MULTIFUNCTIONAL EXPERIMENTAL STAND. ACCELERATION OF PLASMA PARTICLES BY A FIELD FORMED BY A LONGITUDINAL MICROWAVE FIELD [[1]](#footnote-1)\*)

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The stand was created with the aim of studying the conditions for the penetration of an electromagnetic wave with a longitudinally oriented axisymmetric electric field (fо = 2.45 GHz) into a radially inhomogeneous plasma column with magnetized electrons and the conditions for its transformation into electrostatic waves. Studies will allow us to conclude that it is possible to use the studied structures of electromagnetic and stationary magnetic fields to create directed flows of high-power plasma particles.

The stand consists of a plasma conduit (diameter 6 cm, length 160 cm, quartz glass), along which TE111 and E011 are arranged sequentially - cylindrical resonators, the distance between which can vary, and solenoids forming a stationary magnetic field that can also move along the axis of the system. The scheme of the stand is shown in Figure.

5

6

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4

3

1

Figure. Scheme of the experimental stand. 1 - plasma duct, 2 – TE111 - resonator, 3 – E011 - resonator, 4 - solenoids, 5 - pumping of the vacuum system, 6 - working gas injection system.

The plasma flow is formed in a TE111 resonator with circular polarization of a microwave electric field generated by two whip antennas located in its central plane at an angle π / 2. The resonator E011 was excited by a loop antenna. We used M-105 magnetrons with stabilized sources of anode voltage and water cooling.

Testing of the test bench showed the possibility of creating a plasma flow with a particle concentration of more than ten times the critical value for the frequency ωо / 2π = fо = 2.45 GHz at ωc ≈ 0.5 ωо, where ωc is the cyclotron frequency of the electrons, and also the influence of the longitudinally oriented microwave E - field to the longitudinal energy of plasma particles.?

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/Lt/ru/FQ-Balmashnov.docx) [↑](#footnote-ref-1)