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Characteristic Differences Between Wire and Foil X-pinches GILBERT COLLINS, JULIO VALENZUELA, IGOR KRASHENINNIKOV, FARHAT BEG, University of California at San Diego, Center for Energy Research, MINGSHENG WEI, General Atomics — We conducted X-pinch experiments using laser-cut Ni and Cu foils on the 250kA GenASIS current driver at UC San Diego. General Atomics' Laser Micro-Machining (LMM) Center manufactured the X's. To characterize the foil X-pinches, we measured and compared the evolution, emission spectra, yield, and source size of these new arrays to that of comparably massed wire X-pinches on the same driver. Diagnostics included Si PN diodes and diamond PCDs, optical probing, X-ray spectroscopy, an XUV framing camera, a slit-wire camera, and current probes. We used novel structures machined into the crosspoint in an effort to better understand the effects of the initial geometry on the final pinch and to spatially confine the source location. Some designs entirely prohibited pinching. In other designs, when pinching occurred, the sources were comparable to ideal wire shots on GenASIS both in size (at or less than five microns) and X-ray flux (5-10 MW @ 1-10 keV). The data collected here also show considerable differences between successful foil and wire pinches. The X-ray spectra are not identical, and we find that the foil X's produce a single >2.5 keV emission pulse with none of the additional later and longer-lasting hard emission pulses found in wire X-pinches.

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