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Additions and Improvements to the FLASH Code for Simulating High Energy Density Physics Experiments[1] D.Q. LAMB, C. DALEY, A. DUBEY, M. FATENEJAD, N. FLOCKE, C. GRAZIANI, D. LEE, P. TZEFERACOS, K. WEIDE, Flash Center for Computational Science, University of Chicago
— FLASH is an open source, finite-volume Eulerian, spatially adaptive radiation hydrodynamics and magnetohydrodynamics code that incorporates capabilities for a broad range of physical processes, performs well on a wide range of computer architectures, and has a broad user base. Extensive capabilities have been added to FLASH to make it an open toolset for the academic high energy density physics (HEDP) community. We summarize these capabilities, with particular emphasis on recent additions and improvements. These include advancements in the optical ray tracing laser package, with methods such as bi-cubic 2D and tri-cubic 3D interpolation of electron number density, adaptive stepping and 2nd-, 3rd-, and 4th-order Runge-Kutta integration methods. Moreover, we showcase the simulated magnetic field diagnostic capabilities of the code, including induction coils, Faraday rotation, and proton radiography. We also describe several collaborations with the National Laboratories and the academic community in which FLASH has been used to simulate HEDP experiments.

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