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HED jet-ambient interaction studies in the lab PHILIP DE GROUCHY, SERGEY LEBEDEV, MATTHEW BENNETT, GUY BURDIK, SIMON BLAND, GARETH HALL, LEE SUTTLE, GEORGE SWADLING, FRANCISCO SUZUKI-VIDAL, MATTEO BOCCHI, JEREMY CHITTENDEN, Imperial College London, SHENG LIANG, Northwest Institute of Nuclear Technology, Xi'an — The formation and evolution of shock structures and density non-uniformities along the jets from young stellar objects [1] provides insight into the basic fluid dynamics of collimated, radiatively cooled supersonic flows. Pulsed power driven jets (conical /radial wire arrays; radial foils [2,3]) have appropriate dimensionless parameters (Mach number; Reynolds number; cooling parameter) to simulate aspects of this class of astrophysical jets under controlled conditions. In our previous experiments gas cloud [4] and ablation of a plastic target [5] provided an ambient medium for jet interaction/deflection studies. Recent work has shown that hydrodynamic jets from conical arrays can be injected into the precursor plasma of cylindrical wire array mounted in series above it, and that diagnostic access remains open. In this paper we present our latest results illustrating the formation of shock structures in the target region, density distribution across the interaction and the influence of jet material on the flow dynamics.

- [1] Hartigan et al. 2011, ApJ, 736, 29
- [2] Lebedev et al. 2002, ApJ, 564, 113-119
- [3] Ciardi et al. 2009, ApJ, 691, L147-L150
- [4] Suzuki-Vidal et al. 2012, PoP, accepted
- [5] Lebedev et al. 2004, ApJ, 616, 988-997

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