

Abstract Submitted
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Modeling laser produced plasmas with smoothed particle hydrodynamics for next generation advanced light sources¹ ROBERT HOLLADAY, Virginia Tech, ALEC GRIFFITH, Harvey Mudd College, MICHAEL S. MURILLO, Michigan State University — A computational model has been developed to study the evolution of a plasma generated by next-generation advanced light sources such as SLAC's LCLS and LANL's proposed MaRIE. Smoothed Particle Hydrodynamics (SPH) is used to model the plasma evolution because of the ease with which it handles the open boundary conditions and large deformations associated with these experiments. Our work extends the basic SPH method by utilizing a two-fluid model of an electron-ion plasma that also incorporates time dependent ionization and recombination by allowing the SPH fluid particles to have an evolving mass based on the mean ionization state of the plasma. Additionally, inter-species heating, thermal conduction, and electric fields are also accounted for. The effects of various initial conditions and model parameters will be presented, with the goal of using this framework to develop a model that can be used in the design and interpretation of future experiments.

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