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EXPERIMENTAL DETERMINATION OF THE EFFECT OF FERROMAGNETIC STRUCTURES ON THE MAGNETIC FIELD CONFIGURATION OF THE MAIN SOLENOIDS IN THE GYROTRON HALL OF THE TOKAMAK T-15MD *)

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It is planned to place eight gyrotrons with a total capacity of 8 MW at the Tokamak T-15MD installation. The parameters of the operating mode and operating conditions of gyrotrons are determined by the manufacturer of gyrotrons, CJSC NPP GIKOM [1].

In accordance with this, in particular, the value of the radial component of the magnetic field above 5 Gs near the collector wall together with any other significant destruction of solenoids magnetic fields topology leads to a violation of the normal operation of the device. A spent electron beam reaching the collector wall in an altered magnetic field can lead to an increase in the local power density and the device's failure.

Three factors or their combined effect can be the reason of a violation of the magnetic field configuration:

1) the magnetic field created by the poloidal coils and the central solenoid (CC) on the tokamak T-15M D installation [2];
2) magnetic fields created by cryomagnets of neighboring gyrotrons [2];
3) ferromagnetic structures located in the T-15MD gyrotron hall.

In this paper, the influence of steel profiles installed near the gyrotron cryomagnet is investigated. To estimate the initial coordinate of the beam output on the gyrotron collector under the action of a distorted field, a special device simulating the operation of a gyrotron is used. The luminophore coating on the inner wall of the collector of the described device allows to visualize the location of the beam position, which can be used to judge the distortion of the magnetic field.

At this stage, the influence of nearby ferromagnetic structures on the configuration of the magnetic field near the collector of some stands has been simulated.

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References

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