Abstract Submitted
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**Lumped-state CRE Modeling of the Ionization Dynamics of O- and N-like Krypton**[1] K.G. WHITNEY, Berkeley Scholars Inc., A. DASGUPTA, J.W. THORNHILL, J. DAVIS, Plasma Physics Division, Naval Research Laboratory — An often used approximation employed to simplify the problem of modeling the L- and M-shell ionization dynamics of moderate to high atomic number plasmas is to lump the states within each $n\ell$ multiplet of each ionization stage, and historically, this approximation has been applied assuming the multiplet substates are in LTE with respect to one another. In both Fe and W Z-pinch plasmas, this assumption has been shown to break down in ionization stages where the ground state has no multiplet structure [2]. In this talk, we study the subpopulation dynamics in O- and N-like ionization stages where significant amounts of population can be stored in excited states and where ground states have multiplet structure. The non-LTE behavior of the following states is calculated: the ground states, the $\Delta n = 0$, and the $2p^3 3\ell$ or $2p^2 3\ell$ excited states of O-like and N-like Kr respectively, and used to determine the impact on lumped state excitation and ionization rates and on the MHD of Z-pinch Kr implosions. In particular, the reduction of the Einstein decay rates of the $n = 3$ states as a function of ion density is calculated.

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[2]K. G. Whitney, et. al., J. Phys. B, **40, 2747 (2007).**

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