some features of Transport at Powerful ECRH on Т-10 Tokamak [[1]](#footnote-1)\*)

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A new type of L-H transitions, called "semi-global", has recently been discovered in T-10 plasma with a tungsten limiter, lithium coating and Rec = 1.5 MW [1]. Some transport processes depend on the value of EC-power in an almost threshold way. In [2] it is shown that at high specific ECRH power per electron (P\*> 10-13 W inside the surface q=1 (with purely perpendicular power input and heating at the 1st harmonic of the ECR), sawtooth oscillations become "saturated". That is, after a short-term stage of a strong temperature increase in the central part of the cord, the growth simply stops. This can be interpreted as a jump in thermal conductivity inside the surface q = 1. Apparently, the same thing happens with perpendicular power input and heating at the 2-nd harmonic of the ECR, although the data analysis is not finished at the moment. At the qualitative level, the deviation of the distribution function from the Maxwellian one depends on the value of P\*. Even in a burning ITER, the value of P\* does not reach the above value of 10-13 watts per electron.

With non-perpendicular input of EC waves, a current is generated, which can affect sawtooth oscillations [3-5]. The analysis of density transport between sawtooth oscillations was previously investigated only in one ohmic mode T-10 [6] and the rise of the density in the central part of plasma column was explained by the presence of the neoclassical electron pinching velocity Vp neo (directed inward). Analysis of density transport between sawtooth oscillations [7] showed that both with central ECRH and ECR current generation (PECRH <0.7 MW), the rate of particles pinch velocity Vp in the central part of the plasmas is close to neoclassical. With high EC heating power Vp changes sign (directed outward) and several times exceeds the value of Vp neo in absolute magnitude. This directly confirms the existence of non-monotonic density profiles at high EC power, which has been discussed by the T-10 team since the mid-80s (the plane or non-monotonicity of the profile lies within the errors of solving the inverse problem for interferometer signals). The analysis of density transport between sawtooth oscillations, given in this report, shows an almost threshold dependence on the EC-power of the appearance of sawtooth oscillations with the reverse phase (removal of particles from the center between sawtooth oscillations). The value of P\* is close to the above value (more pulses are being analyzed at the moment). With a further increase in power, the absolute value of Vp (directed outward) increases. The author is grateful to N. A. Kirneva for useful discussions.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Mu/ru/AC-Neudachin.docx) [↑](#footnote-ref-1)