.0 T.