Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

**Modeling ICF Spherical Implosion Instabilities in 3D with Exact Energy Conservation**[1] MILAD FATENEJAD, GREGORY MOSES, Univ. of Wisconsin - Madison — We will present the results of 3D instability simulations performed on spherically convergent geometries with a new 3D Lagrangian hydrodynamics code, cooper. The code uses a compatible discretization of the conservation equations to ensure that energy is conserved to within machine round off error [Caramana *JCP* 146, 227 (1998)]. Modifications are made to the discrete equations to ensure that spherically symmetric implosions can be performed on non-orthogonal Cartesian grids [Caramana *JCP* 157, 89 (2000)]. Subzonal restoring forces counteract anomalous grid distortions [Carmana *JCP* 142, 521 (1998)] and an edge-centered viscosity is used to capture shocks [Caramana *JCP* 215, 385 (2006)]. Cooper is parallelized using domain decomposition. This is necessary due to the large processor and memory requirements associated with simulations in three dimensions. Advanced computational libraries are used to reduce the complexity of the code without sacrificing features. One example is the MOAB library [Tautges *Engr. Comput.* 20, 286 (2004)] which manages the mesh and is responsible for communicating information between processes.

[1]Work Supported By: Laboratory for Laser Energetics, U. of Rochester

Milad Fatenejad
Univ. of Wisconsin - Madison

Date submitted: 16 Jul 2009 Electronic form version 1.4