DOI: 10.34854/ICPAF.51.2024.1.1.090

NUMERICAL SIMULATION OF LOWER HYBRID CURRENT DRIVE EXPIREMENTS DATA AT THE GLOBUS-M2 AND FT-2 TOKAMAKS [*)]

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This paper presents a comparison of the results of numerical simulation of lower hybrid current drive generation and experimental data obtained on the Globus-M2 and FT-2 tokamaks using the updated numerical code FRTC[1,2], incorporated into the ASTRA code[3].

To calculate the starting spectrum of the refractive index of an electromagnetic wave launched into plasma, taking into account the geometry of the antenna and plasma parameters in the tokamak, the numerical code Grill3D is used [4]. The calculated spectrum is two-dimensional, that is, it contains poloidal and toroidal components of the refractive index. In an earlier version of the numerical code FRTC, the two-dimensional spectrum of starting decelerations was integrated in the direction perpendicular to the specified direction of orientation of the antenna in the experimental discharge. Thus, the beams were launched with only one mode, toroidal or poloidal. Such a simplification is permissible in the case of a classical tokamak, where the poloidal field is weak and the direction of the total magnetic field practically coincides with the toroidal direction. In a spherical tokamak, for example, Globus-M2, the magnetic field is directed at an angle to the toroidal direction, and both components of the field, toroidal and poloidal, must be taken into account for wave damping calculating.

In this paper, a new two-dimensional approach to accounting for the spectrum of starting decelerations of lower hybrid waves is used for serial modeling of current drive generation based on experimental data from the Globus-M2 tokamak. Calculations were carried out for two groups of experiments, with toroidal and poloidal grill orientation. The results of modeling current drive generation based on experimental data for the FT-2 tokamak are also presented. The calculation results are compared with experimental data. It was shown that the model demonstrates a stable result for various parameters of the plasma discharge, which corresponds well with the measured values.

The modernization of the numerical code was carried out with the support of State Task No. 0034-2021-0002, calculations for tokamaks were carried out with the support of State Task No. 0040-2019-0023.

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