

Interaction of radiatively cooled plasma jets with collimated, supersonic gas flows

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March 22, 2012

Abstract

A supersonic (Mach 3-5), radiatively cooled plasma jet is produced by the ablation of plasma from a radial foil, a metallic disk subjected to a 1.4 MA, 250 ns current pulse from the MAGPIE generator. The ablated plasma converges on axis, producing a steady and collimated jet with a typical axial velocity of 100 km/s.

The study of jet-ambient interactions is achieved by introducing a neutral, cold gas above the foil using a fast valve with a supersonic gas nozzle. The system was adjusted to study different interaction geometries, and to vary critical parameters such as the jet-ambient density

contrast. The effects of radiative cooling on the working surface of the jet are studied by varying the gas composition. Results from experiments and 3-D MHD simulations using the GORGON code will be presented and discussed.

Work supported by EPSRC Grant No. EP/G001324/1, by the NNSA under DOE Cooperative Agreements No. DE-F03-02NA00057 and No. DE-SC-0001063, by DOE SBIR Grant DE-FG02-08ER85030, and by a Marie Curie European Reintegration Grant.