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RECONSTRACTION OF THE PLASMA BOUNDARY FROM EXPERIMENTAL MEASUREMENTS OF THE T-15MD TOKAMAK *)

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To obtain the required plasma configurations with the required elongation and in a given location, it is necessary to be able to determine the boundary of the plasma column with good accuracy. Solving this problem is also necessary for effective control of the plasma during the discharge and prediction of the next pulses.

The goal of this work is to reconstruct the plasma boundary from experimental measurements of the T-15MD tokamak based on solving inverse problems [1], i.e. show the possibility of the realization this task based on the available electromagnetic diagnostics and measurements taken on the tokamak. To solve the inverse problem, the following experimental information was used, namely the measured voltage by poloidal flux loops, as well as currents in the poloidal coils and plasma current.

Note that when solving the inverse problem [1], information about the flux and magnetic field is used, so it was necessary to integrate the measured signals, which were carried out numerically. For the test example, a comparison was made between the results of numerical integration and the result obtained using an analog integrator, which showed their good agreement. This made it possible to use numerical integration of the experimentally measured voltage for all poloidal flux loops.

At the next stage, a comparison was made of the equilibrium calculated by the TOKAMEQ code [2] for one of the discharge moments and obtained from the solution of the inverse problem [1]. Good agreement of the reconstructed equilibrium was shown, which made it possible to proceed to the processing of experimental signals obtained during the last campaign on the T-15MD tokamak.

Processing of experimental data showed the possibility of reconstructing the boundary of the plasma column from experimental poloidal flux loops for the existing configuration of electromagnetic diagnostics. Several plasma equilibria were reconstructed for the T-15MD tokamak.

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