

Abstract Submitted
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Images of 50 km/s laboratory plasma jet colliding with neutral gas cloud AUNA MOSER, PAUL BELLAN, Caltech — Jets of magnetized plasma are common in astrophysical settings; their interaction with the surrounding medium is of particular interest. We have developed an experimental facility to better understand this interaction. The experiment accelerates a magnetized plasma jet¹ to velocities of $\sim 10\text{-}50$ km/s into a target cloud of neutral gas with densities in the range of 10^{16} to 10^{20} m⁻³. We view the interaction using a high speed camera that produces 16 images in $5\ \mu\text{s}$ with an exposure time of 10 ns. Preliminary experiments show different qualitative behavior in each of three regimes defined by the mass ratio of the target gas to the plasma ions. A plasma jet whose mass is less than the mass of the target gas is observed to pile up at the boundary of the target gas cloud, whereas a jet of mass equal to that of the target slows but does not have significant thickening at its front. When a heavy plasma jet hits a light target gas cloud, a front that we believe may be a shock wave is pushed away from the interaction boundary between the target and the jet at a velocity greater than that of the jet.

¹ S. C. Hsu and P. M. Bellan, *Mon. Not. R. Astron. Soc.* **334**, 257 (2002).

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