

Abstract Submitted
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Implosion dynamics and x-ray generation in small-diameter wire-array z-pinches¹ V.V. IVANOV, V.I. SOTNIKOV, J.M. KINDEL, A.L. ASTANOVITSKIY, A. HABOUB, S.D. ALTEMARA, University of Nevada, Reno, NV, A.P. SHEVELKO, Brigham Young University, Provo, UT, E.D. KAZAKOV, Lebedev Physical Institute, Moscow, Russia, P.V. SASOROV, Institute of Theoretical and Experimental Physics, Moscow, Russia — The implosion in cylindrical wire arrays with diameters from 1 to 16 mm were compared to find a transition from regimes with high kinetic energy to regimes with other mechanisms of plasma heating. The x-ray power falls in 1-2-mm loads that can be linked to the lower efficiency of plasma heating with lack of kinetic energy. The electron temperature and density of pinches also depend on the array diameter. Correlated bubble-like implosions were observed with a multi-frame shadowgraphy. The energy balance provides evidence for mechanisms of non-kinetic plasma heating in z-pinches. Formation and evolution of bright spots in Al and W z-pinches were studied with a time-gated pinhole camera. A comparison of x-ray images with shadowgrams shows that implosion bubbles produce “necks” and initiate bright spots in the pinch.

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