

Experimental observations of ITG and TEM instabilities on J-TEXT tokamak

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Recently, two different quasi-coherent (QC) density fluctuations have been measured by the newly developed far-forward collective scattering measurements on J-TEXT tokamak Ohmic plasmas. The two QC instabilities have characteristic frequencies in the range of 30 – 100kHz (low-frequency) and 150 – 250kHz (high-frequency) respectively. And the corresponding characteristic normalized wavenumber is estimated to be in the range of $k_{\theta}\rho_s < 0.1$ and $0.15 < k_{\theta}\rho_s < 0.3$ respectively. Furthermore, the propagation directions in plasma frame for the low-frequency (LF) and high-frequency (HF) QC instabilities are identified to be ion and electron diamagnetic direction respectively. Considering the features of the two QC modes and the discharge conditions on J-TEXT, the LF and HF QC modes are predicted to be the ion-temperature-gradient (ITG) driven instability and the trapped electron mode (TEM) respectively. In addition, the variations of ITG and TEM modes during density ramp-up have been investigated. More details will be showed in the poster.