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THOMSON SCATTERING DIAGNOSTICS OF DIVERTOR PLASMA IN GLOBUS-M2 TOKAMAK (STATUS) *)

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The report presents the status of the diagnostic system of Thomson scattering (TS) in an open-type divertor on a spherical tokamak Globus-M2 and the results of its measurements in the “private flux region”, the internal divertor leg and the edge plasma in the X-point region from the high field side. The vertical probing chord (major radius R = 24 cm) has a length of 11 cm. Scattered radiation is collected from 9 spatial points using an optical system, which consists of both in-vacuum elements located on a movable periscope and an atmospheric lens. Diagnostics is designed for local measurements of the electron temperature $T_e(Z)$ in the range of 1 – 100 eV and the concentration $n_e(Z)$ in the range of 10^{17} - 10^{20} m^{-3}. The source of the probing radiation is a laser developed during the preparation of the equipment for divertor TS diagnostics of the ITER tokamak: Nd:YAG 1064 nm / 2 J / 100 Hz / 3 ns. The TS spectrum is measured by polychromators similar to those developed for diagnostics at ITER.

The demand for research is determined by the importance of studying and testing the mechanism of divertor operation, characterized by reduced interaction of plasma with divertor plates. Load reduction can be achieved by maintaining an increased pressure of the neutral component in the divertor plasma region, for example, by puffing a radiating impurity into this area. In this case, the power coming to the divertor from the central plasma is distributed to the power of isotropic radiation and the power of the neutral particle flux. Thus, the incident power density on the plasma-facing surface in the divertor is significantly reduced by increasing the interaction area. Such a regime of full or partial "detachment" of the plasma from the divertor plates must be optimized by varying the speed and location of the emitting impurity puff in order to re-emit most of the power outside the confinement zone. The report will present the results of measurements in the Globus-M2 divertor and their comparison with the results of modeling by the SOLPS-ITER code.

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