

## **Adding HEDP Capabilities to the Hydrodynamics in the FLASH Code**

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The FLASH code has been used to model X-Ray bursts, novae, supernovae, stellar atmospheres, galaxy clusters, and many other problems in astrophysics and other fields. We are adding capabilities to FLASH to make it an open toolset for the academic High-Energy Density Physics community. We first give an overview of the capabilities we plan to implement in the short to medium term. These include code for energy deposition by lasers, hydrodynamics in the presence of shocks and radiation, and enhanced MHD capabilities. We then describe in detail the equations and the method of solution we plan to use to enhance the Hydro and Eos components of FLASH, focusing on a three-temperature single-fluid description of the relevant physics with Flux Limited Diffusion for the radiation component. Finally, we discuss numerical methods, an initial implementation, and early testing results.