ANALYSIS OF THE EFFICIENCY of the EC PLASMA HEATING AT A FREQUENCY OF 140 GHz IN THE T-15MD TOKAMAK [[1]](#footnote-1)\*)

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Electron cyclotron (EC) resonant heating (ECRH) and current drive (ECCD) are considered as effective methods for auxiliary plasma heating and non-inductive current drive in T-15MD tokamak [1]. In a series of works, studies were carried out to determine optimal parameters of ECH/ECCD system in T-15MD tokamak (determination of the operating frequency of the gyrotron waves, selection of injection schemes, optimization of the heating and current drive efficiency): search for optimal parameters of injection angles for heating and current drive using the extraordinary waves at the first and second harmonic, ECRH X1, X2 @ 56/112 GHz [2], substantiation of the choice of the operating frequency of the ECRH system using the waves X2 @ 82,6 GHz and waves X2, X3 @ ~102—110 GHz [3], study of the possibility of using the X3 wave @ 140 ГГц in Т-15MD [4].

Optimization of the ECRH/ECCD system parameters requires performing fast calculations of the efficiency of EC heating and current drive (cf. [5] for ITER) either using the raytracing codes (e.g., GENRAY [6], TORAY [7], TORBEAM [8]) and the Fokker-Plank (FP) codes for determination of the electron velocity distribution function (e.g., CQL3D code [9]) or using codes that combine the simulation of Gaussian beam propagation with the solution of the FP equation (e.g., OGRAY
code [10]).

In this work, we use the GENRAY code [6] to analyze the absorption efficiency of EC heating in T-15MD tokamak, since it allows one to perform calculations for various models of the dispersion function, which determines the propagation of EM waves in plasma, and for various models of the wave absorption coefficient of EC waves in plasma. The results of simulation of ECRH in the T-15MD tokamak at a frequency of 140 GHz using the GENRAY code are compared with similar results obtained using the OGRAY code in [4].

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