

CONTENTS

	<i>Page</i>
IN BRIEF	iii
CONTENTS	v
Section 1 PROGRESS IN LASER FUSION	109
1.A Nonlinear Interactions in Long-Scale-Length Plasmas	109
1.B Thermal Stimulated Brillouin Scattering	125
Section 2 ADVANCED TECHNOLOGY DEVELOPMENTS	132
2.A Anomalous Optical Response of Superconducting Films	132
2.B High-Reflectance Transport-Mirror Development for the OMEGA Upgrade	139
2.C An Externally Triggered, Single-Mode, Nd:YLF Laser Oscillator	155
Section 3 NATIONAL LASER USERS FACILITY NEWS	165
Section 4 LASER SYSTEM REPORT	167
4.A GDL Facility Report	167
4.B OMEGA Facility Report	167
PUBLICATIONS AND CONFERENCE PRESENTATIONS	

IN BRIEF

This volume of the LLE Review, covering the period April–June 1992, contains articles on laser-plasma interaction experiments in long-scale-length plasmas and on the theory of a new form of the stimulated Brillouin scattering instability. The advanced technology section includes reports on the optical response of superconducting films, the development of high-reflectance transport mirrors for the OMEGA Upgrade, and a new high-brightness mono-mode laser oscillator. Finally, the activities of the National Laser Users Facility and the GDL and OMEGA laser systems are summarized.

Highlights of the research reported in this issue are

- Experiments on long-scale-length plasmas, which model the conditions expected in the corona of a reactor-size target, have shown that smoothing by spectral dispersion (SSD), a technique developed at LLE to improve target irradiation uniformity, is also effective in reducing the level of stimulated Raman scattering. Scattered light produced by other instabilities was also observed and analyzed, providing information on the laser-plasma interaction.
- The theory of a new form of stimulated Brillouin scattering has been developed, in which inverse bremsstrahlung heating rather than ponderomotive force provides the driving nonlinearity. This form of the instability dominates in high- Z , low-temperature plasmas.

- The anomalous optical response of high-temperature superconductors to a laser beam has been measured. This effect may have an application as a fast (subnanosecond), high-power switch.
- It has been found that the intensity damage threshold for multilayer dielectric mirrors decreases with increasing angle of incidence. Methods of mitigating this effect for the OMEGA Upgrade transport mirrors (such as substitution of scandia for hafnia dielectrics) are proposed and discussed.
- An externally triggered, single-mode, Nd:YLF oscillator has been developed; possible applications include the generation of shaped synchronized pulses for OMEGA.