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4P51 - Diagnostics to study electrothermal instabilities on MYKONOS

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The electrothermal instability (ETI) is a Joule heating-driven instability that can initiate in the solid state in solid liner-driven fusion. In the solid state, the ETI generates azimuthally correlated (striated) temperature and density perturbations. These striations may seed the magneto Rayleigh-Taylor (MRT) instability, which has been shown to limit stagnation pressure and fusion yield. These experiments will observe ETI growth from diamond-turned, 99.999% pure aluminum rods in a z-pinch configuration by monitoring characterized “engineered” defects machined into the rod surface. Experiments will be conducted on the ~ 1 MA MYKONOS driver at Sandia National Laboratories. A multi-camera splitter system will be used to simultaneously image these scaled defect patterns, located on the front and back sides of the target, in order to examine visible-light emission from the surface. Laser shadowgraphy and interferometry diagnostics are also being developed to characterize ETI evolution. Experimental results will be compared to 3D-MHD simulations. Here, diagnostic developments and ongoing experimental results will be presented.

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