



IAEA FEC 2014

Contribution ID: 481

Type: Poster

Study of ITB Formation, Electron Heat and Density Flux Structure in New ECRH/ECCD Experiments at T-10 Tokamak

Tuesday 14 October 2014 08:30 (4 hours)

In the present report, we focus at the analysis of four transport processes in T-10. First, we analyze inward electron heat pulse propagation (HPP) created by switch-on of additional off-axis ECRH on a sawteeth-free background sustained by off-axis ECRH. The presence of slow and diffusive inward HPP with “dynamic” $hi-e$ value close to power balance value shows that the so-called “heat pinch” is either absent or very small. Second, analysis of sawtooth density oscillations in the regimes with central ECRH and in the experiments with ECCD current drive to damp the sawteeth oscillations (PECRH < 0.7 MW), shows that the electron pinch velocity value is close to the neoclassical one in the plasma centre. Under PECRH $> \sim 1.5$ MW, ne profiles become hollow (or fully flat within the errorbars) at $r/a < 0.5$ and we observe sawteeth density oscillations with inverted phase (rise at $r = \pm 4$ cm and decay at $r = \pm 12$ cm). The decay of ne in the centre between the crashes is explained by the presence of the outward electron convective velocity with $V_p \approx 0.3$ m/s at $r/a = 0.35$. Third, a set of experiments with programmed plasma motion allows us to analyze fine detail of Te profile with ECE measurements. No signs of clear ITB at the $q=1$ surface have been observed so far (PECRH up to 0.9 MW). In several shots, the existence of a narrow ITB with a 0.5 cm width and a doubled Te gradient can be suggested within the errorbars. Finally, a new type of ITB created by sawteeth oscillations almost damped by off-axis ECCD has been found. A sawteeth crash causes the rise of Te outside r_s and heat pulse does not propagate outside during 15 ms. The value of χ_e becomes 2.5 times lower compared with the L-mode scaling. The experiments with various values of current generation and reflectometer measurements are under the way.

Country or International Organisation

Russian Federation

Paper Number

EX/P1-43

Author: Dr NEUDATCHIN, Sergey (IFT, NRC Kurchatov Institute)

Co-authors: Dr BORSHEGOVSKII, Aleksandr (IFT, NRC Kurchatov Institute); Mr SERGEEV, Dmitrii (IFT, NRC Kurchatov Institute, Russia); Dr SHELUKHIN, Dmitrii (IFT, NRC Kurchatov Institute, Russia); Mr MUSTAFIN, Nikita (IFT, NRC Kurchatov Institute); Dr MALTZEV, Sergey (IFT, NRC Kurchatov Institute); Dr MUALTON, Tatyana (IFT, NRC Kurchatov Institute)

Presenter: Dr NEUDATCHIN, Sergey (IFT, NRC Kurchatov Institute)

Session Classification: Poster 1