Kazakhstani material testing tokamak. main research directions [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2023.50.2023.1.1.090

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The KTM tokamak is a specialized facility designed to study structural and functional materials, elements and units of future fusion facilities, as well as to study plasma physics. The main features of this tokamak are the aspect ratio equal to 2, which is the boundary region between spherical and classical tokamaks; the presence of a transport-slice and a movable divertor devices, allowing the replacement of the samples of divertor plates without vacuum loss in the vacuum chamber. The basic parameters of the KTM plasma are: plasma current of 750 kA, divertor configuration with elongation of k=1.7 and discharge duration of 5 s, triangularity 0.1 – 0.2. Nominal toroidal magnetic field is 1 T. The inner surface of the KTM vacuum chamber is lined with FP-479 graphite tiles. Ion-cyclotron resonant heating (ICR) will be used as additional plasma heating.

The activities at KTM tokamak are currently being carried out for the facility to achieve the nominal parameters. The following parameters of plasma discharge under the ohmic heating mode have been achieved: plasma current Ip ≈ 500 kA, density 1 × 1019 m-3, with a discharge duration of ~ 1 s.

Currently, the KTM tokamak is use for realization of the joint scientific research program, which was developed in order to implement the intergovernmental Agreement of CIS countries on the joint use of the experimental complex based on the KTM tokamak. Joint scientific research program is implemented by Russian Federation specialists from the National Research Center “Kurchatov Institute”, D.V. Yefremov Research Institute for Electrophysical Apparatus (Efremov NIIEFA), Physical-Technical Institute after Ioffe, Tomsk Polytechnic University, and Krasnaya Zvezda JSC (now a branch of NIKIET), NRNU MEPhI. The program’s participants from the Republic of Belarus are: State Scientific Institution “The Joint Institute for Power and Nuclear Research – Sosny” of the National Academy of Sciences of Belarus, and NRU “Institute of Nuclear Problems” of the Belarusian State University. The program of joint work at KTM tokamak included the following stages: development of methods for conducting research at KTM; development of innovative technologies for the creation of a fusion reactor; modernization of the preparation technology for the KTM tokamak, studies of plasma-wall interactions; improvement of technological, physical methods of plasma diagnostics and control system.

References

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2. Kireeva N.A., et al, Comparison of tokamak KTM working parameters with facility’s operational limits, VANT, 2022, Fusion Series, V 45, Iss.2, p. 50-54.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Mu/ru/AH-Tazhibaeva.docx) [↑](#footnote-ref-1)