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Modeling K- and L-shell Spectra from Cu Wire Array Implosions on ZR[1] R.W. CLARK, Berkeley Scholars Inc., Springfield, VA, A. DASGUPTA, J.L. GIULIANI, Naval Research Laboratory, Washington, DC, N.D. OUART, NRC/NRL Post Doc, B. JONES, D.J. AMPLEFORD, C.A. COVERDALE, Sandia National Laboratories, Albuquerque, NM — We will examine K- and L-shell data obtained from the copper nested wire-array SNL shot Z1975, and compare it with data obtained from a simulation using the 1-D DZAPP radiation-hydrodynamics code. In addition to Cu, lines of Ni, Fe and Cr were observed in the experimental spectra, and we performed the calculations with an appropriate mixture of these elements. In the present analysis, we find support for an alternative K-alpha model which competes with the better known e-beam generation mechanism, wherein K-shell photons from hot plasma on or near the axis are absorbed in a dense, cool annular envelope via inner-shell photoionization. The resulting electronic relaxation of the absorbing ions produces the K-alpha radiation. By generating radially resolved synthetic spectra from self-consistent calculations of K-shell vacancy formation, and characterizing the energies of the resulting K-alpha radiation, diagnostics are obtained which can help differentiate between beam generated and photon driven K-alpha radiation.

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Arati Dasgupta
Naval Research Laboratory, Washington, DC

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