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Gas Puff Z-Pinches at 1-MA and 200-ns on COBRA[1] DAVID HAMMER, NIANSHENG QI, ELLIOTT ROSENBERG, LEVON ATOYAN, WILLIAM POTTER, KATE BLESENER, ADAM CAHILL, PIERRE-ALEXANDRE GOURDAIN, JOHN GREENLY, CAD HOYT, BRUCE KUSSE, SERGEI PIKUZ, PETER SCHRAFEL, TATIANA SHELKOVENKO, Cornell University — We report 6-cm diameter, double-shell gas puff Z-pinch experiments at 1 MA on the COBRA pulsed power generator, in which the implosion dynamics in puff-on-puff load configurations with and without a wire on the pinch axis were studied. Diagnostics used included: Planar Laser Induced Fluorescence Analyzer for measuring initial density profiles of the gas puff; a Laser Shearing Interferometer and a Laser Wavefront Analyzer for density profiles in the implosion and pinch phases; fiber-coupled, gated visible-light spectrometers for radially resolved imploding plasma spectra; gated XUV cameras for implosion dynamics; filtered pinhole x-ray cameras for imaging x-ray emission; and a double-crystal x-ray spectrometer for axially resolved pinch plasma densities and temperatures. From these, we derived the implosion velocity, ion charge states and then the imploding plasma temperatures, obtained the time evolution of the imploding plasma sheath structure and Magnetic Rayleigh-Taylor instability, and observed the most stable implosion with light-ions (Ne) imploding on heavy-ions (Ar), unstable implosions with heavy-ions (Ar) imploding on light-ions (Ne), and tighter, denser and less hot pinch plasma with a wire on axis. Details of the results will be presented.

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