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MEPHIST TOKAMAK: CURRENT STATUS OF THE PROJECT ^{*)}

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MEPhIST Tokamak is an educational and research university tokamak, the main task of which is to provide access to the installation and involve students in working on it, starting from the early years of their education. Tokamak's scientific agenda includes developing and small scale testing of the diagnostics for large installations, studying plasma-surface interactions, and the initial stages of discharge development. Due to the educational focus of the installation, much attention is paid to the automation of the installation, data collection and processing systems, providing remote access and control of the installation.

In 2024, the diagnostic complex of the installation was significantly expanded – loop voltage loops number was increased to a total of 15, the number of magnetic probes (Mirnov coils) was increased from 4 to 16, which allows for the restoration of magnetic surfaces during discharge. A microwave interferometer, and a movable triple electric probe, has been launched.

A discharge time of more than 3 ms has been achieved, and the discharge current at least 6 kA. The plasma density is estimated as $\sim 5 \times 10^{18} \text{ m}^{-3}$. The electron temperature in the near wall region is $\sim 40\text{-}50 \text{ eV}$. There is a good repeatability of the received discharge parameters, the basic discharge scenario is defined within the current engineering limitations of the installation. In 2024, more than 1,000 successful pulses were produced. The average amount of main plasma shots per work day in 2024 – 7.

Three laboratory works for undergraduate and graduate students using tokamak have been introduced into the curriculum. The technical possibility of remote laboratory works for students of other universities, including foreign ones, has been implemented.

Work has begun on the Tokamak MEPhIST-1 project. A 3D scan of the discharge chamber was performed, induced currents arising in it under external electromagnetic influence were evaluated..

^{*)} [abstracts of this report in Russian](#)