Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Temporal and Spatial Measurements of a Z-Pinch Magnetic Field and Comparison with Simulations[1] EYAL KROUPP, GUY ROSENZWEIG, Weizmann Institute of Science, Rehovot, Israel, AMNON FISHER, Technion, Israel Institute of Technology, Haifa, Israel, YITZHAK MARON, Weizmann Institute of Science, Rehovot, Israel, JOHN GIULIANI, WARD THORNHILL, ALEXANDER VELIKOVICH, ARATI DASGUPTA, Plasma Physics Division, Naval Research Laboratory — Magnetic forces drive the implosion of a linear Z-pinch. The finite conductivity of the plasma means that the azimuthal field can diffuse into the accelerated material and the current is distributed. We have performed detailed measurements of the evolution of the azimuthal magnetic field within an oxygen z pinch on a 500 kA generator. Polarization spectroscopy is used to record the individual line profiles of the left and right circularly polarized component of Zeeman-split emission lines from OIII and OVI ions. The magnetic field spatial distribution down to <5 mm radius is presented for four times within 26 ns of stagnation. Numerical simulations using a 2D radiation MHD code are compared with the data. Implications for the current distribution and plasma resistivity will be discussed in light of the simulations and data.

[1]Work supported by the Israel Science Foundation and DOE/NNSA.

Guy Rosenzweig
Weizmann Institute of Science, Rehovot, Israel

Date submitted: 10 Jul 2014 Electronic form version 1.4