



UA0500890

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INVESTIGATION OF THE SPECIFIC PLASMA POTENTIAL OSCILLATIONS BY HEAVY ION BEAM PROBING IN T-10

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Investigations of the specific oscillations with frequencies 15-30 kHz on the T-10 tokamak ($R = 150$ cm, $a = 30$ cm) with Heavy Ion Beam Probe (HIBP) diagnostics was started in [1]. In this paper we report the extended studies in regimes with ECR plasma heating ($B_0 = 2.33$ T, $I_{pl} = 220$ kA).

Previous experiments in the regimes with Ohmic heating [1] have shown that 20 kHz modes are mainly the potential fluctuations. These oscillations exist on the signals of HIBP, Langmuir probes and reflectometry. They should cause the fluctuations of the poloidal rotation, i.e. the torsional oscillations of the plasma with $m=0$, called as the zonal flows.

Evolution of the "20 kHz" mode on the plasma potential in regimes with off-axis ECRH (power deposition zone ~ 12 cm) is presented in this report. HIBP sample volume was localized out the ECRH region in the area $r = 25$ cm. Increase of the frequency is observed when ECRH turns on. This frequency change is linked with change of the electron temperature, measured by 2nd harmonic of EC at the nearest chord (24 cm). Data analysis has shown that frequency of the "20 kHz" mode is proportional to square root of the local T_e (Fig.1). This dependency allows us to suppose these oscillations to be linked with Geodisic Acoustic Mode [1, 2] which is characterized by such dependency

$$v_{GAM} \sim \frac{c_s}{R} \sim \sqrt{T_e}$$

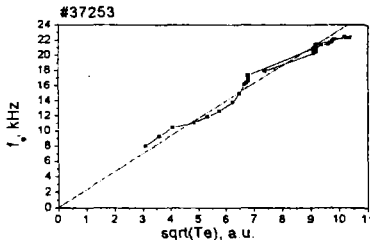


Fig.1

This work was supported by Minatom RF, RFBR grants 02-02-17727, Scientific School-1608.2003.2, INTAS 2001-2056, NWO-RFBR 047.016.015.

[1] A.V.Melnikov, V.A.Vershkov et al, EPS-30, St.Petersburg, Russia, ECA Vol. 27A, P-3.114

[2] G.R.McKee et al, EPS-30, St.Petersburg, Russia, I-5.6 (P-4.238)