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Observations of ETI under dielectric-overcoated aluminum pulsed to hundreds of Tesla[1] TREVOR HUTCHINSON, BRUNO BAUER, STEPHAN FUELLING, University of Nevada, Reno, KEVIN YATES, University of New Mexico, THOMAS AWE, GRAHAM YELTON, Sandia National Laboratories
— MagLIF is an inertial confinement concept that takes advantage of relaxed fusion criteria due to premagnetized and preheated fuel. The drive surface is particularly susceptible to highly azimuthally correlated magneto-Rayleigh Taylor (MRT) instabilities, which section the liner wall and compromise confinement. This degree of azimuthal correlation is not due to residual lathe machining or surface roughness and a growing body of evidence suggest electrothermal instabilities (ETI) seed the MRT instability and allow for levels of azimuthal correlation that have been observed experimentally[1]. Implementation of dielectric coatings on Sandia's Z accelerator has reduced MRT amplitudes by at least a factor of ten[2], which simulations suggest is due to mass tamping of the ETI. However, neither ETI nor its theorized suppression via an applied dielectric overcoat has been experimentally observed on a thick wire. We will report on experimental observations of ETI on the surface of 500 um radius aluminum rods with a 70 um parylene-N overcoat pulsed with 1 MA in 100 ns. [1] McBride, et al., PRL 109, 135004 (2012). [2] Peterson, et al., PRL 112, 135002 (2014).

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