

Abstract Submitted
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A Novel Peak Load Current Measurement for Magneto-Inertial-Fusion Targets MARK HESS, KYLE PETERSON, DAVID AMPLEFORD, BRIAN HUTSEL, CHRISTOPHER JENNINGS, DANIEL DOLAN, WILLIAM STYGAR, MATTHEW GOMEZ, MATTHEW MARTIN, GRAFTON ROBERTSON, DANIEL SINARS, Sandia National Laboratories — We have developed a novel method for measuring the peak load current (>15 MA) delivered to MagLIF targets on the Z pulsed power facility at Sandia National Laboratories using a Photonic Doppler Velocimetry (PDV) diagnostic in the final power feed section. Our diagnostic features a 600 micron thick aluminum PDV flyer, which is sufficiently thick to minimize the effects of magnetic diffusion in the flyer. In this regime, we can relate the peak velocity of the flyer to a peak magnetic pressure, and hence, peak load current, since the measured peak velocity is relatively insensitive to typical variability in MagLIF load current shapes. This allows for a quick analysis (<1 hour) in determining the peak MagLIF load current. We also demonstrate the agreement between measured peak load currents from this diagnostic and circuit models of Z machine, which have been developed at Sandia. Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U. S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

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