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Implosion and stagnation dynamics of wire array z-pinches S.N. BLAND, S.V. LEBEDEV, D.J. AMPLEFORD, S.C. BOTT, J.P. CHITTENDEN, G.N. HALL, C.A. JENNINGS, J.B.A. PALMER, J. RAPLEY, Imperial College Plasma Physics Group, D.A. HAMMER, S.A. PIKUZ, T.A. SHELKOVENKO, Laboratory of Plasma Studies, Cornell University, I.H. MITCHELL, J.A. GÓMEZ, Pontificia Universidad Católica de Chile — We present detailed measurements of the implosion and stagnation phases of wire array z-pinch experiments on the MAGPIE generator (1MA, 240ns). The implosion of the array, which consists of an accelerating snowplough of current traveling towards the axis, critically depends upon the redistribution of mass ablated from the wires prior to implosion. Array configurations that alter the ablation of plasma from the wires of the array (e.g. by varying Bθ, introducing Bz and Br and/or by reversing the direction of Er) are used to explore the dependence of implosion on this process. The initiation of the implosion phase and formation of the snowplough sheath is investigated. The width of the sheath colliding with a precursor plasma column on axis is consistent with the rise time of the X-ray pulse observed in the experiments; and whilst the level of emission increases, the stagnated body of plasma on axis compresses, and axial electron beams are observed. After peak emission, the stagnated plasma shows large scale instabilities that then cause discontinuities. This research was sponsored by Sandia National Laboratories Albuquerque, the SSAA program of NNSA under DOE Cooperative Agreement DE-FC03-02NA00057

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