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P5.1090 Studies of poloidal rotation of plasma density turbulence with HIBP in the T-10 tokamak

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An ExB drift poloidal rotation is now considered as an effective mechanism to suppress the plasma instabilities [1]. So, the direct radial electric field Er studies are important ingredient for understanding the role of E_r x B_t shear poloidal rotation in the turbulence suppression. In the -10 tokamak, the mean values of E_r were retrieved via plasma electric potential measured by heavy ion beam probe (HIBP) [2]. On top of that, recent advances in the T-10 HIBP allows us to measure simultaneously the plasma potential and density fluctuations within the frequency domain up to 250 kHz in 5 poloidally shifted sample volumes with the 5-slits energy analyser [3] in the plasma core (0.07 m < r < 0.2 m). Cross-phase θ_ij between density fluctuations in two sample volumes poloidally shifted at Δx_ij, each observed by corresponding analyzer entrance slits with numbers i and j, gives the information on the poloidal turbulence rotation velocity: V_turb =Δxij·2πf/θij, i, j = 1-5, ixj [4]. The ohmic plasmas with m, B_t = 2.2 T, I_pl = 230 kA, n_e = 1x1019 m -3 were studied. For the stochastic low-frequency fluctuations (SLF) [5] with f_SLF =0-30 kHz, V_SLF ~ 2.5-3 km/s is directed towards the ion diamagnetic drift. For the low-frequency quasi-coherent fluctuations (LFQC) [6], f_LFQC =50200 kHz, V_LFQC ~ -10-15 km/s is directed towards the electron diamagnetic drift. It has been shown that E_r = - 60 V/cm, so E_r X B_t rotation velocity V_ExB equals to ~ -3 km/s and directed to the electron diamagnetic drift. The effect of EC heating on the ExB and turbulence rotation will be also presented.

References
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Presenter: MELNIKOV, A.V. (EPS 2019)

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