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Computational modeling of Krypton Gas Puffs on Z[1] C.A. JENNINGS, D.J. AMPLEFORD, A.J. HARVEY-THOMPSON, B. JONES, S.B. HANSEN, D.C. LAMPPA, M.R.L. JOBE, T. STRIZIC, M.E. CUNEO, Sandia National Laboratories — Large diameter multi-shell gas puffs rapidly imploded by high current ($\sim$ 20MA, $\sim$ 100ns) on the Z generator are able to produce high-intensity K-shell radiation. Experiments are underway to produce Krypton K-shell emission at $\sim$ 13keV, although efficiently radiating at these high photon energies represents a significant challenge. This necessitates the careful design and optimization of the distribution of gas in these loads. To facilitate this we hydro-dynamically model the flow of gas out of the nozzle, before imploding that mass distribution using a 3-dimensional resistive, radiative MHD code (GORGON). Modeled gas profiles have been validated against 2-dimensional interferometric measurements of the gas distribution from these nozzles, and MHD calculations are validated against power, yield, spectral and imaging diagnostics of previous gas puff implosions on Z. This approach enables us to iterate between modeling the implosion and modeling gas flow from the nozzle to optimize radiative output from this combined system. Guided by our implosion calculations we have redesigned the gas nozzle to better optimize Krypton K-shell output and the evaluation of these designs is the subject of ongoing experiments.

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