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Implosion dynamics of wire-array z-pinches on the COBRA accelerator[1] R.D. MCBRIDE, K.S. BELL, I.C. BLESENER, D.A. CHALENSKI, J.D. DOUGLASS, J.B. GREENLY, P.F. KNAPP, S.A. PIKUZ, T.A. SHELKOVENKO, T. BLANCHARD, H. WILHELM, D.A. HAMMER, B.R. KUSSE, Laboratory of Plasma Studies, Cornell University — Experimental results characterizing wire-array z-pinch implosion dynamics on the 1-MA, 100-ns rise time COBRA pulsed power generator are presented. Diagnostics fielded include an optical streak camera, a time-gated XUV framing camera, a laser shadowgraph system, filtered time-integrated pinhole cameras, a focusing x-ray spectrometer with spatial resolution (FSSR), a load voltage monitor, a faraday cup, a bolometer, silicon diodes and diamond photoconducting detectors (PCDs). The load geometries investigated in this set of experiments include cylindrical arrays ranging from 6 to 16 mm in diameter, and consisting of 8, 16, or 32 wires of either aluminum (Al) or tungsten (W). The data produced by the entire suite of diagnostics are analyzed and presented to provide an overall picture of implosion dynamics and timing on COBRA. In particular, data fitting to various implosion trajectory models, as well as x-ray pulse shape dependencies on various loads and implosion characteristics are presented and discussed.

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