Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Counter-propagating radiative shock experiments on the Orion laser facility[1] T. CLAYSON, F. SUZUKI-VIDAL, S.V. LEBEDEV, G.F. SWADLING, G.C. BURDIAK, S. PATANKAR, R.A. SMITH, Imperial College London, J. FOSTER, J. SKIDMORE, E. GUMBRELL, P. GRAHAM, C. DANSON, AWE Aldermaston, UK, C. STEHL, R.L. SINGH, U. CHAULAGAIN, LERMA, OBSPM, France, J. LAROUR, Ecole Polytechnique, France, M. KOZLOVA, ELI, Czech Republic, C. SPINDLOE, Scitech Precision, UK — The Orion high-power laser facility, at AWE Aldermaston UK, was used to produce hyper-sonic radiative shocks, travelling at 60km/s, in noble gases, between 0.1 and 1.0 bar. These experiments aimed to study the radiative precursor, a heat and ionization wave preceding the shock front, and dynamics of colliding radiative shocks. X-ray backlighting and optical self-emission streak imaging were used to study the shock front and collision dynamics, while multi-frame and streaked interferometry were used to simultaneously study the radiative precursor. These experiments compared the shock and collision dynamics in different gases (e.g. Ne, Ar, Kr, Xe), while maintaining a constant mass density, to vary the strength of the radiative precursor. Some shocks exhibited features suggesting the formation of hydrodynamic or radiative instabilities. The experimental data is in good agreement with 2-D rad-hydro simulations and provides a new benchmark for codes to be tested against.

[1]Supported by Orion Academic Access, the Royal Society, EPSRC, Labex PLAS@PAR.

Thomas Clayson
Imperial College London

Date submitted: 14 Jul 2016 Electronic form version 1.4