

The influence of the external magnetic field on the characteristics of the prototype RF air-breathing inductive electric propulsion thruster

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The characteristics of a model of an RF inductive ion engine operating on nitrogen and oxygen with external longitudinal magnetic field applied to the discharge with magnetic induction up to 75 G have been studied. It has been experimentally shown that the highest ion current can be obtained using magnetic fields with an induction of 18 and 70 G. In the operating range $f = 10\text{--}25$ sccm for a current of 200 mA the ion cost, calculated based on the power values of the RF generator, is 1400–1500 W/A. Estimation of the ion cost based on the amount of power absorbed by the plasma allows us to determine the minimum possible value of the ion cost of 850 W/A for the prototype of RF ion engine.

Keywords: ion thruster; RF; IT; Air-breathing electric propulsion; ABEP; inductive; radiofrequency; discharge; plasma; ions; ion cost; VLEO.

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