

Core NPA measurements in the Globus-M2 experiments

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Globus-M2 [1] is a new generation compact spherical tokamak (ST). Its design assumes twofold increase in the toroidal magnetic field and plasma current as compared to the previous Globus-M ST: up to 1 T and 500 kA respectively. Globus-M2 plasma is auxiliary heated with the 1 MW 18-30 keV neutral beam injector. Recently Globus-M2 neutral particle analyzer (NPA) complex, consisting of two ACORD [2] NPAs, was equipped with a scanning system. ACODR-12 NPA, previously installed with a line of sight (LOS) directed perpendicularly to the plasma column, now can be tilted 0-15° horizontally and ±10° vertically. ACORD-24M NPA has the same impact parameter as the neutral beam injector. The new scanning system allows ±10° vertical tilting of the NPA LOS relative to the equatorial plane. In the experiments with the neutral beam injection the NPA active signal, coming from the intersection of the LOS with the beam injection line, is an order of magnitude higher than the passive signal from the rest of the plasma. This simplifies the interpretation of the NPA data and makes possible local measurement of the ion distribution function in the plasma core.

In this report a specific features of the NPA measurements in a beam-heated compact ST is discussed. Thermal part of the ion distribution function was reconstructed with the DOUBLE [3] code in order to get the core ion temperature. Fast ion distribution was locally measured in the MHD-quiescent plasma. Fast ion redistribution due to the MHD perturbations was observed.

References

- [1] Gusev V.K. et al. 2013 Nucl. Fusion 53 093013.
- [2] Izvozchikov A.B. et al. 1992 Tech. Phys. 37 201.
- [3] Afanasyev V.I. et al. 1999 Preprint JET-R-(00)04.