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Characterization of an inductively coupled plasma source with convergent nozzle[1] MICHAEL DROPMANN, CASPER - Baylor University / IRS - University of Stuttgart, KATHRYN CLEMENTS, JOSH EDGREN, RENE LAUFER, CASPER - Baylor University, GEORG HERDRICH, CASPER - Baylor University / IRS - University of Stuttgart, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — The inductively heated plasma generator (IPG6-B) located in the CASPER labs at Baylor University has recently been characterized for both air, nitrogen and helium. A primary area of research within the intended scope of the instrument is the analysis of material degradation under high heat fluxes such as those imposed by a plasma during atmospheric entry of a spacecraft and at the divertor within various fusion experiment. In order to achieve higher flow velocities and respectively higher heat fluxes, a new exit flange has been designed to allow the installation of nozzles with varying geometries at the exit of the plasma generator. This paper will discuss characterization of the plasma generator for a convergent nozzle accelerating the plasma jet to supersonic velocity. The diagnostics employed include a cavity calorimeter to measure the total plasma power, a Pitot probe to measure stagnation pressure and a heat flux probe to measure the local heat flux. Radial profiles of stagnation pressure and heat flux allowing the determination of the local plasma enthalpy in the plasma jet will be presented.

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Truell Hyde
CASPER - Baylor University

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