

# Section 1

## LASER SYSTEM REPORT

### 1.A GDL Facility Report

The glass development laser (GDL) facility was used during this quarter for target experiments and has undergone further study and improvement. Focus scans and conversion-cell tuning have been completed, and damaged optics replaced. The thermal properties of the active mirrors were investigated off-line, after which they were incorporated back into the system in the double-pass configuration. Shearing tests on the second harmonic beam showed little or no defocus as a result of thermal deflection of the mirrors. Target experiments included focusing-lens characterization, diagnostic instruments activation, and experiments on x-ray radiography of targets for the Target Fabrication Group.

A summary of GDL shots during this quarter follows:

Beamline Test and Calibration Shots	119
Alignment Shots	129
Target Shots	<u>80</u>
TOTAL	<u>328</u>

### 1.B OMEGA Facility Report

During the fourth quarter of FY86 the OMEGA laser has undergone a number of upgrades. The driver line has been improved to provide a more uniform beam profile. This included the introduction of free

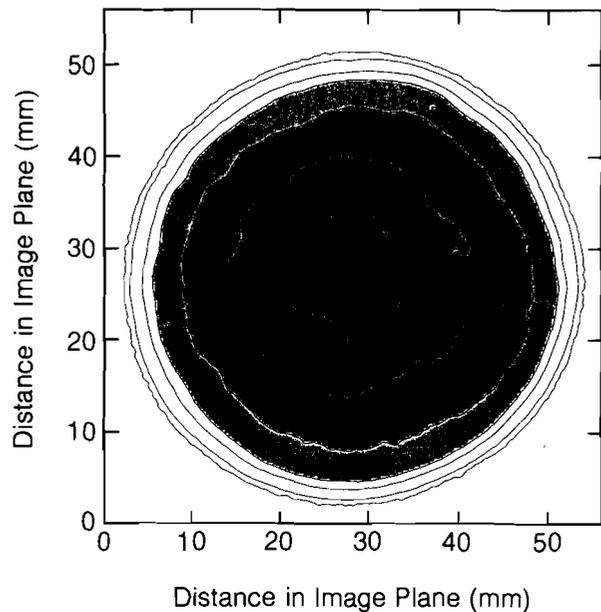
propagation of the oscillator beam over a distance of 4 m, and the addition of new diagnostics, such as a CID camera for pointing and centering verification.

A number of optical elements in the laser system were replaced to improve beam uniformity. These include several spatial filter lenses, wave plates, frequency-conversion cells, and transport optics. Linear polarizers were replaced with liquid-crystal circular polarizers, which will provide circular polarization through the red amplifiers and reject any light of birefringence-induced depolarization.

We have selected one of the beamlines (labeled 6-2) for an extensive investigation of uniformity. A corridor is being constructed around it to minimize air turbulence and thermal gradients.

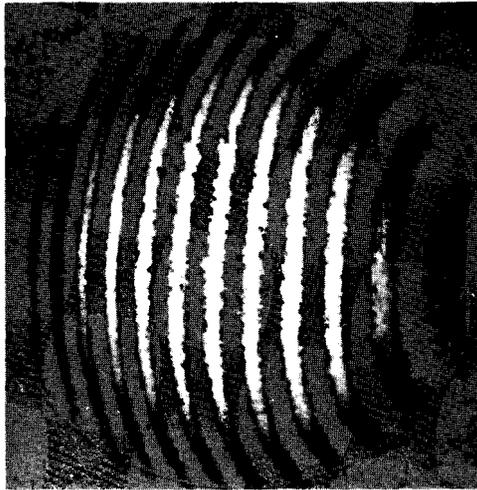
Figure 28.1 demonstrates the result of the driver-line upgrade. This figure is the digitized near-field photograph of the driver output beam and shows a high degree of uniformity and circular symmetry. The degree of uniformity has been determined using an interferometer applied to the output of the driver line, and the results are shown in Fig. 28.2. The interferogram indicates total aberration of less than  $1/8$  of a wave. This level of performance is required to achieve the uniformity specifications of the high-density target experiments.

The fall series of target experiments were under way toward the end of the quarter.

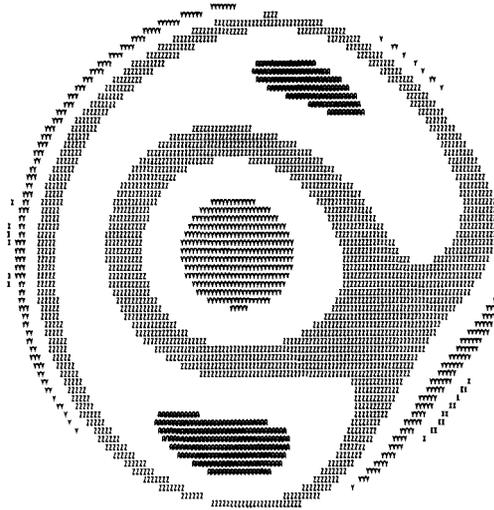


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Fig 28.1  
Digitized near-field photograph of driver output beam.



interference pattern  
(image enhanced)



reduced phase profile  
( $\lambda/5$  contour interval)

G1896

Fig. 28.2  
*Interferometric representation of driver  
output beam.*

**ACKNOWLEDGMENT**

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