MULTICHANNEL X-RAY SPECTROMETER for TOKAMAK T-15MD [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2023.50.2023.1.1.037

1Ideal R., 2Ryzhakov D.V., 1,2Budaev V.P.

1NRU “Moscow Power Engineering Institute”, Moscow, Russia, IdealR@mpei.ru ,
2NRC “Kurchatov Instiпtute”, Moscow, Russia, ryzhakov\_dv@nrcki.ru.

To measure the profile of the absolute value of the electron temperature of a plasma cord in a tokamak, it is necessary to develop multi-channel diagnostics for X-ray registration.

In this work, the calculation of X-ray radiation from tokamak plasma was carried out in order to develop a diagnostic "Multichannel X-ray spectrometer" for tokamak T‑15MD and a diagnostic scheme (Fig.1) was developed using experimental measurement results on tokamak T-10. From the comparison of calculated and experimental data, the dependence of the absorption of X-ray radiation in the detector (the spectral sensitivity of the detector) on the energy of the recorded radiation was determined, the geometric dimensions of the diagnostics designed for T‑15MD were selected, the characteristics of filters and detector were clarified, a program was written that automatically approximates experimental data and determines the temperature of electrons. It was shown that with the selected diagnostic parameters, a good spatiotemporal resolution is expected for measurements at T‑15MD. Diagnostics will allow measuring the characteristics of the plasma when registering quanta in the range from 2 keV to 15 keV.



Fig. 1. Diagnostic measurement scheme on T-15MD (CFC - collimator and filter changer).

References

1. Experimental thermonuclear installation tokamak T-15MD /P.P. Khvostenko et al. // VANT. Ser. Thermonuclear fusion. – 2019. – vol. 42, in .1. – pp. 15-38.
1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Mu/ru/BJ-Ideal.docx) [↑](#footnote-ref-1)