Abstract Submitted
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Impact of Dielectronic recombination on Ionization dynamics and Spectroscopy of Z-pinch Stainless Steel plasma[1] A. DASGUPTA, J. DAVIS, J.L. GIULIANI, Plasma Physics Division, NRL, R.W. CLARK, K.G. WHITNEY, Berkeley Research Associates — The implosion dynamics of an array of stainless steel (SS) wires on the Z and/or ZR accelerator produces an abundances of radiation from the K- and L-shell ionization stages. We will evaluate the contributions of dielectronic recombination (DR) process to the K-shell yield and its role in cooling the plasma and influencing the recombination rate of the recombining plasma. As the plasma assembles on axis, a number of time resolved snapshots will provide temperature and density profiles and size of the emitting region. We will analyze the ionization dynamics and generate K- and L-shell spectrum using the temperature and density conditions generated in Z and/or ZR accelerator describing the implosion with a 1-D non-LTE radiation hydrodynamics model. The non-LTE populations will be obtained by using detailed atomic models that include all important excitation, ionization, and recombination processes. In particular, we will investigate the effects of DR which is the most important recombination process for moderate to high Z plasma such as iron at moderate densities, on the generated spectrum.

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