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Simulation and Spectroscopy of highly charged Krypton Plasmas[1]

ARATI DASGUPTA, NRL, ROBERT CLARK, Berkeley Research Scholar, Beltsville, MD, JOHN GIULIANI, JACK DAVIS, NRL — We will analyze the sensitivity of atomic models for K- and L-shell krypton by investigating its impact on radiation from a cylindrical static plasma of specified internal energy. Our atomic model employs an extensive atomic level structure, which is necessary to accurately model the pinch dynamics and the spectroscopic details of the emitted radiation. The atomic data is obtained using the state-of-the-art Flexible Atomic Code, and all relevant radiative atomic processes are included in generating the model. The enormous number of fine-structure levels are judiciously lumped to create a database that is detailed but appropriately sized for future use in hydrodynamic simulation of Z-pinches. We will compare and contrast the results with those obtained using previous krypton atomic models which have limited structure. We will explore the behavior in the krypton ionization stages and emitted synthetic spectra using temperature and density conditions that have been predicted in 1-D calculations of implosions on the Sandia ZR accelerator.

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