Abstract Submitted
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Fast Temperature Rise and Saturation of Al Surface Plasma Generated by Pulsed MG Fields[1] STEPHAN FUELLING, University of Nevada, Reno, THOMAS AWE, Los Alamos National Laboratory, BRUNO BAUER, IRVIN LINDEMUTH, RICHARD SIEMON, University of Nevada, Reno — In pulsed power system, the performance of current carrying surfaces is limited by plasma generation. Experiments with thick (diameter 0.5 – 1.25 mm) aluminum rods, performed on the 1 MA Zebra generator at the Nevada Terawatt Facility reveal a threshold of 2.2 MG surface fields for plasma formation, independent of the initial diameter. For 1-mm thick loads, emission spectra obtained by extreme ultraviolet spectroscopy (8-18 nm spectral range) compare well with a modeled aluminum plasma temperature (PrismSPECT) of about 15 eV, both in early and late (peak current) plasma emissions. Time-gated, intensified imaging show spotty plasma formation at early times. This suggests that the temperature in the early spotty plasma quickly rises to 15 eV. At peak current, the intensity of the 15 eV plasma emissions reaches a maximum, suggesting that more of the same 15 eV plasma covers the surface of the aluminum rod.

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