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Experimental Radial Density Profiles in Wire Array Z-Pinches SIMON BOTT, S. LEBEDEV, S. BLAND, J. CHITTENDEN, M. HAINES, G. HALL, J. RAPLEY, F. SUZUKI, A. MAROCCHINO, Imperial College London, J. PALMER, AWE Plc, D. AMPLEFORD, C. JENNINGS, Sandia National Laboratory — The ablation processes occurring in wire arrays are fundamental to the evolution of the radial density profile, the development of precursor structures, and the trajectory of the final implosion of the main array mass. During the flow of plasma to the array axis, a quasi-periodic axial modulation in the density is observed experimentally for all array materials. The wavelength of this 'flare' structure varies with material, but the mechanism which seeds the development of this axial modulation axis remains unresolved. This is often introduced into numerical simulations by artificially by use of either an initial axial mass or temperature variation at the appropriate periodicity in order to emulate the experiment. Experimental characterization of the evolution of the radial density profile will provide a constraint for the initial conditions of the simulation. This paper describes radiographic and interferometric data from wire array experiments on the MAGPIE generator at Imperial College London. In particular, two-frame radiography is applied to image a single wire core at multiple times to study the development of the radial flare structure, and these data are compared to results from the Gorgon 3D MHD code. This research was sponsored by the NNSA under DOE Cooperative Agreement DE-F03-02NA00057.

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