

Abstract Submitted
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Dynamics and Radiation Characteristics of Copper Wire Arrays at the Z Accelerator C.A. COVERDALE, B. JONES, C. DEENEY, Sandia National labs, A.S. SAFRONOVA, N. OUART, University of Nevada, Reno, J. CHITTENDEN, Imperial College, P.D. LEPELL, Ktech Corporation — Experiments to study the dynamics and radiation characteristics of single and nested copper z-pinches have been fielded at the 20 MA Z facility. Wire initiation and early implosion phases have been studied through monochromatic backlighting, shadowgraphy, and self-emission imaging and show instability and trailing mass. Pinhole images of the imploding plasma and stagnated pinch also show structure; the single arrays show multiple hotspots, while the nested arrays show more uniform emission. The K-shell output varies less for nested than for single arrays, suggesting hot spots dominate the K-shell radiation pulse for single arrays. Plasma parameters extracted from modeling of time-integrated K-shell and L-shell spectra indicate that more than one plasma source contributes to the radiation, which could result from hot spots or temporal gradients in the spectrum. The alignment of outer to inner wires of nested arrays has also been studied, though modeling suggests that outer/inner array interaction is dominated by modulations in the magnetic field caused by the return current configuration. *Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.

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