

Characteristics of a gridded RF ion source with a metal gas-discharge chamber

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An experimental study of the parameters of a gridded RF ion source with a metal gas-discharge chamber with a diameter of 10 cm and an internal antenna was carried out. The stability of the operation of the specified source has been demonstrated in the case when 2 capacitors are connected in series to the RF antenna circuit, opening this circuit by direct current. It is shown that in the dependence of the extracted ion current on the induction of the external longitudinal magnetic field, a maximum is observed in the region of 16 G. The extracted ion current from the studied ion source is approximately 2 times less than from a similar source with a quartz gas-discharge chamber of the same diameter and an external RF antenna.

Keywords: ion source, inductive RF discharge, gridded.

REFERENCES

1. Goebel D. M. and Katz I., *Fundamentals of Electric Propulsion: Ion and Hall Thrusters*, Hoboken, Wiley, 2008.
2. Mazouffre S., *Plasma Sources Sci. Technol.* **25**, 033002 (2016). doi: 10.1088/0963-0252/25/3/033002
3. Gorshkov O. A., Muraviev V. A., Shagayda A. A. and Koroteev A. S., *Hall and Ion Plasma Thrusters for Spacecraft*, Moscow, Mashinostroyenie, 2008 [in Russian].
4. Freisinger J. et al., *Rev. Sci. Instrum.* **63**, 2441 (1992). doi: 10.1063/1.1142904
5. Bisten M. et al., in *Proceedings of the 22th IEPC*, Viareggio, 1991, IEPC-1991-066.
6. Kralkina E. A. et al., *Vacuum* **167**, 136 (2019). doi: 10.1016/j.vacuum.2019.05.041