Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Mitigation of Electrothermal Instabilities with Thick Insulating Coatings[1] KYLE PETERSON, THOMAS AWE, EDMUND YU, DANIEL SINARS, MICHAEL CUNEO, Sandia National Laboratories — We will show results of recent experiments on Sandia's Z facility that demonstrate a dramatic reduction in instability growth when thick insulating coatings are used to mitigate electrothermal instability growth [1,2] in magnetically driven imploding liners. These results also provide further evidence that the inherent surface roughness as a result of target fabrication is not the dominant seed for the growth of Magneto-Rayleigh-Taylor (MRT) instabilities in liners with carefully machined smooth surfaces ($\sim$100 nm surface RMS or better), but rather electrothermal instabilities that form early in the electrical current pulse as Joule heating melts and vaporizes the liner surface. More importantly, these results suggest a mechanism for possibly reducing the integral MRT instability growth substantially in magnetically driven inertial confinement fusion concepts such as MagLIF [3].

[1] K.J. Peterson et al., Phys. Plasmas 19, 092701 (2012)
[2] K.J. Peterson et al., Phys. Plasmas 20, 056305 (2013)
[3] S.A. Slutz et al., Phys. Plasmas 17, 056303 (2010)

[1]Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000

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Date submitted: 11 Jul 2013 Electronic form version 1.4