

Abstract Submitted  
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**Positive polarity effect on 8-wire cylindrical z-pinches** DAVID CHALENSKI, JOHN GREENLY, PETER SCHRAFEL, BRUCE KUSSE, Cornell University — The Cornell University COBRA pulser is a nominal 1MA, 1MV machine, capable of driving up to 8 wire cylindrical Z-pinches. COBRA operates normally in negative polarity. A bolt-on convolute at the load was designed to allow both positive and negative polarity drives for the array. In positive polarity the electric field lines originate on the array wires while in negative polarity the field lines terminate on the wires. Data were collected on 8-wire 12.5 $\mu$ m Aluminum Z-pinches in both polarities. Time dependent x-ray signals were measured using diodes and diamond detectors. A 6 ns pulsed laser was used as a backlighter to obtain images that were time-stepped through the evolution of the pinch. Pinches in positive polarity showed an increase in the power and total energy of the soft X-rays, and a decrease in the power and total energy of the emitted hard X-rays as compared to negative polarity pinches. Initial observations indicated that the pinch column in positive polarity began to form earlier than in negative polarity, and the structure of the imploding material was shown to be drastically different for the two polarity configurations. This research was supported by DOE grant DE-FG03-98ER54496, by Sandia National Laboratories contract AO258, and by the NNSA Stockpile Stewardship Academic Alliances program under DOE Cooperative Agreement DE-FC03-02NA00057.

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