

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Soldered contact effect on wire array Z-pinches¹ DAVID CHALENSKI, BRUCE KUSSE, JOHN GREENLY, Cornell University Laboratory of Plasma Studies — The Cornell University COBRA pulser is a nominal 1MA machine, capable of driving up to 16 wire cylindrical Z-pinch arrays. COBRA can operate with variable current risetimes ranging from 100ns to 250ns. Wires are typically strung with a “press” contact to the electrode hardware, where the wire is loosely pulled against the hardware and held there to form an electrical contact. Previous research with single wires on a 1-5kA pulser has shown that soldering the wire, thereby improving the wire/electrode contact, can improve the expansion of and energy deposition into the wire. Previous experiments on Z (T.W.L. Sanford et al., Phys. Plasmas 12, 122701 (2005)) have shown that improving the contact improves the X-ray yield. Data were collected on 16- and 8-wire, Aluminum, Copper and Tungsten Z-pinch arrays, with radii ranging from 16mm to 8mm. Experiments were conducted with both slow and fast risetimes (100ns and 200ns). The initiation, ablation, implosion and stagnation phases were compared for soldered and unsoldered arrays. Soldering appeared to produce a smaller radius pinch and improve X-ray yield in properly massed arrays.

¹This research was supported by DOE grant DE-FG03-98ER54496, by Sandia National Laboratories contract AO258, and by the NNSA SSAA program under DOE Cooperative Agreement DE-FC03-02NA00057.

David Chalenski
Cornell University Laboratory of Plasma Studies

Date submitted: 20 Jul 2007

Electronic form version 1.4