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Comparison of Staged Z-pinch Experiments at the NTF Zebra Facility with Mach2 simulations[1] E. RUSKOV, F. J. WESSEL, H. U. RAHMAN, P. NEY, Magneto-Inertial Fusion Technologies, Inc., T. W. DARLING, Z. JOHNSON, E. MCGEE, A. COVINGTON, University of Nevada, Reno, NTF, E. DUTRA, National Security Technologies, LLC, J. C. VALENZUELA, F. CONTI, J. NARKIS, F. BEG, University of California, San Diego — Staged Z-pinch experiments at the University of Nevada, Reno, 1MA Z-pinch Zebra facility were conducted. A hollow shell of argon gas liner is injected between 1 cm anode-cathode gap through a supersonic nozzle of 2.0 cm diameter with a throat gap of 240 microns. A deuterium plasma fill is injected inside the argon gas shell through a plasma gun as a fusible target plasma. An axial magnetic field is also applied throughout the pinch region. Experimental measurements such as pinch current, X-ray signal, neutron yield, and streak images are compared with MACH2 radiation hydrodynamic code simulations. The argon liner density profiles, obtained from the CFD (FLUENT), are used as an input to MACH2. The comparison suggests a fairly close agreement between the experimental measurements and the simulation results. This study not only helps to benchmark the code but also suggests the importance of the Z-pinch implosion time, optimizing both liner and target plasma density to obtain the maximum energy coupling between the circuit and the load.

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