Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Equation of State Determination from Quasi-Isentropic Compression of Solid Beryllium Liners on Z[1] MATTHEW MARTIN, RAYMOND LEMKE, RYAN MCBRIDE, MARCUS KNUDSON, JEAN-PAUL DAVIS, Sandia National Laboratories — We investigate the beryllium equation of state through constraining magneto-hydrodynamic and magneto-solid dynamic simulation with experimentally determined density profiles of a compressed beryllium cylindrical liner. Experiments utilizing pulse shaping techniques on Z have achieved quasi-isentropic compression of cylindrical beryllium liners to approximately 3 Megabars, and simulation results suggest that a large fraction of the liner remains in the solid phase through peak pressure for a 20 MA current pulse on Z. This opens up the possibility of extending the range of pressures we can explore with magnetic drive by utilizing cylindrical convergence. However, the cylindrical geometry limits the usefulness of diagnostics commonly applied to planar equation of state measurements on pulsed power machines and requires the development of new methods to unfold isentropes from the experimental data.

[1]Sandia is a multiprogram laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Company, for the US Department of Energy's National Nuclear Security Administration under Contract No. DE-ACO4-94AL85000.

Matthew Martin
Sandia National Laboratories

Date submitted: 19 Jul 2010 Electronic form version 1.4