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Latest Developments to the FLASH Laser Energy Deposition Package¹ NORBERT FLOCKE, CHRIS DALEY, MILAD FATENEJAD, PETROS TZEFERACOS, DON Q. LAMB, University of Chicago — We describe recent improvements to the FLASH laser energy deposition package. FLASH is an open source, compressible, spatially-adaptive, radiation hydro/MHD code based on an Eulerian AMR grid. Laser energy deposition is modeled using geometric optics ray-tracing algorithms and the inverse-Bremsstrahlung process. A large variety of options exist for users, which allows for a flexible setup of the laser. Several domain geometries are possible (1D, 2D cartesian and cylindrical, 3D in 2D ray-tracing, 3D cartesian) and several beam cross-sections are available (ray placements on square, radial or statistical grids). The original treatment is based on the Kaiser algorithm, which represents the electron number density as a cell-by-cell, piece-wise linear continuous function. We have added a second option that uses cubic interpolation of the electron number density, resulting in a smoother distribution of the energy deposition. We have also improved the computational performance of the package through threading and asynchronous communication when rays cross a block boundary. We present the results of performance and verification tests of the improved package.

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