Dynamics of cold pulses induced by super-sonic molecular beam injection in the EAST tokamak

Evolution of electron temperature, electron density and its fluctuation with high spatial and temporal resolutions are presented for the cold pulse propagation induced by super-sonic molecular beam injection (SMBI) in ohmic plasmas in the EAST tokamak. The non-local heat transport occurs for discharges with plasma current $I_p = 450$ kA ($q_{95} \sim 5.55$), and electron density $n_{e0}$ below a critical value of $(1.35 \pm 0.25) \times 10^{19} \text{ m}^{-3}$. In contrary to the response of core electron temperature and electron density (roughly 10ms after SMBI), the electron density fluctuation in the plasma core increases promptly after SMBI and reaches its maximum around 15 ms after SMBI. The electron density fluctuation in the plasma core begins to decrease before the core electron temperature reaches its maximum (roughly 30ms). It was also observed that the turbulence perpendicular velocity close to the inversion point of the temperature perturbation changes sign after SMBI.

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