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Exploring the Parameter Space of a Laboratory Astrophysical Experiment Modeling a Molecular Cloud Experiment using CRASH[1] MATTHEW TRANTHAM, ROBERT VANDERVORT, University of Michigan, PAUL KEITER, Los Alamos National Laboratory, CAROLYN KURANZ, R PAUL DRAKE, University of Michigan — Recent laboratory experiments explored radiation hydrodynamics relevant to irradiated molecular clouds, by using X-rays from a laser-driven gold foil to irradiate a foam sphere. The primary goal of this study is to identify conditions under which the foam sphere target will implode, explode, or be blown away. We used CRASH, an Eulerian code developed at the U. of Michigan, which includes block adaptive mesh refinement, multigroup diffusive radiation transport, and electron heat conduction. We explored different regimes of molecular-cloud photoevaporation proposed by Bertoldi 1989. The dynamics of the experiment depend on the shock velocity produced, the speed of sound in the target, the opacity of the target, the size of the target, and ionizing flux incident on the target. We present a parameter study varying the foam target and X-ray flux showing the conditions under which an experiment could access the different regimes.

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