Investigation of implosions in star-like wire arrays on the 1-MA Zebra generator

V.V. IVANOV, V.I. SOTNIKOV, A. HABOUB, A.L. ASTANOVITSKIY, A. MOROZOV, S.D. ALTEMARA, C. THOMAS, S. BATIE, V. NALAJALA, University of Nevada, Reno, A.P. SHEVELKO, E.D. KAZAKOV, P.N. Lebedev Physical Institute, Moscow — Implosions in star-like wire arrays, consisting of multiple rays of linear wire rows extending from the central axis, were investigated in the 1-MA Zebra generator. Arrays with 12-24 wires placed on 3-8 rays and 3-6 cylinders were tested. In star-like arrays the imploding plasma cascades to the center from wire to wire along rays of the star and forms plasma columns with a smooth leading edge. Shadowgraphy shows improved plasma homogeneity and mitigation of instabilities. Despite the low azimuthal symmetry, star-like wire arrays produce a stable x-ray pulse with the enhanced peak power of 0.4 TW and the shortest duration of 8-12-ns among other loads in this series of shots. Dynamics of the implosion in star-like wire arrays are compared with cylindrical and nested arrays. Work was supported by the DOE/NNSA under UNR grant DE-FC52-06NA27616.

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