Abstract Submitted
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**Experimental Investigation of the Electrothermal Instability on Planar Foil Ablation Experiments**[1] ADAM STEINER, SONAL PATEL, DAVID YAGER-ELORRIAGA, NICHOLAS JORDAN, RONALD GILGENBACH, Y.Y. LAU, Department of Nuclear Engineering and Radiological Sciences, University of Michigan — The electrothermal instability (ETI) is an important early-time physical effect on pulsed power foil ablation experiments due to its ability to seed the destructive magneto-Rayleigh-Taylor (MRT) instability. ETI occurs whenever electrical resistivity has temperature dependence; when resistivity increases with temperature, as with solid metal liners or foils, ETI forms striation structures perpendicular to current flow. These striations provide an initial perturbation for the MRT instability, which is the dominant late-time instability in planar foil ablations. The MAIZE linear transformer driver was used to drive current pulses of approximately 600 kA into 400 nm-thick aluminum foils in order to study ETI in planar geometry. Shadowgraph images of the aluminum plasmas were taken for multiple shots at various times within approximately 50 ns of current start. Fourier analysis extracted the approximate wavelengths of the instability structures on the plasma-vacuum interface. Surface metrology of pre-shot foils was performed to provide a comparison between surface roughness features and resulting plasma structure.

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