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Simulations of a Molecular Cloud experiment using CRASH[1]
MATTHEW TRANTHAM, PAUL KEITER, ROBERT VANDERVORT, R. PAUL DRAKE, Univ of Michigan - Ann Arbor, DOV SHVARTS, Univ of Michigan - Ann Arbor and Nuclear Research Center-Negev, Israel — Recent laboratory experiments explore molecular cloud radiation hydrodynamics. The experiment irradiates a gold foil with a laser producing x-rays to drive the implosion or explosion of a foam ball. The CRASH code, an Eulerian code with block-adaptive mesh refinement, multi-group diffusive radiation transport, and electron heat conduction developed at the University of Michigan to design and analyze high-energy-density experiments, is used to perform a parameter search in order to identify optically thick, optically thin and transition regimes suitable for these experiments. Specific design issues addressed by the simulations are the x-ray drive temperature, foam density, distance from the x-ray source to the ball, as well as other complicating issues such as the positioning of the stalk holding the foam ball. We present the results of this study and show ways the simulations helped improve the quality of the experiment.

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