

Optical and proton measurements of laser-driven plasma jets propagating in an ambient gas

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In this work we present experimental research related to laboratory astrophysics using intense laser. The goal of this experiment is to investigate some of the complex features of Young Stellar Objects (YSO), and in particular the plasma jet interaction with the interstellar medium (ISM). The jets are generated via LULI2000 laser irradiation of a foam-filled cone target, the results and characterisation of which have been reported previously [Loupiau et al., *Phys. Rev. Lett* 99, 265001 (2007)] for propagation in vacuum. In this context, the introduction of an ambient medium of argon at varying density is seen to result in the formation of a complex interaction area where perturbations appear to grow with time. The system is diagnosed with proton radiography, imaging the perturbed structure in the interaction area between the jet and the argon gas with high resolution. Several visible diagnostics have been also implemented to infer the dimensionless parameters necessary to verify the similarity of the experiment with YSO.

Poster presentation