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2D Radiation MHD Modeling of Ar Gas Puff Experiments on Z, ZR, Saturn, and DQ[1] J.W. THORNHILL, Y.K. CHONG, J.P. APRUZESE, J. DAVIS, A.L. VELIKOVICH, R.W. CLARK, R.E. TERRY, K.G. WHITNEY, R.J. COMMISSO, Plasma Physics Division, Naval Research Laboratory, M.H. FRESE, S.D. FRESE, NumerEx, J.S. LEVINE, N. QI, H. SZE, L-3 Pulse Sciences — Large diameter nozzle argon gas puff experiments present us with the opportunity to demonstrate the progress that has been made in 2D state-of-the-art modeling of K-shell emitting gas puff plasmas. In this modeling the Mach2 2D MHD code is extended by incorporating into it a computationally efficient and reasonably accurate model for the non-LTE equation of state and radiation transport present in K-shell emitting multi-dimensional plasmas. This extension is called the tabular collisional radiative equilibrium model. This fully 2D radiation – MHD capability is used to investigate how the initial, multi-dimensionally structured, gas-puff density distribution affects the evolution of the pinch and produces substantial deviations from 1D behavior. The density and temperature profiles of the pinch, the current profile, the implosion time, and the radiation characteristics are all substantially affected. The 2D calculations can be employed to project the K-shell yield behavior of different nozzle designs on higher current machines. Here we project the K-shell behavior of L3's 4-3-2-1 nozzle and their 6-5-3-2 with-central-jet nozzleto the Saturn and ZR pulse power generators.

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