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**Influence of Load Geometry on Nonthermal Emission in High-Energy-Density X-pinch Plasmas on the Zebra Generator**[1]
RYAN CHILDERS, ALLA SAFRONOVA, VICTOR KANTSYREV, RICHARD PLOTKIN, AUSTIN STAFFORD, University of Nevada, Reno, DAVE AMPLEFORD, Sandia National Laboratories — Nonthermal x-rays are used as a fundamental tool to diagnose astrophysical environments, e.g. solar flares and accretion zones of compact objects. Laboratory Z-pinches are efficient producers of nonthermal inner-shell x-rays, which are typically driven by energetic, "hot" electrons. In the current study, we explore the production of hot electrons in Z-pinch plasmas through the manifestation of nonthermal inner-shell x-rays. K-shell emission from astrophysically relevant Fe, Ni, and Cr plasmas produced on the 1 MA Zebra generator are studied using stainless steel (Fe: 69%, Ni: 9%, Cr: 20%) X-pinches. X-pinches consist of four wires crossing in the middle that produce fixed hot spots at the cross point. Wire loads are arranged with angle between wires of 31 or 62.5 degrees to investigate the influence of load geometry on x-ray production. Theoretical modeling of hard x-ray (1.6 – 2.3 Å) K-shell Fe, Ni, and Cr spectra reveals hotter thermal plasma (Te $\geq$ 1 keV) and cooler nonthermal plasma (Te: 10-40 eV), indicating two different plasma regions with presence of hot electron beams. Theoretical modeling used with time-resolved spectral and flux diagnostics shows inner-shell emission intensifies for the 31 degree geometry.

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