

Abstract Submitted  
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**Calibrated areal density measurements of cable-array Z-pinch plasmas at 1 MA** C.L. HOYT, P.F. KNAPP, S.A. PIKUZ, T.A. SHELKOVENKO, P.-A. GOURDAIN, J.B. GREENLY, D.A. HAMMER, Cornell University — We present areal density measurements of multi-wire cable-array Z-pinch plasmas obtained using X-pinch x-ray backlighter radiographs. The elements of a cable array are made by twisting 2 - 4 wires into a cable with a twist wavelength ranging from 0.5mm to 4mm. In experiments on the 1 MA COBRA pulsed power generator, the radiographs of the cables displayed density structure not observed in standard wire-array z-pinches, including sharp density gradients in the form of spirals that follow the twisting wires and small scale striations that are the result of an undetermined mechanism. The X-ray radiographs were produced using the 3-5 keV spectral band of Mo X-pinches, which was obtained using 12.5 micron Ti filters. Ag, Ni, Cu and W cable-arrays have been tested, and film exposure was converted to plasma areal density using calibrated step wedges of the test material that were deposited on the Ti filter. X-pinch timing was monitored with 12.5 micron Ti filtered silicon diodes. Laser shadowgraphy and XUV self-emission diagnostics were also employed. This research is supported by the NNSA SSAA program under DOE Cooperative Agreement DE-FC03-02NA00057.

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