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## MULTICHANNEL DIAGNOSTICS OF SOFT X-RAY RADIATION AT THE T-15MD INSTALLATION <sup>\*)</sup>

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Multiwire proportional chambers were developed at CERN in 1968 [1] and were later widely used in high-energy physics experiments. They can also be used to measure the intensity of soft X-ray radiation from plasma in tokamak [2, 3].

The advantage of proportional chambers is a high gas gain coefficient of  $10^5$  (depending on the voltage on the detector), which allows for optimal signal level in any operating mode of the tokamak. Multiwire detectors can operate either in proportional counter mode, which generates discrete current pulses proportional to the energy of each detected photon, or in constant current mode, where the detector output current is proportional to the intensity of the incident X-ray radiation. For quasi-stationary thermonuclear installations, multichord measurements of the intensity profile of soft X-ray radiation are of interest, making it possible to study fluctuations of soft X-ray radiation from the central region of the plasma with high temporal and spatial resolution.

On the T-15MD, multichannel diagnostics of soft X-ray radiation is designed to measure the radial distribution of soft X-ray radiation in the range of 1–10 keV. For the experimental campaign of 2023–2024 in the T-15MD, a multiwire detector is installed in a vertical diagnostic port and provides an overview of the plasma along 32 chords, in a zone of  $\pm 0.75$  small radius horizontally with a spatial resolution of  $\sim 33$  mm and a temporal resolution of about 30 ms.

In the future, it is planned to increase the number of measurement chords up to 64, as well as install additional detectors to provide multi-angle measurements and tomographic reconstruction of a two-dimensional image of the soft X-ray plasma radiation intensity.

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### References

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<sup>\*)</sup> [abstracts of this report in Russian](#)