Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

**Shock compression of glow discharge polymer (GDP): density functional theory (DFT) simulations and experiments on Sandia's Z-machine** THOMAS R. MATTSSON, K.R. COCHRANE, T. AO, R.W. LEMKE, D.G. FLICKER, Sandia National Laboratories, M.E. SCHOFF, B.E. BLUE, General Atomics, S. HAMEL, M.C. HERRMANN, Lawrence Livermore National Laboratory — Glow discharge polymer (GDP) is used extensively as capsule/ablation material in inertial confinement fusion (ICF) capsules. Accurate knowledge of the equation of state (EOS) under shock and release is particularly important for high-fidelity design, analysis, and optimization of ICF experiments since the capsule material is subject to several converging shocks as well as release towards the cryogenic fuel. We performed Density Functional Theory (DFT) based quantum molecular dynamics (QMD) simulations, to gain knowledge of the behavior of GDP - including the effect of changes in chemical composition. The shock pressures calculated from DFT are compared experimental data taken on magnetically launched flyer plate impact experiments on at Sandia's Z-machine. Large GDP samples were grown in a planar geometry to improve the sample quality and maintained in a nitrogen atmosphere following manufacturing, thus allowing for a direct comparison to the DFT/QMD simulations. Sandia National Laboratories is a multi program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's NNSA under contract DE-AC04-94AL85000.

Thomas R. Mattsson
Sandia National Laboratories

Date submitted: 24 Jul 2015 Electronic form version 1.4