Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Simulations of the supersonic radiative jet propagation in plasmas XAVIER RIBEYRE, PHILIPPE NICOLAI, STEPHANE GALERA, VLADIMIR TIKHONCHUK, CELIA — The supersonic plasma jets are ubiquitous in astrophysics. We focus our attention on the jets emanated Herbig-Haro objects. They have velocities of a few hundred km/s and extending for a parsec. The interaction of the jets with the surrounding matter produces two structures at the jet head: the bow shock and the Mach disk. The radiative cooling of these shocks affects strongly the jet dynamics. A tool to understand the physics of these jets is the laboratory experiment. The supersonic jet-plasma interaction with surrounding plasma was studied on the PALS laser facility [1]. A collimated high-Z plasma jet with a velocity exceeding 400 km/s was generated and propagated over a few millimeters length. The jet radiative cooling is an important mechanism of jet formation, and propagation similarly to what was shown in the astrophysical context [2]. We study the jet propagation in plasmas and structure of the interaction zone using 2D ALE radiative code CHIC. A comparison between the adiabatic and radiative jets for various relative density ratios is performed. The bow shock and Mach disk evolution and their dependence are studied. A multigroup treatment of the radiative transport makes important differences in the shock structure, compared to the model [2] of radiative losses. [1] Nicolaï, Ph., 2006 *et al. Phys. of Plasmas* **13**, 062701 [2] Blondin, J. M. *et al.*, 1990 *Astr. Phys. J.* **360**, 370

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Date submitted: 18 Dec 2007 Electronic form version 1.4