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A Radiation-Hydrodynamics Code Comparison for Laser-Produced Plasmas: FLASH versus HYDRA and the Results of Validation Experiments[1] CHRIS ORBAN, The Ohio State University, MILAD FATENEJAD, Flash Center for Computational Science, University of Chicago, SUGREEV CHAWLA, Center for Energy Research, University of California San Diego; Lawrence Livermore National Laboratory, SCOTT WILKS, Lawrence Livermore National Laboratory, DONALD LAMB, Flash Center for Computational Science, University of Chicago — The potential for laser-produced plasmas to yield fundamental insights into High Energy Density Physics (HEDP) and deliver other useful applications can sometimes be frustrated by uncertainties in modeling the properties and expansion of these plasmas using radiation-hydrodynamics codes. In an effort to overcome this and to validate and verify the HEDP capabilities of the publicly available FLASH radiation-hydrodynamics code, we present detailed comparisons of FLASH simulations to previously published results from the HYDRA code used extensively at Lawrence Livermore National Laboratory for the validation experiments investigated by Grava et al., Phys. Rev. E, 78, (2008). Their paper describes the laser irradiation of an Al target and includes both interferometric measurements of electron number densities as well as HYDRA simulations of the target evolution. Despite radically different schemes for determining the computational mesh, and different equation of state and opacity models, the HYDRA and FLASH codes give excellent agreement with the experimental data.

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