Spherical tokamak Globus-M2 – status and scientific plans

M. Patrov 1, N. Bakharev 1, F. Chernyshev 1, A. Dudkovskaya 1, V. Dyachenko 1, V. Gusev 1, A. Kavin 1, A. Konovalov 1, G. Kurskiev 1, S. Khitrov, N. Khromov 1, V. Minaev 1, A. Mineev 2, I. Miroshnikov 1, A. Novokhatksiy 1, Y. Petrov 1, N. Sakharov 1, P. Shchegolev 1, A. Sladkomedova 1, V. Solokha 1, V. Tokarev 1, A. Telnova 1, S. Tolstyakov 1, V. Varfolomeev 1

1 Ioffe Institute, St. Petersburg, Russia
2 JSC «NIIEFA», St. Petersburg, Russia

The main factor limiting plasma performance in spherical tokamak is a relatively low toroidal magnetic field [1]. The increase of the magnetic field up to 1.0 T together with the plasma current up to 0.5 MA will result in the significant enhancement of the operating parameters in the upgraded machine – Globus-M2 spherical tokamak [2] (Globus-M machine [3] with novel electromagnetic system and remained vacuum vessel).

The presentation consists of several complementary parts. The first part deals to the success of the Globus-M2 integration and renovation. Some critical techniques of magnetic system construction which allow to produce high value of magnetic field in compact geometry are described.

In the second part the experimental results of the final Globus-M campaign in the past 2016 are described. The experiments were carried out at 0.5 T of the toroidal magnetic field (usual Globus-M value was 0.4 T) and within these, new data on energetic particle confinement, NB heating and NB current drive generation efficiency were obtained.

The last part is focused on Globus-M2 scientific plans, plasma parameters and regimes propagation. More accurate estimations for auxiliary heating and non-inductive current drive efficiency are based on both Globus-M 0.4 T / 0.5 T experiments comparison and plasma transport modeling.

References