

Electron temperature and density distribution at Globus-M2 tokamak.

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Spatial distributions of plasma electron temperature T_e and density n_e provide a vast information on plasma kinetic parameters. Thomson scattering (TS) diagnostics is the robust tool for T_e and n_e measurements. The reliability of TS is proved by its inclusion in tokamak control system. This report describes the T_e and n_e profile evolution during the plasma discharges at Globus-M2 compact spherical tokamak measured by the equatorial TS diagnostics [1].

The non-intrusive laser probing is performed with the time step of ≈ 3 ms throughout the whole tokamak discharge. The processed data is available in real-time with < 2.4 ms delay after each laser pulse. The high temporal resolution ~ 10 ns enables studying of the transient plasma processes, including sawtooth relaxations, edge-localized modes (ELMs), thermal quenching, etc.

The T_e and n_e profiles were measured at 11 spatial points located in the equatorial plane on the low-field side. The measurements were carried out from the magnetic axis to the separatrix. This provides information on plasma shift and instability localization. High sensitivity of the presented TS system allows measurement in the scrape-off layer (SOL) of plasma. The equatorial measurements, projected on the poloidal cross-section [2], allow to estimate electron stored energy W_e . This report compares T_e and n_e profiles in different tokamak scenarios: pure ohmic heating, additional heating by one or two neutral beam injectors.

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References

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