Highly Radiative Shock Experiments driven by GEKKO XII

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In this poster, very recent experimental results on radiative shocks generated by a high power laser in a xenon gas cell are presented. Using the GEKKO XII laser at Osaka University, we are able to irradiate targets with a laser intensity up to 10^{15} W/cm^2. In this case, the radiative shocks are faster and more radiative than those observed in the past using the LULI2000 laser [1]. The intensity range in this experiment is equivalent to those performed on the Omega laser by the Drake team [3]. However, the main interest of our original gas cell design [2] lies in the fact that we can adjust the gas pressure in the cell down to a lower pressure (≈ 0.1 bar). The radiative shocks generated are high-Mach number shocks with a strong coupling between radiation and hydrodynamics.
Going to this level of initial pressure, the radiation almost becomes dominant. Several visible diagnostics were fielded, in order to determine the shock velocity, temperature and the "precursor" electron density. It is the first time that velocities of up to 250 km/s are observed in a low-density gas. Preliminary comparisons with 2D radiative hydrodynamic simulations will be discussed.

References

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