Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Validation of PERSEUS and Implementing Ionization Energy Models in PERSEUS[1] JEFF WOOLSTRUM, University of Michigan, DAVID YAGER-ELORRIAGA, Sandia National Laboratories, PAUL CAMPBELL, NICHOLAS JORDAN, University of Michigan, CHARLES SEYLER, Cornell University, RYAN MCBRIDE, University of Michigan — Ultrathin foil liners, with thicknesses of 400 nm, are used in university-scale Z-pinch experiments (˜1 MA) to study physics relevant to inertial confinement fusion efforts on larger-scale facilities (e.g. the MagLIF efforts on the 25 MA Z facility at Sandia National Laboratories). We demonstrate the ability of the 3D MHD simulation code PERSEUS [1] to accurately model the implosions of ultrathin liners by comparing general implosion trends and detailed plasma structures in simulation and experiment. In university-scale experiments [2], ultrathin foils have used a central support rod to maintain structural integrity prior to implosion, and we have now used PERSEUS to study these experiments in detail. The results suggest that it is the support rod which enables the helical structures to persist beyond stagnation. In addition, we report on new efforts to include more robust material ionization models in PERSEUS to enhance the code's simulation capabilities. [1] Seyler, C. E., & Martin, M. R. (2011). Relaxation model for extended magnetohydrodynamics: Comparison to magnetohydrodynamics for dense Z-pinches. *Physics of Plasmas*, *18* [2] Yager-Elorriaga, D. A., et al. (2016). Discrete helical modes in imploding and exploding cylindrical magnetized liners. *Physics of Plasmas*, *23*(12)

[1]Supported by NNSA Stewardship Sciences Academic Programs under DOE Cooperative Agreement DE-NA0003764.

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Date submitted: 02 Jul 2019 Electronic form version 1.4