Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Analysis of laser preconditioning experiments on Z Beamlet Laser for MagLIF[1] MICHAEL GLINSKY, MATTHEW WEIS, ADAM HARVEY-THOMPSON, MATTHIAS GEISSEL, CHRISTOPHER JENNINGS, TAISUKE NAGAYAMA, KYLE PETERSON, Sandia National Laboratories — Presented is an analysis of a series of laser preconditioning experiments on the Z Beamlet Laser (ZBL). These experiments examine the penetration of the laser through the plastic window (a few microns thick), the energy deposition into a gas behind the window, and the resulting density variations in the gas. The ZBL is a glass laser, frequency doubled to 527 μm, capable of delivering up to 4 kJ on target with a pulse length of a few ns. This is the same laser that is used to preheat the fuel in the MagLIF scheme before it is magnetically imploded on the Z generator. The design space for the laser pulse is explored in a series of experiments. Diagnostics include transmitted energy, backscattered energy, x-ray self emission images, and density shadowgrams at several times. These results are matched against HYDRA simulations using the uncertainty quantification engine Dakota. The potential for SBS, SRS, and filamentation are evaluated. Estimates of the energy deposition profile and disposition of the window (important because of potential mix with the fuel) are obtained with uncertainty.

[1]Work was performed by Sandia National Laboratories for USDoE under contract DE-AC04-94AL85000. SAND NO. 2016-6689C

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Date submitted: 13 Jul 2016 Electronic form version 1.4