UNIVERSITY OF ROCHESTER
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Contents

In Brief

This volume of the LLE Review, covering the period January–March 1996, contains three articles related to spherical implosions and their diagnosis, one article that provides an analysis of laser-plasma interactions, and three articles on advanced technologies developed at LLE.

Highlights of the research presented in this issue are

- Initial shell convergence measurements on 60-beam implosions using unsmoothed laser beams show a marked improvement over similar 24-beam experiments performed several years ago. These results augment the success of high-performance targets planned on OMEGA once uniformity enhancements are implemented.

- Scientists from LLE and LANL have worked together to develop a microscope that produces time-gated, monochromatic images with reasonably high resolution. Ideally suited for imaging ICF implosions, this device will find many applications on OMEGA experiments. One such experiment is discussed.

- Many ICF experiments use one- or two-dimensional x-ray imaging to infer the conditions of the imploded core. Central to this application is the Abel inversion, which enables the transformation of a line-of-sight measurement to the local emission or absorption features in the target. Several configurations are discussed for a canonical cryogenic experiment.

- When intense laser beams cross in the presence of a plasma, ion-acoustic waves can transfer energy between the beams. This problem, particularly critical for indirect drive, has been studied for several test cases. A two-dimensional analysis of beams with unequal frequency propagating through a homogeneous plasma is presented for both the transient and steady-state regimes.

- Optical replication is used for a variety of optical manufacturing applications, including the production of distributed phase plates for OMEGA. It is hoped that a photoresist with low surface energy will obviate the need for a release layer and greatly simplify the production of phase plates and other optical components. The first steps for development of such a resist are discussed.

- One of the primary criteria for judging a finishing technique is the surface quality it produces. This article correlates resultant surface microroughness to the mechanical properties of various glasses finished with deterministic microgrinding.

- Chiral nematic liquid crystal can be used in applications where the helical sense of the molecules produces the desired optical effect. This article discusses the vitrification of these crystals into cholesteric glasses as a way to preserve the mesogenic order, thereby producing robust components. Various methods to optimize optical performance of these components are also suggested.

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Editor