Simulations of Ar gas-puff implosions on Z with a Xe dopant

VARUN TANGRI, Berkeley Research Associates, J. L. GIULIANI, A. L. VE-LIKOVICH, N. D. OUART, A. DASGUPTA, Plasma Physics Division, Naval Research Laboratory, J. W. THORNHILL, Berkeley Research Associates, J. P. APRUZESE, Consultant to the NRL through Engility Corp., A. J. HARVEY-THOMPSON, B. JONES, C. A. JENNINGS, Sandia National Laboratories — A recent experiment [1] on the Z machine at SNL indicated that the presence of a small fraction of Xe (0.8% by number in the center jet) in a Ar gas puff shot had a significant effect on the emitted K-shell radiation. In presence of the Xe dopant, the Ar K-shell yield dramatically reduced from 373 9 to 129 9 kJ. The peak K-shell power was also significantly lower and accompanied by two nearly equal peaks. A second shot without the Xe dopant consisted of a single peak. We present radiation-magnetohydrodynamic simulations of these shots [Z2603 (with Xe) and Z2605 (without Xe)] using the using the Mach2-TCRE code with a tabulated collisional radiative equilibrium model. Detailed numerical simulations exploring the impact of the Xe dopant on the implosion dynamics and the resultant K-shell radiation will be presented. Analysis of a time- and space resolved synthetic K-shell spectra would also be presented. [1] Harvey-Thompson et al., Submitted to Phys. Plasmas, (2016)

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