Operation of a dispersion interferometer on the Globus-M2 spherical tokamak

K.D. Shulyatiev[1,2], A.L. Solomakhin[3], K.A. Grinemayer[3], V.B. Minaev[1], P.B. Shchegolev[1], V.K. Gusev[1], Yu.V. Kovalenko[3], Yu.V. Petrov[1], V.Ya. Savkin[3], N.V. Sakharov[1]

[1] Ioffe Institute, 194021, St.Petersburg, Russia

[2]Advanced Plasma Research Laboratory, Peter the Great St.Petersburg Polytechnic University, 195251, St.Petersburg, Russia

[3]Budker Institute of Nuclear Physics, 630090, Novosibirsk, Russia

The report is devoted to the results of the work on setting up a dispersion interferometer for monitoring the plasma density of the Globus-M2 spherical tokamak. In the process of the work a number of technical and design faults were found [1], some of which related to software and density recovery algorithms were successfully eliminated. The presented data were obtained as a result of experimental campaign in the first half of 2020, which included discharges with Ohmic heating, neutral beam injection and RF-heating. An analysis of the experimental data favors the correct operation of the dispersion interferometer. However, it also revealed some effects that affect the measurement results, such as signal inversion and low-frequency noise. Identification of the causes of these effects, as well as the elimination of the remaining technical and structural problems is planned for the second half of 2020.

This work was supported by the Ministry of science and higher education of Russian Federation in the framework of the state contract in the field of science under project No. 0784-2020-0020 using the Federal Joint Research Center "Material science and characterization in advanced technology" (project RFMEFI62119X0021), including the unique scientific facility "Spherical tokamak Globus-M".

References

[1]. K.D. Shulyatiev, A.L. Solomakhin, K.A. Grinemayer, et al. // The first results of dispersion interferometer operation on plasma density control on the Globus-M2 tokamak. XLVII International Zvenigorod Conference, Collection of abstracts, p. 72, (2020).