THOMSON SCATTERING DIAGNOSTICS RECONSTRUCTION AT THE GLOBUS-M2 TOKAMAK [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2021.48.1.030

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Thomson scattering (TS) diagnostics is one of the prime techniques of high temperature plasma research, providing well-localized measurements of electron temperature and concentration. Spatial distribution dynamics of plasma kinetic parameters is the foundation of plasma heating and confinement research. This information is also beneficial as a feedback signal for a tokamak magnetic control system.

The new equatorial TS system was designed and assembled at Globus-M2 spherical tokamak. As TS technique bases on probing plasma with laser impulse, laser source primarily defines diagnostics overall performance and limitations. The new TS system includes 1064 *nm* Nd:YAG pulsed laser with 330 *Hz* repetition rate. Each pulse has 10 *ns* duration at FWHM and carries up to 3 *J* of energy.

The collection optics gather light scattered with angles between 118º near the tokamak central column and 137º at the plasma periphery. The image-space telecentric lens projects observed spatial domains onto faces of optical fiber assemblies. Up to 18 independent assemblies, consisting of one or two optical fiber bundles, can be installed simultaneously. The resulting spatial resolution is 11 *mm* near the central column and 21 *mm* at the periphery. The size of observed spatial domain can be reduced twice, using two-bundle assemblies. The lens field of view covers the most of normalized major radius (r/a): from 0.45 on the high-field side to 0.9 on periphery.

Each optical fiber bundle guides the collected light to one of the polychromators. For the moment, the diagnostics is equipped with 10 filter polychromators with 6 spectral channels each. Avalanche photodiodes are used as detectors, providing signals for an external 12 *bit* 3.2 *GS/s* switched capacitor digitizer (CAEN V1743 based on the SAMLONG chip).

This work presents a description of the new Thomson scattering system for Globus-M2 tokamak. The system sensitivity, measurement accuracy and acceptable parameters range is discussed based on the first results from the plasma experiments at the Globus-M2 tokamak.

The work was funded by RSF, research project №17-72-20076.

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