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Spectroscopy and implosion dynamics of combined W and Al X-pinch
1 MA z-pinch generator A. SAFRONOVA, V. KANTSYREV, D. FEDIN, A. ESAULOV, F. YILMAZ, N. OUART, T. HOPPE, G. OSBORNE, V. NALAJALA, S. POKALA, I. SHRESTHA, University of Nevada, Reno, J.P. APRUZESE, NRL — Experiments on the 1 MA Zebra generator at UNR with combined planar-loop X-pinchs composed from high-Z (W) and low-Z (Al) materials provide a unique opportunity to study M-shell radiation of W. In particular, X-pinchs with a 35 μm W wire in the top loop and a 99 μm Al wire in the bottom loop as well as reversed, Al at the top and W at the bottom, of the same diameter, were analyzed and compared. In addition, wire arrays with 5 μm W wires coated with 5% NaF were investigated and compared with X-pinchs. Spatially-resolved and integrated x-ray spectral data and time-resolved and integrated pinhole x-ray images accumulated in these experiments were analyzed. Modeling of K-shell radiation from Al, Mg, and Na ions provides K-shell plasma parameters. Modeling of M-shell radiation from W provides parameters for M-shell plasmas. Based on this modeling, Al and W radiation is analyzed and compared for different wire loads. The importance of using different materials, dopants, and load configurations for understanding the radiative properties of W is illustrated. Work supported by the DOE/ NNSA under UNR grant DE-FC52-01NV14050 and by Sandia National Laboratories under DOE contract DE-AC04-94AL85000.

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