STATUS of TOKAMAK T-15MD

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At the present time, the preparation to physical start-up of tokamak T-15MD is completed in the National Research Center “Kurchatov Institute”. The main parameters of T-15MD are: R=1.48 m, a=0.67 m, B=2.0 T, Ipl= 2.0 MA. Tokamak T-15MD is a compact installation with a divertor that has no analogues in the world in terms of parameters: a toroidal field of 2 T with an aspect ratio of 2.2 [1]. The magnet system is capable to maintain without overheating (more 60 °C) the plasma current at range of 2 MA÷250 kA for 4÷400 s [2]. Plasma current drive can be maintained either by injection of fast neutrals or by electromagnetic waves.

In 2020, the reconstruction of substation No. 745 (110/10 kV) and two substations of 10/1 kV was completed. 24 new transformers of various capacities have been installed to ensure the operation of the tokamak with a pulse load of up to 300 MVA. Twenty new thyristor converters, manufactured in the Czech Republic, for the power supply systems of the toroidal field winding and the three-section inductor, were installed in the regular place and tested for equivalent load. The accuracy of the installation of toroidal field coils and the efficiency of poloidal coils were measured using an electron beam in argon at toroidal magnetic field values in the range of 300÷500 G. Preliminary tests of the systems of ohmic baking of the vacuum chamber and glow discharge were carried out. The operation of technological equipment of high-vacuum pumping systems, power supply of baking and glow discharge systems during conditioning of the vacuum chamber was carried out by control system.

Experiments to obtain and study the plasma regimes will be started in mid-2021. To facilitate the breakdown, a gyrotron with a frequency of 82.6 GHz (second harmonic for a magnetic field of 1.5 T) will be used. Plasma studies will be carried out using a contemporary diagnostic complex.
In 2022-2024, the installation will be equipped with a systems for additional plasma heating and current drive in quasi-stationary discharges with a pulse duration of up to hundreds of seconds at a power input level of at least 15 MW.

References

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