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Spatially-Resolved Argon and Neon K-Shell X-Ray Spectra from Triple-Nozzle Gas-Puff Z-Pinches on Cobra[1] NIANSHENG QI, L-3 Communications, Oakland, PHILIP DE GROUCHY, CAD HOYT, Cornell University, TANIA SHELKOVENKO, SERGEI PIKUZ, Lebedev Physical Institute, Moscow, LEVON ATOYAN, WILLIAM POTTER, ADAM CAHILL, JOHN GREENLY, BRUCE KUSSE, DAVID HAMMER, Cornell University — We present the x-ray spectra obtained during Ar/Ne gas puff z-pinch experiments on the 1MA, 200ns COBRA pulsed power generator at Cornell University. A triple-nozzle gas-puff, which produces two annular ("outer" and "inner") gas puffs and a high density center jet, is used to tailor the radial mass density distribution. Argon and/or neon plasmas are imploded. Filtered x-ray photo-conducting detectors are used for timing the neon and argon K-shell emission and a filtered x-ray pinhole camera images the K-shell x-ray source size. A spectrometer with three spherical mica crystals is used to capture the K-shell x-ray emission. Our objective is to diagnose the Ar and Ne pinch plasma densities (10^{19}-10^{20} cm^{-3}) and temperatures (0.5 - 2 keV) with 0.1 mm axial and/or radial spatial resolution from the K-shell X-ray spectra. The He-like resonance to intercombination line ratio will be used to estimate the electron density and the He-like resonance to Li-like satellite line ratio will be used to estimate the electron temperature. We will also add Cl as a dopant in either the center Ar gas jet or inner annular puff for K-shell x-ray spectrum studies.

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