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Computational investigations of x-ray illuminated foam spheres of different opacities[1] GRIFFIN CEARLEY, ROBERT VANDERVORT, MATTHEW TRANTHAM, University of Michigan, PAUL KEITER, Los Alamos National Laboratory, R. PAUL DRAKE, CAROLYN KURANZ, ERIC JOHNSEN, University of Michigan — The radiation hydrodynamics of x-ray illuminated foam spheres of different densities were investigated experimentally on the OMEGA-60 laser system to study radiatively-imploded molecular gas clouds relevant to star formation. In the optically thick case, prediction of the shock location and strength is important for experimental design. We investigate a number of experimentally-relevant conditions for different densities (and opacities) by comparing semi-analytical self-similar solutions for equilibrium radiation diffusion to three-temperature simulations using the flux-limited diffusion radiation hydrodynamics code CRASH. Although the theory captures some of the salient features of the problem, we find that the three-temperature simulations are necessary for accurate heat-front and shock location predictions in the majority of cases considered.

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