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FIRST THOMSON SCATTERING MEASUREMENTS OF ELECTRON TEMPERATURE AND DENSITY ON THE T-15MD TOKAMAK *)

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The tangential Thomson scattering diagnostic [1] began operating on the T-15MD tokamak in 2023. New diagnostics is based on a 100 Hz Nd:YAG laser (λ = 1064 nm, pulse energy up to 3 J), which makes possible measurements during the entire plasma discharge, with a time interval of 10 ms, for up to 10 seconds. Laser beam is injected into the tokamak vacuum vessel in the equatorial plane. Collection optics are located at the vacuum vessel's equatorial port. Scattering angles lie between 11 and 56 degrees depending on the spatial point. Thomson scattering detection system consists of 10 filter polychromators [2], which allow measurements at 10 spatial points from the inner to the outer periphery of the plasma. These polychromators were previously tested [3] in Thomson scattering diagnostics at the T-10 tokamak [4].

The report presents the first results of electron temperature and density measurements. Measurements were carried out at 6 spatial points from R = 0.81 m to R = 2 m. It is likely that the plasma parameters in the region R > 2 m were beyond the Thomson scattering diagnostic measurement range. In the pulse with a record duration of 2 s, the diagnostics provided measurements during the entire discharge. It's shown that in this discharge, with a plasma current of 190 kA and ECR heating power of 1 MW at the quasi-stationary stage, the plasma temperature reached 2.5 keV.

References

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