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LPI Risk Mitigation on NIF Using Larger Radius Hohlräume

PAUL BRADLEY, D.C. WILSON, Los Alamos National Laboratory, D. CALLAHAN, L.J. SUTER, M.J. EDWARDS, Lawrence Livermore National Laboratory — As part of the laser-plasma instability (LPI) risk mitigation strategy for ignition at the National Ignition Facility, we performed capsule/hohlraum calculations where we made the hohlraum 20% larger in radius than a standard 300 eV design. The hope is the larger radius would reduce the plasma electron density and thereby reduce the LPI gains to an acceptable level. We find that although the electron density is lower, this is offset by the increased intensity needed to heat the larger hohlraum, so there is little improvement in the LPI gains. Also, relatively more power is required in the outer cone in order to obtain an implosion symmetry good enough for ignition in our calculations. There appears to be little advantage to making the hohlraum larger in radius without taking additional steps to mitigate LPI gain. Work supported by US DOE/NNSA, performed at LANL, operated by LANS LLC under Contract DE-AC52-06NA25396.

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