STATUS OF THOMSON SCATTERING DIAGNOSTICS developed for ITER DIVERTOR [[1]](#footnote-1)\*)

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Measurement of the electronic component parameters in the divertor plasma has two main goals: monitoring the divertor operational mode, including degree of plasma contact with the divertor plates, and interpretation of impurity radiation. The measurement range of Te 1 – 200 eV with an accuracy of 20% and ne 1019 – 1022 m-3 with an accuracy of 20% in the ITER diverter follow from the main problems facing diagnostics and are based on the results of modeling. The allowable decrease in accuracy in measuring temperatures of ~0.3 eV reflects the difficulty of measuring narrow spectral contours near strong tray light at the laser wavelength, and is also reasonable in the sense that one of the most important tasks of DTS will be to provide experimental confirmation that strong recombination occurs in the vicinity of the divertor target. Because the recombination rate increases faster in the Te region below 0.5 eV compared to the 0.5-1.0 eV range, it is sufficient, for modeling, to be validated that the diagnostics provide a measurement that can approximately distinguish between these regions. Combined laser diagnostics of DTS and LIF should measure the spatial distribution of a set of electron, ion and atomic parameters that will help to understand better physics of plasma detachment from divertor plates by estimating electron reaction rates, including ionization rates, recombination and radiation intensity, which play an important role in cooling and recombination plasma flow, as well as the velocities of ion-neutral collisions. The current status of LIF diagnostics includes responsibility for: (a) nHeI measurement using helium ash to evaluate removal efficiency and (b) Ti HeII ion temperature measurement. The measurement of ne from the temporal shape of the HeI fluorescence signal of the measured LIF is supposed to be used as an additional method for absolute calibration of the DTS acquisition and detection system. Spectral transmission calibration is supposed to be done by simultaneous measurement of Thomson scattering signals at several wavelengths.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/IF-Mukhin.docx) [↑](#footnote-ref-1)