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Window decompression in laser-heated MagLIF targets[1] DANIEL WOODBURY, University of Maryland- College Park, KYLE PETERSON, ADAM SEFKOW, Sandia National Laboratories — The Magnetized Liner Inertial Fusion (MagLIF) concept requires pre-magnetized fuel to be pre-heated with a laser before undergoing compression by a thick solid liner. Recent experiments (M. R. Gomez, et. al., Phys. Plasmas 22, 056306 (2015)) and simulations (A. B. Sefkow, et. al., Phys. Plasmas 21, 072711 (2014)) suggest that yield has been limited to date by poor laser preheat and laser-induced mix in the fuel region. In order to assess laser energy transmission through the pressure-holding window, as well as resultant mix, we modeled window disassembly under different conditions using 1D and 2D simulations in both Helios and HYDRA. We present results tracking energy absorption, time needed for decompression, risk of laser-plasma interaction (LPI) that may scatter laser light, and potential for mix from various window thicknesses, laser spot sizes and gas fill densities. These results indicate that using thinner windows (0.5-1 μm windows) and relatively large laser spot radii (600 μm and above) can avoid deleterious effects and improve coupling with the fuel.

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