

## Section 4

# LASER SYSTEM REPORT

### 4.A GDL Facility Report

During the third quarter of FY90 the GDL oscillator was successfully converted to a 50-MHz drive for synchronization and timing. GDL operations concentrated on the four main experimental programs: x-ray laser, shine-through, Thomson scattering, and OMEGA Upgrade support. Additional developmental research was performed on a regenerative amplifier for the pulse-shaping experiments, apodizer testing, and film studies. G. Banas from University of Illinois performed the only NLUF experiment this quarter.

A summary of GDL operation this quarter follows:

Beamline Test, Calibration, Tuning, and	
Laser Alignment Shots	211
Apodizer Tests	2
Film Studies	32
Target Shots	
Shine-through	45
X-ray Laser	36
NLUF User	47
Thomson Scattering	<u>20</u>
TOTAL	393

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## 4.B OMEGA Facility Report

The OMEGA laser system remained fully operational for the third quarter of FY90. Several minor laser modifications were incorporated and three primary experimental programs supported.

A redesigned microwave modulator utilizing a waveguide-coupled cavity has resulted in the capability to create up to 5 Å of laser bandwidth. This new modulator and tunable waveguide provided more reliable broadband phase-converted irradiation conditions for experimentation.

Many target shots were taken to assess the variation of performance as a function of laser bandwidth. One experiment used a single beam of OMEGA to explore the Stimulated Rotational Raman Scattering (SRRS) threshold dependence on bandwidth and dispersion. The first round of SRRS data collection was finished early in the quarter and results will be reported in an upcoming LLE Review. Secondly, implosions were investigated in ongoing yield/density programs. These studies included sequences of LLE-fabricated plastic targets, Argon targets (in collaboration with NLUF users from the University of Florida), and surrogate cryogenic targets of deuterated CH. The last campaign run on OMEGA this quarter involved irradiation of flat targets with eight beams per side. The beams were staggered in time to create a large-scale plasma for various laser-plasma interaction instability investigations. These experiments gave interaction data with unique laser conditions designed specifically to create instability signatures.

A shot summary on OMEGA for this quarter follows:

Driver Line	35
Laser Test	52
Target	125
Software	<u>12</u>
TOTAL	224

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