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Experiments to study radiation transport in inhomogeneous plasmas M.J. TAYLOR, J.M. FOSTER, P.A. ROSEN, C.D. BENTLEY, C.C. SMITH, S.J. DAVIDSON, AWE Aldermaston, Reading, RG7 4PR, U.K., P.A. KEITER, J.R. FINCKE, M. GUNDERSON, Los Alamos National Laboratory, Los Alamos, NM 87544, T.S. PERRY, Lawrence Livermore National Laboratory, Livermore, CA 94551 — Calculations of radiation transport in heated materials are greatly complicated by the presence of regions in which two or more materials are inhomogeneously mixed; approximate, statistical treatments of this problem have been developed by Pomraning and others, but their application has not been tested in detail. We describe laboratory experiments to test modelling of radiation transport through inhomogeneous plasmas. An Omega laser-heated hohlraum is used as a thermal source to drive radiation through a polymer foam containing randomly-distributed gold particles. We discuss the design of these experiments, and the relation between the choice of hohlraum driver and the energetics and hydrodynamics of heat transport through the hot, gold mixture. Experimental data are compared with full post-shot simulations using different models for the opacity of the inhomogeneously-mixed material. Enhancements to the post-shot modelling will be outlined, and potential areas of improvement highlighted to increase the quantitative nature of the experiment.

Mark Taylor

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