

## IN BRIEF

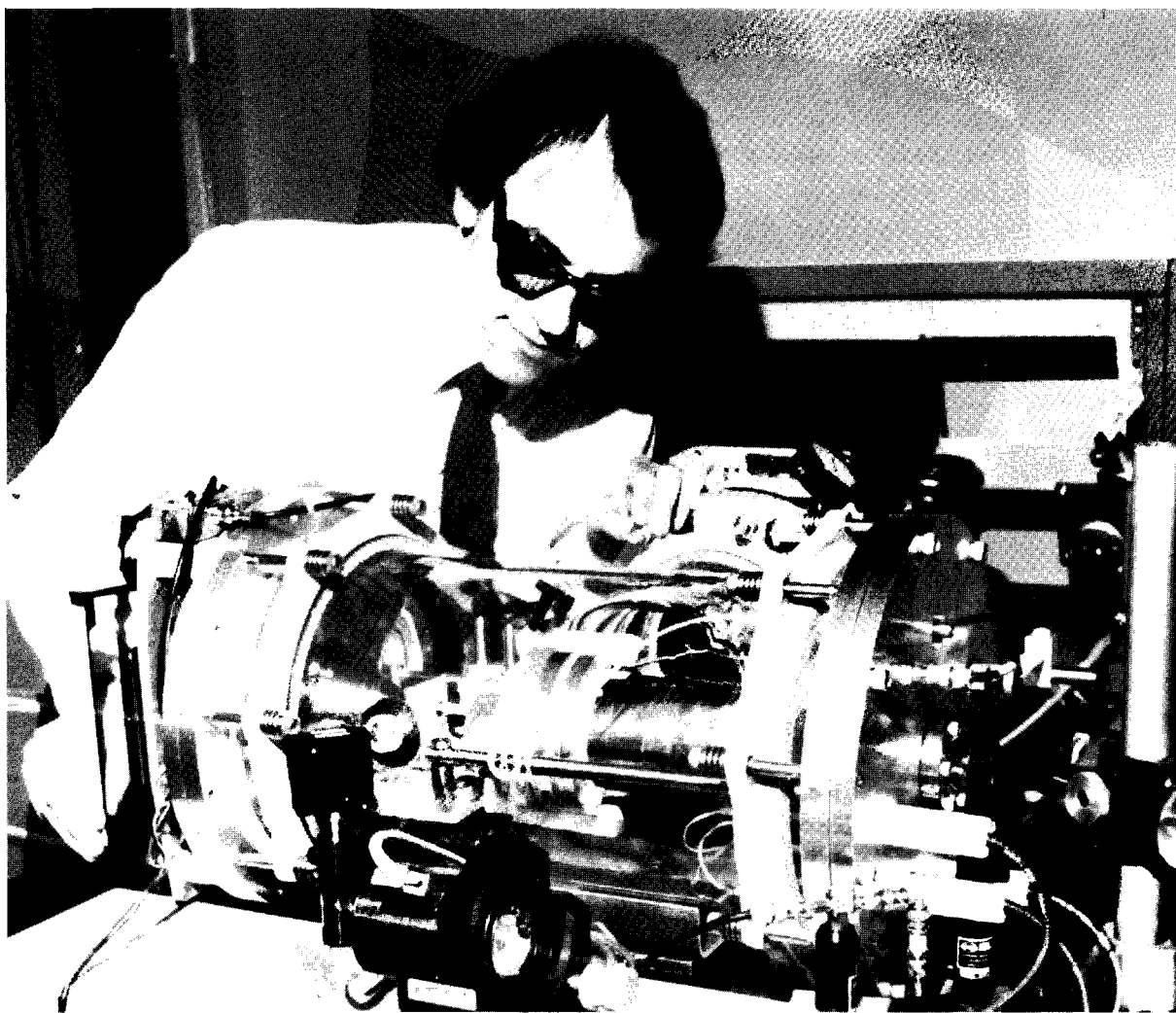
This edition of the LLE Review contains articles on target interaction experiments on OMEGA and GDL, characterization of symmetry on OMEGA, frequency-conversion technology, advances in target characterization and picosecond research, and NLUF experiments performed on OMEGA during the first quarter of 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  $1.05\text{ }\mu\text{m}$  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- $\mu$ m 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.

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*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.*