

LLE Review



Quarterly Report

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In Brief

This volume of the LLE Review, covering the period of July–September 1996, includes a description of an important experiment carried out on OMEGA by researchers from LANL, LLNL, and LLE to demonstrate the feasibility of using OMEGA for indirect drive. Additional topics include tetrahedral hohlraums, the speckle properties of phase-converted laser beams, design criteria for SSD phase modulators, and the design of slab amplifiers.

Highlights of the research presented in this issue are

- Results from the proof-of-principle indirect-drive experiments in which up to 40 OMEGA beams were used to irradiate cylindrical hohlraums. Nova results were reproduced, and new capabilities not available on other lasers were demonstrated.
- A discussion of tetrahedral hohlraums (spherical hohlraums with four laser entrance holes) as a means of achieving better capsule irradiation uniformity. Tetrahedral hohlraums also allow the use of all 60 OMEGA beams and may provide an alternate route to ignition on the NIF.
- An analysis of the residual target irradiation nonuniformity due to the fine laser speckle remaining on the beam after being phase converted by the DPP's. A model shows how a uniformly ablating plasma atmosphere reduces the speckle contribution to the effective time-averaged irradiation nonuniformity.
- A discussion of the theory, design, manufacture, testing, and implementation of the microwave SSD phase modulators used on OMEGA for two-dimensional SSD. The modulators are capable of operating in the gigahertz frequency range.
- A discussion of the design and performance of a large-aperture, high-gain Nd:glass zig-zag slab amplifier for materials testing. The design incorporates improvements from previous work in addition to improvements obtained from careful design choices guided by analytic calculations.

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Editor

