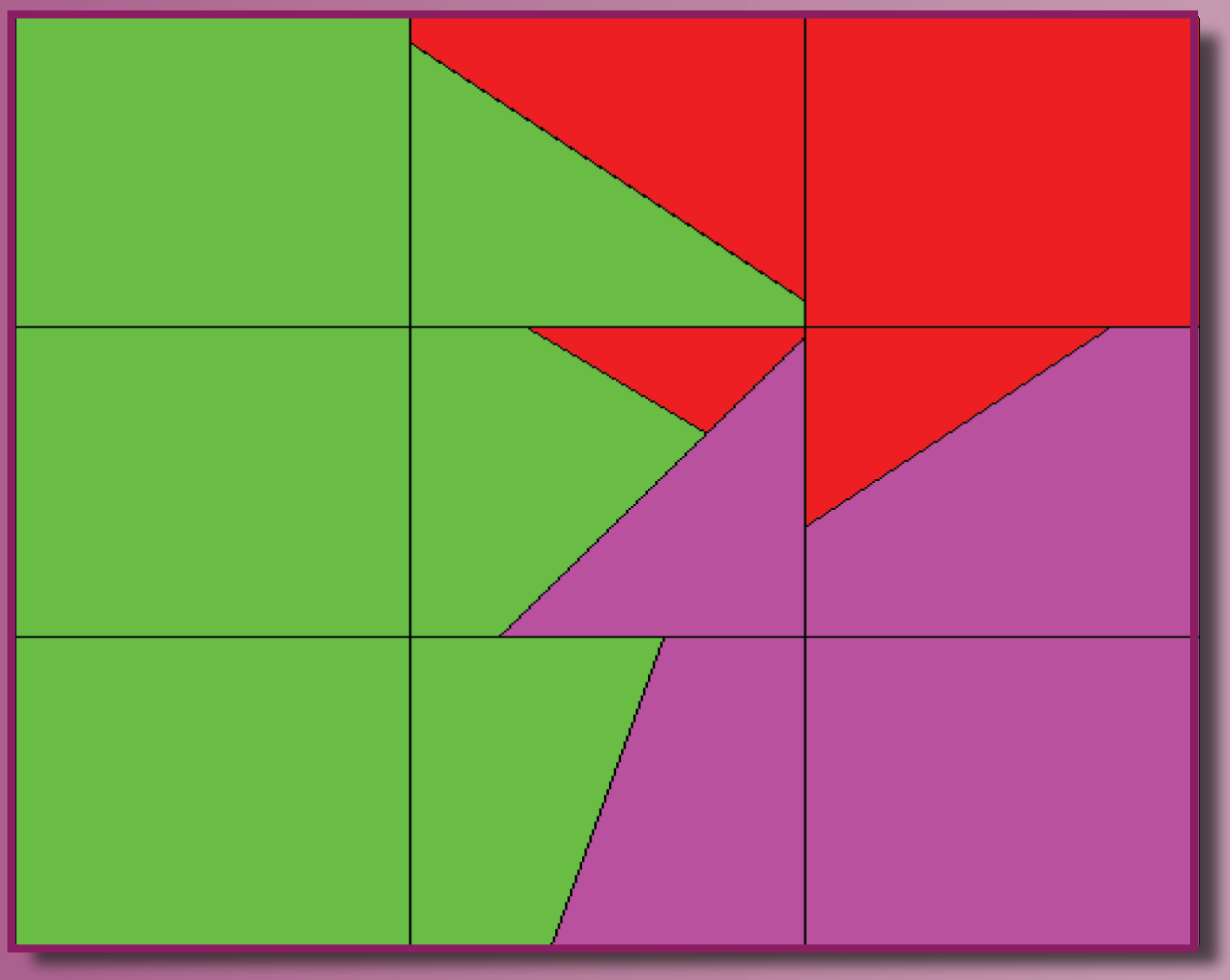

Hydrodynamics Methods and Algorithms

The dynamics of fluid flow is one of the fundamental physical processes in the evolution of the explosion of a nuclear weapon. The articles in this section speak to the current state-of-the-art in the simulation and understanding of some of the underlying physics in hydrodynamics—from the effect of approximations and numerical instability, to the fundamental evolution of turbulence, to the simulation of shock dynamics.

The six articles in this section summarize current developments in:

- the effect of pressure-temperature equilibrium on an important multimaterial fluid instability, the evolution;
- the evolution of turbulence in the interface between fluids of different densities using numerical simulation and experiment;
- the structure of radiative shock waves and the efficacy of their numerical prediction;
- the evolution of Rayleigh-Taylor instabilities and numerical comparisons with theory;
- a new method for the reconstruction of multimaterial interfaces; and
- new atomistic methods for simulating Rayleigh-Taylor instabilities.

These research developments are fundamental to improving the nature of predictive science in the nuclear weapons program.