Motivation for December 2009 CRASH experiment was to acquire data for Hyades calibration

CRASH requires calibrated input from Hyades for laser-driven state. Data regarding early time behavior are essential for this calibration. It is important that the initial conditions of the experiment are well understood.

Geometry of an optically thin (upstream) radiative shock

A postshock cooling layer forms when energy flux due to thermal radiative losses from shocked material approaches the energy flux entering shocked material. We will define the parameter $R$ to be the ratio of the radiative fluxes to loss from shocked material.

$$R \sim \frac{\text{radiative fluxes}}{\text{material fluxes}} \sim \frac{u_s T}{\rho u_s T} \sim \frac{\sigma T^4}{\rho u_s T} \sim \frac{u_s}{\rho_o}$$

Launching a fast shock in low-density gas will create a radiative shock.

Data analysis includes shock breakout time from Be disks

Shock breakout time vs. disk thickness. Actual disk thicknesses are 19, 20 and 21 µm. Data points are offset 0.2 µm from shot-to-shot to differentiate between individual shots. Each shot potentially yields data from one of two VISARs and SOP. The error on the right represents the systematic error in timing of 75 ps. The error in the thickness is ±0.5 µm and is not shown.

Conclusions and Future Directions

Further data analysis needs to be performed on the December 2009 experiments, including side-on SOP data and shock breakout from thinner targets. Present results are yielding important information about the input space for Hyades.

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