New radiative shock experiments with high power lasers

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The formation of 'radiative shocks', shocks in which the structure of the density and temperature is affected by radiation from the shock-heated matter, is ubiquitous in many astrophysical scenarios. They are present, for instance, in Supernovae remnants, accretion disks, and in supersonic jets from young stars. The study of these extreme shocks in controlled laboratory conditions has been possible due to the development of high-power lasers, which allow producing plasmas with the right physical conditions for radiative shock formation. I will present results from experiments performed at the Orion (UK) and PALS (Czech Republic) lasers, in which new geometries have been investigated particularly the collision between two counterpropagating shocks. The investigation benefits from the plasma diagnostics available at each laser facility, for instance point-projection X-ray backlighting and 4-frame optical self-emission imaging at Orion, and optical laser interferometry with fs-exposure at PALS. The results are also investigated with numerical simulations using radiation-hydrodynamic codes such as NYM/PETRA and ARWEN.

[1] F. Suzuki-Vidal et al., "*Counterpropagating Radiative Shock Experiments on the Orion Laser*", Physical Review Letters 119, 055001 (2017)

[2] R.L Singh et al., "*Experimental study of the interaction of two laser-driven radiative shocks at the PALS laser*", High Energy Density Physics 23, 20-30 (2017)