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Initial Operation of the Miniaturized Inductively Heated Plasma Generator IPG6 MICHAEL DROPMANN, GEORG HERDRICH, RENE LAUFER, HELMUT KOCH, CHRIS GOMRINGER, MIKE COOK, JIMMY SCHMOKE, CASPER - Baylor University / IRS, University of Stuttgart, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — In close collaboration between the Center for Astrophysics, Space Physics and Engineering Research (CASPER) at Baylor University, Texas, and the Institute of Space Systems (IRS) at the University of Stuttgart, Germany, two plasma wind tunnel facilities of similar type have been established using the inductively heated plasma source IPG6 which is based on proven IRS designs. The facility at Baylor University (IPG6-B) works at a frequency of 13.56 MHz and a maximum power of 15 kW. A vacuum pump of 160m^3/h in combination with a butterfly valve allows pressure control in a wide range. First experiments have been conducted with Air, O_2 and N_2 as working gases and volumetric flow rates of up to 14 L/min at pressures of a few 100 Pa, although pressures below 1 Pa are achievable at lower flow rates. The maximum tested electric power so far was 8 kW. Plasma powers and total pressures in the plasma jet have been obtained. In the near future the set up of additional diagnostics, the use of other gases (i.e. H_2, He), and the integration of a dust particle accelerator are planned. The intended fields of research are basic investigation in thermo-chemistry and plasma radiation, space plasma environments and high heat fluxes e.g. in fusion devices or during atmospheric entry of spacecraft.

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