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K- and L-shell spectra of stainless steel X-pinches with notable effect of interwire angle R.R. CHILDERS, A.S. SAFRONOVA, V.L. KANTSYREV, A. STAFFORD, I.K. SHRESTHA, V.V. SHLYAPTSEVA, E.E. PETKOV, University of Nevada, Reno — Due to *Chandra*'s x-ray data capabilities, laboratory-produced plasma spectroscopy can be benchmarked against astronomical radiation and used as a diagnostic in astrophysical research. X-ray Fe and Ni spectra of astrophysical interest are studied using four-wire, 830 μg stainless steel (Fe: 69%, Ni: 9%, Cr: 20%) X-pinches on the 1 MA Zebra Generator, where the interwire angle is varied between 31 and 62.5 degrees. Harder x-ray (1.6-2.3 Å) K-shell Fe, Ni and Cr spectra included both "hot", ionic ($T_e \geq 1.5$ keV) and "cold", characteristic (T_e: 10-30 eV) lines, indicating a much colder plasma and the existence of an electron beam. For the smaller interwire angle, K-shell emission intensifies, producing both stronger ionic and characteristic lines. Softer x-ray spectra between 8-13 Å include L-shell spectra dominated by 3-2 Ni and higher Rydberg ($n \rightarrow 2$; $n \geq 4$) Fe lines. Plasma conditions are estimated using Fe, Ni, and Cr non-LTE spectral models. In addition, shadowgraphy exhibits the formation of jets in the middle of the cross-point region and orthogonal to the wires in the load with an almost column-like plasma resembling a single wire for the 31 degree load. Work was supported by NNSA under DOE grant DE-NA0003047

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