FLASH Can Model Laser-Created Dense Plasmas

NATIONAL ENERGY RESEARCH SCIENTIFIC COMPUTING CENTER

***Objective*: Modeling the shockwave physics observed in laboratory laser experiments.**

***Implications*: High-energy laser facilities create hydrodynamic conditions relevant to astrophysics, specifically Supernova explosions.**

***Accomplishments*: Simulations using the FLASH code reproduce most experiment features but certain aspects differ in ways that are not completely understood.**

- **May be due to magnetic fields that are not currently considered in such simulations.**
- **Differences in Equation of State and 2-D vs. 3-D structure also examined as important effects.**

***NERSC*: FLASH runs (64 - 2,048 cores) and visualization using VisIt (64 - 128 cores) on Franklin; movies generated on DaVinci**

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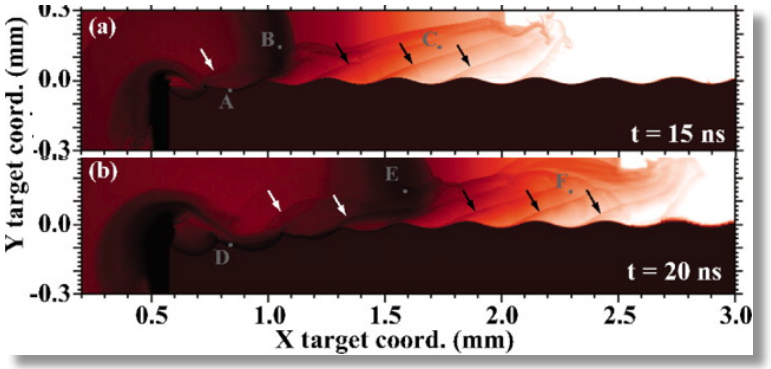
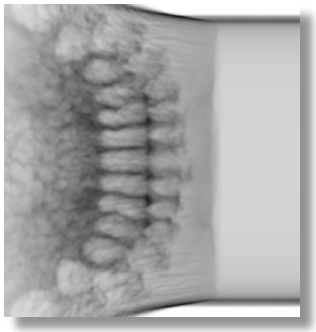


2-D FLASH *simulations showing development of high- (black arrows) and low-Mach (white arrows) shock waves in a Nike laser experiment.*



Results from 3-D FLASH simulation observing a blast-wave-driven Rayleigh Taylor instability induced by the Omega Laser. The experiment was designed to be well scaled to conditions in the outer layers of Supernovae.

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