Abstract Submitted
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Comparison of Wire, Foil, and Hybrid X-Pinch Backlighters for Talbot-Lau X-Ray Imaging Diagnostics[1] G. COLLINS IV, University of California San Diego, M. P. VALDIVIA, D. STUTMAN, Johns Hopkins University, F. N. BEG, University of California San Diego — Three types of Cu X-pinches were studied as X-ray sources for refraction-based imaging. In the deflectometer configuration, Talbot-Lau X-ray (TLX) Interferometry can provide electron density, elemental composition, and scatter information from a single image. TLX backlighters must meet specific source requirements to accurately diagnose HED experiments. Wire, hybrid, and laser-cut foil X-pinches were compared on the GenASIS driver ($\sim$ 200 kA, 150 ns). All configurations produced short (˜1 ns), small ($\leq$ 5 μm) Cu L-shell ($\sim$ 1 keV) sources with comparable peak fluxes. Laser-cut foil X-pinches produced the brightest ($\sim$ 1 MW) and smallest ($\leq$ 5 μm) Cu K-shell (˜8-9 keV) sources. While Moire fringe formation was demonstrated for all X-pinches, laser-cut foils delivered the highest fringe contrast and spatial resolution, making them the ideal candidate for pulsed-power based X-ray backlighting for TLX refraction diagnostics. Moreover, spectroscopic data indicate foil X-pinches reached temperatures >2 keV, produced no temporally or spatially separated electron beams, and produced single sources with the highest and most localized K-shell flux of any configuration.

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