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Development of the Axial Instability in Low Wire Number Wire Array Z-Pinches P.F. KNAPP, K.S. BELL, I.C. BLESENER, D.A. CHALENSKI, J.B. GREENLY, M.R. MARTIN, R.D. MCBRIDE, S.A. PIKUZ, T.A. SHELKOVENKO, D.A. HAMMER, B.R. KUSSE, Laboratory of Plasma Studies, Cornell University — We are investigating the development of the axial instability that occurs on wires in wire-array Z-pinches, which manifests itself as a modulation of the size of the coronal plasma. The modulation is evidently a result of non-uniform ablation of material from the wire core. It is known that the wavelength of this modulation reaches a constant as the pinch develops that is a strong function of the material and little else, thus it is known as the fundamental mode. In these experiments we have been imaging individual wires with laser shadowgraphy primarily in low wire number, large wire diameter arrays made with Al, Cu, Ag and other wires. We document the development of this modulation from the beginning of plasma formation and show the wavelength and amplitude growth as a function of time. The magnetic field is also measured using B-dot probes inside the array. The change from a closed to an open field topology and its relation to the instability growth will be discussed.This research was supported by the Stewardship Sciences Academic Alliances program of the National Nuclear Security Administration under DOE Cooperative agreement DE-FC03-02NA00057 and by Sandia National Laboratories contract AO258.

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