Abstract Submitted
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Temperature Evolution of a 1 MA Triple-Nozzle Gas-Puff Z-Pinch[1] PHILIP DE GROUCHY, JACOB BANASEK, JOEY ENGELBRECHT, NIANSHENG QI, LEVON ATOYAN, TOM BYVANK, ADAM CAHILL, HANNAH MOORE, WILLIAM POTTER, LAUREN RANSOHOFF, DAVID HAMMER, BRUCE KUSSE, Cornell University, LABORATORY OF PLASMA STUDIES TEAM — Mitigation of the Rayleigh-Taylor instability (RTI) plays a critical role in optimizing x-ray output at high-energy $\sim$ 13 keV using the triple-nozzle Krypton gas-puff at Sandia National Laboratory [1]. RTI mitigation by gas-puff density profiling [1] using a triple-nozzle gas-puff valve has recently been recently demonstrated on the COBRA 1MA z-pinch at Cornell University [2]. In support of this work we investigate the role of shell cooling in the growth of RTI during gas-puff implosions. Temperature measurements within the imploding plasma shell are recorded using a 527 nm, 10 GW Thomson scattering diagnostic for Neon, Argon and Krypton puffs. The mass-density profile is held constant at 22 microgram per centimeter for all three puffs and the temperature evolution of the imploding material is recorded. In the case of Argon puffs we find that the shell ion and electron effective temperatures remain in equilibrium at around 1keV for the majority of the implosion phase. In contrast scattered spectra from Krypton are dominated by of order 10 keV effective ion temperatures. [1] C. Jennings et al. Phys. Plasmas, accepted (2015) [2] A. Velikovich et al. Phys. Rev. Lett. 77 853-856 (1996) [3] P. de Grouchy et al. IEEE Trans. Plasma Sci. Invited and Plenary Speakers of ICOPS 2015

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