Verification and Validation of cassio, an HEDP Code from the Crestone Project[1] THOMAS MASSER, JOHN WOHLBIER, JAMES REYNOLDS, ROBERT LOWRIE, JAMES COOLEY, JACOB WALTZ, Los Alamos National Laboratory — The Crestone Project at Los Alamos National Laboratory produces cassio, an HEDP 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. We provide details of verification and validation studies for the 3T model implemented in cassio, as well as code comparison studies with VULCAN, an ALE HEDP code. For verification, we compare code solutions to available semi- analytical results of 3T Sod problems for radiation hydrodynamics with heat conduction and electron-ion coupling. For validation, we simulate recent laboratory-astrophysics jet experiments at the Omega laser facility. We also study a typical ICF capsule implosion. For all of the problems considered above, we compare the simulation results of cassio and VULCAN.

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