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## THEORETICAL ANALYSIS OF PLASMA ICR HEATING METHODS IN AN ELECTRODELESS PLASMA ROCKET ENGINE \*)

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Experiments conducted by AdAstra company on plasma heating in an electrodeless plasma rocket engine VASIMR [1] are known, in which waves were excited by an antenna and absorbed by an ion stream in an area with magnetic field induction corresponding to ion cyclotron resonance [2]. An alternative to this approach is the so-called magnetic beach method, in which electromagnetic waves are excited by an antenna in an area with a magnetic field higher than the resonant one and in the form of their own modes of a plasma cord "run into" the resonance region, where they are effectively absorbed [3]. Such an approach, on the one hand, can provide better coupling of the antenna with the plasma, on the other hand, this approach creates a space of wave "idle" propagation to the plug, absorption in which is undesirable.

In this work, the efficiency of excitation and absorption of waves by electrons and plasma ions at Cherenkov and cyclotron resonances, respectively, is compared, taking into account the influence of electron-electron and electron-ion collisions. To do this, a system of Maxwell's equations is solved in an azimuthally symmetric, radially inhomogeneous plasma cord located in an external magnetic field. The decomposition of oscillations excited in a plasma cord into the sum of their own waves is carried out, the propagation of which along the cord to the resonance region is described in the WKB approximation.

## References

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<sup>\*)</sup> abstracts of this report in Russian