THE FIRST STAGE OF DEVELOPMENT OF THE GYROTRON SET-UP AND LAUNCHER SYSTEM FOR ECRH AT THE T-15MD TOKAMAK [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2021.48.1.048

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At the current time, the preparatory stage of work for the physical start-up of the T-15MD tokamak is underway at the NRC “KI” [1]. The building-up of the gyrotron installation and assembling HF-launcher for one of horizontal ports is an important step in this stage.

Some earlier, GYKOM company developed and produced the gyrotron with an operating frequency of 82.6 GHz especially for the T-15MD [2]. The output power of the gyrotron is 1MW with 30 s maximum pulse length. This HF-power as a Gaussian beam is transported to the tokamak in HE11 mode through evacuated 35 m long corrugated waveguide. The main task, at the present stage, concludes in organization of breakdown of the working gas at the second harmonic in extraordinary mode for the development of a plasma discharge. To ensure this scenario, a HF-input system, which is going to be used on T15MD, should be similar to the T-10 tokamak HF-launcher, which was successfully used in breakdown experiments [3-5]. This design gives a possibility of scanning the beam in both toroidal and poloidal directions within specified limits and allows to obtain focused beam. T-15MD launcher provides the beam waist of ~ 11 mm at the power level of e-1 and maximum power density in the crossection ~ 0.20-0.25 MW/cm2. T-15MD electrical system allows to raise the magnetic field during discharge (in a few hundred ms from 1.3 to 1.5 T) [5]. In this case breakdown occurs in the inner side.

Eight gyrotrons should be installed at the next stage of operation with divertor configuration and elongated plasma. The HF-power will be launched into the tokamak vacuum chamber through two horizontal ports. Four launcher systems are planning to install in each port. HF-beam should be focused in order to avoid a strong refraction affect in plasmas with high density due to relatively low gyrotron frequency. At the moment, several modifications of launcher system are under consideration. Some of them are presented in this report.

This work was supported by the state corporation ROSATOM.

References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVIII/Mu/ru/BH-Pimenov.docx) [↑](#footnote-ref-1)