Abstract Submitted
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Measurements of plasma mirror reflectivity and focal spot quality for tens of picosecond laser pulses [1] PIERRE FORESTIER-COLLEONI, UCSD, JACKSON WILLIAMS, LLNL, GRAEME SCOTT, RAL, DERECK. A. MARISCAL, LLNL, CHRISTOPHER MCGUFFEY, FARHAT N. BEG, UCSD, HUI CHEN, LLNL, DAVID NEELY, RAL, TAMMY MA, LLNL — The Advanced Radiographic Capability (ARC) laser at the NIF (LLNL) is high-energy (˜4 kJ) with a pulse length of 30ps, and is capable of focusing to an intensity of 10^{18}W/cm^2 with a ˜100 μm focal spot. The ARC laser is at an intensity which can be used to produce proton beams. However, for applications such as radiography and warm dense matter creation, a higher laser intensity may be desired to generate more energetic proton beams. One possibility to increase the intensity is to decrease the focused spot size by employing a smaller f-number optic. But it is difficult to implement such an optic or to bring the final focusing parabola closer to the target within the complicated NIF chamber geometry. A proposal is to use ellipsoidal plasma mirrors (PM) for fast focusing of the ARC laser light, thereby increasing the peak intensity. There is uncertainty, however, in the survivability and reflectivity of PM at such long pulse durations. Here, we show experimental results from the Titan laser to study the reflectivity of flat PM as a function of laser pulse length. A calorimeter was used to measure the PM reflectivity. We also observed degradation of the far and near field energy distribution of the laser after the reflection by the PM for pulse-lengths beyond 10ps.

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