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EXPERIMENTAL INVESTIGATION OF THE THRUST PERFORMANCE OF ATTILA[1]

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Abstract

In order to enlarge the performce of plasma thrusters, for example arc-jet or self-field MPD-thrusters, a new kind of plasma thruster is developped at IRS. ATTILA[1] [1,2] combines the advantages of thermal arc jets and self-field MPD thrusters, especially their relatively simple setup, and the reliability of a radio frequency power supply, which is usually used for surface hardening. The plasma jet generated by the thermal arcjet section, which is operated in a power range between 50 to about 100 kW, is injected into a ceramic tube which is surrounded by a magnetic coil. In this stage additional energy is added by inductive heating It was shown [1,2] that it is possible to operate DC-plasma thrusters and an induction heated plasma source simultaneously. During a first phase ATTILA was operated against atmospheric pressure. As a second step the new thruster was installed in a vacuum tank. Figures 1 and 2 show the thruster operating under vacuum conditions. It was proved that in the second stage a significant increase of the specific power can be achieved.

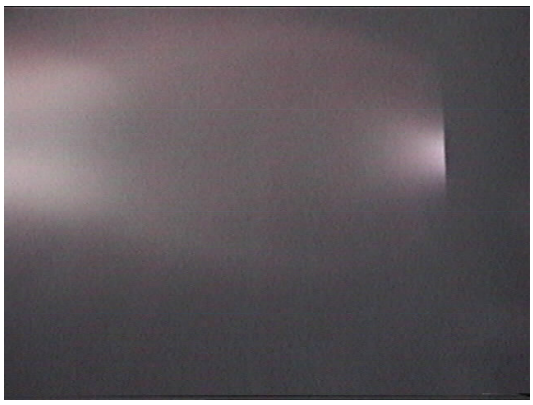

Fig. 1: ATTILA operating in arc-jet mode

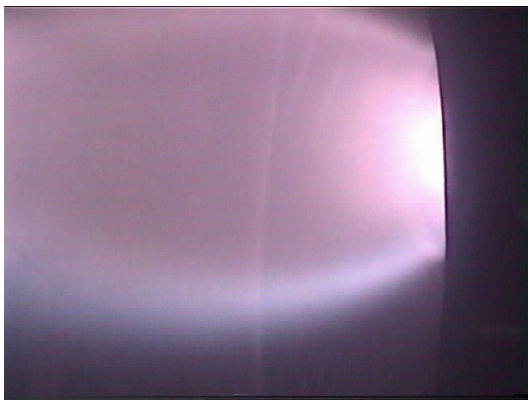

Fig. 2: ATTILA operating with superposed induction heating

The paper will describe the experimental setup of ATTILA. Additionally different methodes to determine the thrust of the new plasma thruster will be applied.

Literature

[1] Stefan Laure, Jörg Heiermann, Monika Auweter-Kurtz and Helmut Kurtz, „ Experimental and Numerical Investigation of a Power Augmented Thermal Arc Jet “,37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, 8-11 July 2001, Salt Palace, Salt Lake City, UT

[2] Stefan Laure, Jörg Heiermann, Monika Auweter-Kurtz and Helmut Kurtz, „ ATTILA- ADJUSTABLE THROTTLE INDUCTIVELY AFTERBURNING ARC JET “, 27th International Electric Propulsion Conference, October 14-19, 2001 at the Pasadena Convention Center in Pasadena, California, USA

[1] **ATTILA- ADJUSTABLE THROTTLE INDUCTIVELY AFTERBURNING ARC JET**