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An Investigation of the Radiation and Implosion Performance of Al/Mg Nested Wire Arrays on the Refurbished Z Simulator<sup>1</sup> Y.K. CHONG, W. THORNHILL, J. GIULIANI, Plasma Physics Division, NRL, R. CLARK, Berkeley Research Scholars, D. AMPLEFORD, C. JENNINGS, B. JONES, C. COVERDALE, Sandia National Laboratories — A set of Al/Mg nested wire array Z-pinch load experiments has been recently performed on the refurbished Z accelerator. The initial 1D predictions display a K-shell yield increasing w/ mass load, but the exp. data showed the opposite trend. In this study, we present the results from the modeling of the exp. using a 1-D non-LTE radiation MHD code with a detailed atomic model and the prob.-of-escape radiation transport. Our focus will be on the characterization of the radiation emission, absorption & transport, & the energetics & dynamics of the Z-pinch plasma as a function of the load mass & wire array distribution. The effects of the current loss & the e-i energy coupling physics on the radiation power & yield and the implosion performance will be investigated. Finally, an examination of the role of multidimensional structures on the radiation & implosion physics will be made using appropriate models w/ relevant improvements suitable for studying the Z-pinch loads in order to help bridge the gap between the exp. & the previous 1-D predictions.

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