parameters of ecr plasma formed by longitudinal microwave electric and spatial inhomogeneous magnetic fields [[1]](#footnote-1)\*)

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Work has begun on studying the possibility of creating a compact plasma source in which a longitudinal microwave electric field is used to accelerate charged particles. The difference between this source and the one described in [1] consists in the method of plasma formation – we use the scheme described in [2] and for organization of the longitudinal microwave electric field E010 resonator before [1] was used E011 one. A schematic of the plasma source is shown in the figure. The plasma source consists of a plasma duct (diameter 6 cm, quartz glass), along which E010 a cylindrical resonator and a solenoid that forms a spatially inhomogeneous stationary magnetic field is located. The resonator is excited by a loop antenna at a frequency of 2.45 GHz. We used an M-107 magnetron with stabilized anode voltage sources. Plasma is formed in the ECR region created by permanent ring-shaped magnets (see [2]).

Ar

HF

1

5

4

6

3

2

Figure. Scheme of device. 1 - pumping of the vacuum system, 2 – plasma source body (E010 resonator), 3 – dielectric plasma duct, 4 - solenoid, 5 - loop antenna, 6 - ring magnets

It was found that at a working gas pressure (Ar) Р = (4-8)10 -4 Torr and a microwave power supplied to the resonator exceeding 100 W, a plasma flow is formed, the longitudinal energy of the ionic component in which depends on the magnitude and profile of the magnetic field in the region of the microwave discharge generated by the solenoid.

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Reference

1. Balmashnov A.A., Dutko N.B., Kalashnikov A.V., Stepin V.P., Stepina S.P., Umnov A.M. XLVII ICPCF. Proceedings of the conf. Zvenigorod, 2020, p. 183.
2. Balmashnov A.A., Dutko N.B., Kalashnikov A.V., Stepina S.P., Umnov A.M. Applied Physics (Prikladnaya Fisika), 2020, №3. P. 17.

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