

Abstract Submitted
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Pointing scheme for the NIF laser with "perfect" low mode uniformity KIM MOLVIG, Massachusetts Institute of Technology, MARK SCHMITT, Los Alamos National Laboratory — A new concept for designing the beam pointings for direct drive on the NIF laser is proposed. It is based on a calculation of the full 3D spherical harmonic laser absorption spectrum for an ideal surface absorbing target irradiated by identical beams of circular cross section aimed at target center. The model is used to find configurations of beam numbers and pointing angles that can zero out the amplitudes of the low mode number spectrum. The 192 beams of the NIF can be pointed in a five cone configuration that eliminates all the modes with principle mode numbers less than 12, (143 modes in all). In addition to zeroing the low modes, the scheme has the consequence of increasing individual beam smoothing such that modes not zeroed are reduced to very small levels – and with relatively narrow beams. Thus with a beam to target ratio of, $R_{\text{beam}}/R_{\text{target}} \approx 0.4$, the P_{12} mode amplitude is reduced by the factor of, 0.004, bringing the normalized amplitude to 0.15 %. The main predictions of the analytic calculations are validated with two dimensional HYDRA simulations of the Revolver ablator shell. Research supported by the LDRD Program of Los Alamos National Laboratory under project number 20180051DR.

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