Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Simulation of laser-driven magnetic flux compression in inertial confinement fusion CHUANDONG ZHOU, AMMAR HAKIM, JOHN LOVERICH, PETER STOLTZ, Tech-X Corporation — Laser-driven magnetic-flux compression is an innovative approach to achieve magneto-inertial fusion (MIF). A cylindrical target with initial seed magnetic field is compressed by energetic laser beams. The magnetic field that is "frozen-in" plasma gets compressed with the target. The resulting high magnetic field reduces electron thermal conductivity and improves alpha particle confinement, thus providing an additional thermal insulation of the fuel forming the hot spot. Computer simulation is a main tool in this area, but an easy-to-use and easy-to-access, parallel, 3D code is not available to this community. New features, including laser energy deposition in under-dense plasma, are incorporated into the Tech-X fluid framework, TxFluids. We discuss our approach to determine the best algorithms for properly modeling laser-driven shock implosions with magnetic fields in conditions relevant to cylindrical MIF and benchmark magnetic compression with one-dimensional simulation.

Chuandong Zhou
Tech-X Corporation

Date submitted: 19 Jul 2009 Electronic form version 1.4