

Passing fast ion transport induced by fishbone on the HL-2A

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A newly developed beam emission spectroscopy (BES) diagnostic system has been installed on HL-2A tokamak. Initial 48 channels has been deployed and high spatial ($\Delta r \leq 1$ cm, $\Delta z \leq 1.5$ cm) and temporal ($\Delta t = 0.5$ μ s) have been achieved. In last campaign, the second neutral beam line has been installed on HL-2A tokamak, providing an opportunity to utilize BES system to study the energetic particle transport on edge region during core plasma instabilities, based on the measurement of passive fast-ion D-alpha (FIDA) signal. Passive FIDA signal means the radiation emitted by charge exchange (CX) between the beam ions and the background neutrals. The BES response suggests that the fishbones (~ 20 kHz) in the core region induce the transport of passing fast ions with full energy (~ 40 keV) to the edge region. FIDASIM prediction confirms that the reliability of BES measurement. We will carry out the particle tracing code to study the effect of fishbone on fast ion transport in numerical and the comparison between the theoretical and the experimental results.

Country or International Organization

China

Primary author: Dr HAO, G.Z. (Southwestern Institute of Physics)

Co-authors: Dr KE, R.; Prof. HEIDBRINK, W.W.; Dr MCKEE, G.R.; Prof. XU, M.; Prof. GAO, Q.D.; Mrs MIAO, Y.T.

Presenter: Dr HAO, G.Z. (Southwestern Institute of Physics)

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