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Positive Polarity X-Pinch Operation I.C. BLESENER, M.D. MITCHELL, T.A. SHELKOVENKO, S.A. PIKUZ, P.W. ZYWICKI, B.R. KUSSE, Cornell Univesity — We present here the results of a series of experiments comparing the operation of an x-pinch in positive and negative polarity. Of particular interest are the x-ray yield, timing, radiating spot size, and the number of radiating spots in a given x-pinch. Conventionally, an x-pinch is operated in negative polarity resulting in electric field lines that terminate on the wires. This choice of polarity for the generator is due to the fact that breakdown in these machines is easier to prevent when they are operated in negative polarity. Previous experiments involving single wire explosions at low current (1-5 kA) have shown that more energy can be deposited in the wire cores when they are driven in positive as opposed to negative polarity. These results raised the question of what happens when pinch-type experiments are driven in positive polarity. Recently, it has become possible to switch the polarity of the 450 kA XP pulser at Cornell to drive x-pinches in either positive or negative polarity. After switching the polarity of the machine and matching current shapes between positive and negative shots, a direct comparison between opposing polarities can be made. 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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