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Modeling ICF With RAGE, BHR, And The New Laser Package
DYLAN CLICHE, Univ of Nevada - Reno, LESLIE WELSER-SHERRILL, BRIAN HAINES, Los Alamos National Laboratory, ROBERTO MANCINI, Univ of Nevada - Reno — Inertial Confinement Fusion (ICF) is one method used to obtain thermonuclear burn through the either direct or indirect ablation of a millimeter-scale capsule with several lasers. Although progress has been made in theory, experiment, and diagnostics, the community has yet to reach ignition. A way of investigating this is through the use of high performance computer simulations of the implosion. RAGE is an advanced 1D, 2D, and 3D radiation adaptive grid Eulerian code used to simulate hydrodynamics of a system. Due to the unstable nature of two unequal densities accelerating into one another, it is important to include a turbulence model. BHR is a turbulence model which uses Reynolds-averaged Navier-Stokes (RANS) equations to model the mixing that occurs between the shell and fusion fuel material. Until recently, it was still difficult to model direct drive experiments because there was no laser energy deposition model in RAGE. Recently, a new laser energy deposition model has been implemented using the same ray tracing method as the Mazinisin laser package used at the OMEGA laser facility at the Laboratory for Laser Energetics (LLE) in Rochester, New York. Using the new laser package along with BHR for mixing allows us to more accurately simulate ICF implosions and obtain spatially and temporally resolved information (e.g. position, temperature, density, and mix concentrations) to give insight into what is happening inside the implosion.

Dylan Cliche
Univ of Nevada - Reno

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