

(SG3) Instability & Anisotropy group report



Date: Mar. 20, 2024

Mar. 21, 2024 (T. Kawate)

Time: 12:30 – 14:15

Shot#: 187809 – 187845 (37 shots)

Prior wall conditioning: No

Divertor pump: No

Gas puff: H₂,

Pellet: H₂ pellet

NBI#(1, 2, 3, 4, 5)=gas(H, H, H, H, H)=P(4.0, 3.5, 4.2, -, -)MW

ECH(77GHz)=ant(5.5-U, 2-OUR)=P(0.698, 0.380)MW

ECH(154GHz)=ant(2-OLL, 2-OUL, 2-OLR)=P(0.477, 0.580, -)MW

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

Topics

1. Study of interactions of energetic ions with stable or weakly unstable Alfvén eigenmodes in high density LHD plasmas produced by ice pellet (K. Toi)

Transition process of destabilization of stable Alfvén eigenmodes excited by pressure perturbations in electron cyclotron wave heated plasmas of LHD (K. Toi)



➤ Background and objective

- The objectives of this study are to investigate

- (1) possibility of excitation of stable AE like modes by ice pellet injection in an ECH plasma w/o energetic ions and electrons, and
- (2) transition processes of AEs from a stable state to a highly unstable state with fast ions.

➤ Experimental conditions

(Bt, polarity, Rax, g, Bq)=(2.75 T, CCW, 3.6 m, 1.2538, 100%)

➤ Results

- (1) Observation of AE like modes of $f \sim 250$ kHz excited by ice pellet injection in high density ECH plasmas.
- (2) Co passing energetic ions destabilize the AE like modes in the range of $f \sim 250 - 300$ kHz together with the TAE like modes of $f \sim 50 - 100$ kHz having frequency chirping.
- (3) The 1st pellet deposition position is around $\rho \sim 0.6$. The 2nd pellet deposition is inferred to be slightly interior ($\rho \sim 0.5$).
- (4) AE like mode of $f \sim 200-300$ kHz will exist in peripheral region. The modes of $f \sim 50-100$ kHz will be TAEs destabilized in more core region..

