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Improvements to the FLASH Laser Energy Deposition Package¹ NORBERT FLOCKE, J. BACHAN, S. COUCH, C. DALEY, A. DUBEY, M. FATENEJAD, C. GRAZIANI, DON LAMB, DONGWOOK LEE, A. SCOPATZ, P. TZEFERACOS, K. WEIDE, University of Chicago — FLASH is an open source, compressible, spatially-adaptive, radiation magnetohydrodynamics code that is currently used at a number of institutions for simulating laser-driven HEDP experiments. FLASH uses ray-tracing to model laser energy deposition via the inverse-Bremsstrahlung process on an Eulerian block-structured mesh. We describe recent improvements to the laser ray-tracing package in FLASH which have led to increased accuracy and performance. A "3D-in-2D" ray-trace model has been developed which transports rays in three-dimensions when FLASH is configured to run in 2D cylindrical geometry. Several options have been added which allow users greater flexibility in choosing the initial ray placement. These options can be used to reduce the number of rays needed to accurately represent the energy deposition. Several models have been added to FLASH for smoothing the deposited laser energy to reduce numerical noise. The laser package has also been modified to use threading and mesh-replication for parallelization to improve computational performance. Finally, we will present the results of FLASH simulations that use these improvements and compare results using different laser options.

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