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Shock heating versus photoionization of a central jet in gas puff z-pinches on COBRA[1] ERIC LAVINE, SOPHIA ROCCO, WILLIAM POTTER, JACOB BANASEK, JOHN GREENLY, NIANSHENG QI, DAVID HAMMER, BRUCE KUSSE, Cornell University, CORNELL TEAM — Gas-puff z-pinch experiments on Cornell University's 1 MA COBRA generator are conducted using a custom triple-nozzle gas-puff valve. For argon center jet densities above 5E16 cm^{-3}, ionization of this region is observed early in the implosion, before the arrival of the magnetic piston. At the start of this process, the electron density is coincident with the initial neutral gas density; later however, the electron density forms an annular shell at the boundary of the center jet that remains approximately stationary until the arrival of the magnetic piston. Early interpretations suggested this feature was indicative of a stagnated shock predicted and observed in some staged z-pinch experiments [1]. A competing explanation postulates photoionization by the radiating magnetic piston followed by ohmic heating. Here we present the results of experiments designed to identify the mechanism(s) behind the observed ionization features. We also present results from a complimentary experiment investigating the photoionization of an annular gas puff by an on-axis wire. [1] F. J. Wessel, et al. AIP Conference Proceedings 1721, 060002 (2016)

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