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Plasma-hydro coupling in cassio, an Inertial Confinement Fusion Code from the Crestone Project THOMAS MASSER, JOHN WOHLBIER, CCS-2, Los Alamos National Laboratory — The Crestone Project at Los Alamos National Laboratory produces cassio, an ICF code. Currently cassio implements radiation hydrodynamics on an Eulerian AMR mesh along with a three temperature (3T) plasma physics model. A 3T model treats a plasma as a single species fluid with separate electron and ion temperatures, and uses a radiation diffusion model, where a radiation temperature characterizes the radiation energy density. The evolution equations for the electron and ion specific internal energies contain nonconservative products ($p\nabla \cdot u$), which requires an assumption about shock jump conditions. Assuming an isentropic discontinuity in electron quantities at the shock permits semi-analytical solutions for simple fully ionized flows; these flows exhibit differential shock heating of the electrons and ions with relaxation to a common temperature. We have developed an Eulerian Godunov-based scheme for computing such shocks. We provide details for the model, method, and semi-analytic solutions, and compare results of the method to the semi-analytic solutions.

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