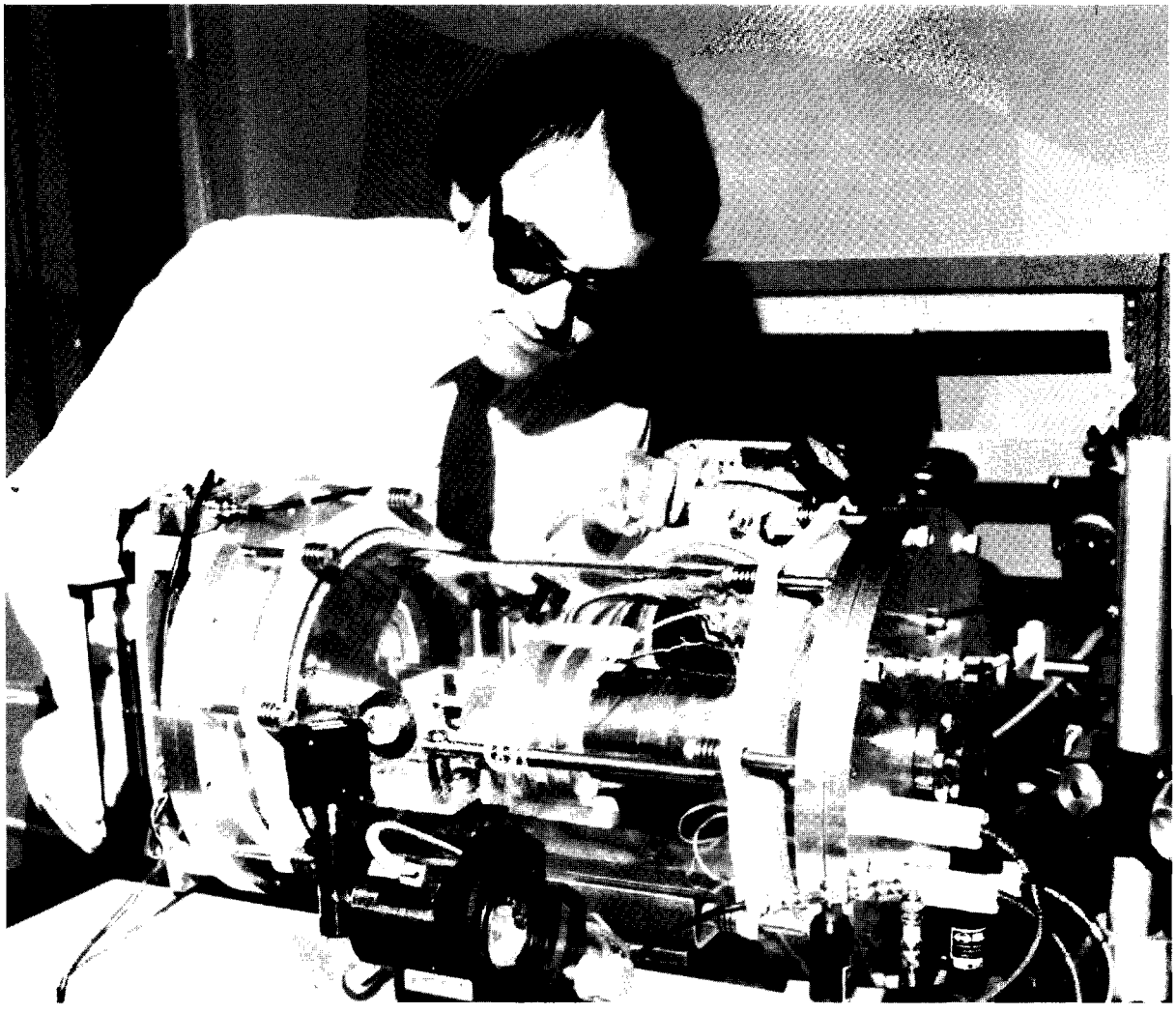
IN BRIEF

This edition of the LLE Review contains articles on target interaction experiments on OMEGA and GDL, characterization of symmetry on OMEGA, frequency-conversion technology, advances in target characterization and picosecond research, and NLUF experiments performed on OMEGA during the first quarter of fiscal year 1983 (October-December 1982). The following are some of the highlights of the work described in this issue:

- A theoretical analysis of illumination uniformity on spherical targets has been developed, using a spherical-harmonic decomposition of the energy deposition pattern of overlapping beams. Estimates show that uniformity levels of order 1% should be attainable.
- An extensive series of thermal-transport experiments at 1.05 μm on OMEGA is reported. Transport in spherical geometry is found to differ from transport under comparable single-beam target irradiation conditions. The temperature profile in spherical geometry has been found to drop gradually rather than steeply into the target.
- Spherical targets on OMEGA have been photographed in their harmonic emissions at $2\omega_0$, $3\omega_0/2$, and $5\omega_0/2$. These emissions provide important information about instability phenomena occurring in the underdense region. Emissions of $2\omega_0$ and $5\omega_0/2$ from the quarter-critical region are reported for the first time.

- Measurements of the continuum x-ray spectra produced by IR- and UV-generated laser plasmas on GDL are reported. A "hard" component, originating from fast electrons produced by resonance absorption, is observed only for 1.05-μm radiation. A "super-hard" component, containing less than 0.1% of the incident laser energy, is seen at both wavelengths.
- A single, "monolithic", frequency-conversion cell has been designed, and will be used for the conversion of the first six beams of OMEGA to the UV. A prototype, containing a new index-matching fluid (Koolase™), has been successfully tested on GDL.
- An improved interferometric technique for the characterization of nonconcentricity in transparent inertial-fusion targets has been developed.
- An improvement in an LLE-developed system for time-resolving short electrical signals has led to the generation and measurement of a step-function electrical signal with a rise time of 850 fs.
- Shifts and widths of hydrogenic ion lines emitted by the dense plasmas generated on OMEGA have been observed in an NLUF experiment.

CONTENTS



Gerard Mourou, senior scientist and leader of the Picosecond Group, making final adjustments to an apparatus in which picosecond electrical pulses are generated as replicas of picosecond optical pulses.