Comparative transport simulation of the ECRH plasmas in the TJ-II stellarator and T-10 tokamak [[1]](#footnote-1)\*)

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The concept of the equivalent discharges of a tokamak and a stellarator, having the same temperatures of electrons and ions introduced in [1] for the same fully absorbed ECRH (electron-cyclotron resonance heating) power is extended in the present paper to the case of partial absorption of ECRH-power. The conditions of discharges equivalence for this case are formulated. The examples of equivalent experimental discharges of the TJ-II stellarator and simulated discharges of the T-10 tokamak, are considered for partial ECRH-power absorption and the value of the absorbed power is determined. It is shown that the electron temperatures and absorbed power in the equivalent discharges are the same. The absorbed ECRH power and energy confinement time are found for series of TJ-II low-density shots with pure ECRH.

Figure 1 shows the dependence of the absorption efficiency  = *Q*ab/*Q*EC, where *Q*ab and *Q*EC are absorbed and input power in T-10 and TJ-II as a function of the ratio of density *n* to the main magnetic field *B*, which allows us to reduce the T-10 data (solid line and squares, field *B* = 2.5 T) to TJ-II (*B* = 1 T). The thin dash-dotted line shows the efficiency calculations in TJ-II using the formulas derived in [1], the thick dashed line shows the new formulas. We see that the calculations are in a good agreement with the experiments.

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| fig_zv.tif | Fig. 1. Dependence of the efficiency of ECR heating on the reduced density in the T-10 tokamak (solid line) and TJ-II stellarator. Points show experiments, thin dash-dotted line is calculations for TJ-II by the formulas from [1], thick dashed line is calculations by new formulas.  |

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References

1. Dnestrovskij Yu.N., et al. Plasma Phys. Control. Fusion 2020, 63 (2021) 055012.
1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Mu/ru/AB-Dnestrovskii.docx) [↑](#footnote-ref-1)