

KTM Experimental Complex Project Status

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The KTM tokamak is intended for study and tests of materials and structures of first wall armor, receiving divertor plates and divertor components under heat load modes similar to ITER and future fusion reactors. The experimental complex is constructed by Kazakhstani and Russian organizations in National Nuclear Center RK, Kurchatov.

The facility's design features are movable divertor device (MDD) and transport sluice device (TSD), due to them the unique possibility is to access to vacuum chamber and to change divertor plates without high vacuum failure. The MDD serves for placement of removable components receiving plasma thermal and particle fluxes, provides for their vertical positioning, replacement of all these components by using one loading sluice. Number of removable components is 24, number of full-scale cycles of plasma discharge - 2×10^4 . Number of plasma disruptions is 10^3 . The sluice is designed on not less than 2000 operation cycles without of serviceability infringement.

At present the initial data and documentation have been developed for designing vacuum-technological complex, the KTM chamber heating and conditioning system and magnetic system, as well as the KTM thermo-mechanical state monitoring system. The following activities have been carried out as well: development of design documentation and initial data of KTM physical diagnostics system, KTM vacuum chamber, RF-heating system, mock-up and execution of design decisions for systems of automation, control and emergency protection. The activities on reconstruction of existing buildings, construction of new ones, as well as mounting of the KTM complex external power supply systems have been begun. The amplifying calculations of basic scenario have been carried out; the disruptions (up and down) have been defined; verification calculations of structure taking into account disruptions have been carried out.

Moreover, considering uniqueness of this facility, preliminary development of experiments and checkout of research techniques, as well as personnel training shall be required for project successful realization. With this purpose the works on creation of the following experimental test benches have been begun: *technological test bench* – for vacuum-technological preparation of discharge chamber, including the development of boronization technology, technology of differential vacuum pumping of the divertor volume, technological modes of plasma additional RF-heating system, *test bench for simulation tests* – for creation of experimental facilities modeling impact conditions (plasma fluxes, neutron irradiation, etc.) on materials of the KTM components, *test bench for physical diagnostics* – to setup and test systems of diagnostic measurements, to adjust system of synchronization and automation of measurements and data processing. The KTM facility commissioning is scheduled at the end of 2006 - at the beginning of 2007.