

Section 4

LASER SYSTEM REPORT

4.A GDL Facility Report

The GDL laser was in continuous service as a target interaction facility during this quarter. While the system served as an x-ray laser research facility for a majority of its operating time, several campaigns were undertaken in GDL for NLUF users. Active mirrors were in nearly continuous service throughout the period. The GDL beam transported to the OMEGA chamber, called the ALPHA beam, was realigned and reactivated for use in future OMEGA experiments. The ALPHA beam has been newly instrumented with a backscatter monitor and an improved targeting system for more accurate and rapid alignment. Plans for GDL operations for the remainder of the fiscal year include extensive testing of various proposed uniformity improvements for OMEGA.

A summary of GDL operations this quarter follows:

Beamline Test, Calibration, and Tuning Shots	202
Alignment Shots	58
Target Shots	<u>162</u>
TOTAL	422

4.B OMEGA Facility Report

The OMEGA laser system was in continuous service this quarter as LLE continued its ultimately successful quest for the 100–200 times liquid DT density milestone. Laser operations subsequent to the achievement of this milestone consisted of recalibration shots for diagnostics and limited exploration of previously successful gas DT target shots.

Throughout January and February, operations personnel assisted in the operation and debugging of the cryogenic target positioner. Assistance was given in eliminating vibration problems, in increasing cryogenic gas flow for improved freezing, in developing better means to diagnose the frozen-layer uniformity, and in general repairs of the cryo positioner.

The laser system continued to provide high-precision performance during this quarter. Beam-energy balance remained consistently in the 3% rms area. The greatly improved illumination uniformity obtained with distributed phase-plate technology and improved polarization control afforded by liquid-crystal circular polarizers contributed to the success of the high-density compression experiments.

The end of the quarter marked the beginning of a planned ten-week period dedicated to laser and target systems maintenance. Following this maintenance period, a characterization period will begin, to test a number of uniformity improvements, to recalibrate the energy measurement system, and to prepare the system for the second phase of cryogenic fuel experiments.

A summary of OMEGA operations for this quarter follows:

Driver Line Shots	63
Beamline Test and Measurement Shots	77
Target Shots	<u>224</u>
TOTAL	364

ACKNOWLEDGMENT

This work was supported by the U.S. Department of Energy Office of Inertial Fusion under agreement No. DE-FC08-85DP40200 and by the Laser Fusion Feasibility Project at the Laboratory for Laser Energetics, which has the following sponsors: Empire State Electric Energy Research Corporation, New York State Energy Research and Development Authority, Ontario Hydro, and the University of Rochester. Such support does not imply endorsement of the content by any of the above parties.