Te AND ne DISTRIBUTION study DURINg NEuTRAL BEAM INJECTION AT GLOBUS-M2 TOKAMAK [[1]](#footnote-1)\*)

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This report is devoted to the study of electron heating in the Globus-M2 (1) tokamak plasmas. Scenarios with a neutral bean injection were studied in comparison with ohmic discharges. The experiments were carried in the following conditions: *B*T ≤ 0.8 T, *Ip* ≤ 0.4 MA, *PNBI* > 390 kW, *ENBI*= 30-50 kV. The deuterium injection into the deuterium plasma started at plasma current ramp-up *Ip* > 0.2 MA and continued throughout the whole discharge. Additional heating by neutral beam injection forced transition to the high-confinement mode.

Thomson scattering diagnostics (2) was the main investigation tool for this study. By it means dynamics of both electron temperature *Te* and density *ne* were measured from plasma core to edge. In particular, *Te* and *ne* gradients were studied in the separatrix region of equatorial plane on low-field side. This included *R ≥ Rsep* region, where *R* – major radius of diagnostics observation point, *Rsep* – separatrix position at the moment of Thomson scattering measurement.

Measurement of *Te* and *ne* spatial distribution allowed to calculate electron component of plasma stored energy *We*. Thus, the dependence of *We* on average electron density was analyzed. The *We* in discharges with neutral beam injection was compared to ohmic discharges.

The dynamics and spatial localization of sawtooth plasma oscillations were studied. Qualitive estimation of sawtooth impact on energy confinement was performed based on *We* analysis. One studied the plasma energy balance, estimated energy confinement time and both electron and ion thermal conductivities.

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References

1. Minaev V. B., et.al. Nuclear Fusion. 2017, 57.
2. Zhiltsov N.S., et.al. ICPAF-2021. 2021.
1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Mu/ru/AY-Zhiltsov.docx) [↑](#footnote-ref-1)