Abstract Submitted
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Study of instabilities in wire-array Z pinches at stagnation[1] V.V. IVANOV, University of Nevada, Reno, USA, J.P. CHITTENDEN, Imperial College, London, UK, R.C. MANCINI, D. PAPP, University of Nevada, Reno, USA, N. NIASSE, Imperial College, London, UK, S.D. ALTEMARA, A.A. ANDERSON, University of Nevada, Reno, USA — Stagnation of the wire array Z pinches was studied at a 1 MA generator with imaging UV and x-ray diagnostics. Cylindrical, linear, and star wire-array Z pinches present different sets of instabilities seeded to the pinch during implosion. Compact cylindrical wire arrays implode to Z-pinches with m =0 necks associated with bright spots on x-ray images. The electron temperature of bright spots measured with K-shell spectroscopy is higher by 20-40% compared to cold areas. Maximum x-ray power is generated by Z pinches with strong instabilities. Fast plasma motion with a velocity >100 km/s was observed in the Z pinch at stagnation with two-frame shadowgraphy. Plasma instabilities may present a mechanism for conversion of magnetic energy to kinetic energy. Comparison of the implosions in small-diameter cylindrical and star wire array shows that the secondary implosion of non-imploded peripheral plasma prolongs the stagnation stage and provides the enhanced x-ray production. Development of instabilities in wire arrays is in agreement with 3D MHD Gorgon simulations.

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