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# LLE Review

## Quarterly Report

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## Contents

# In Brief

This volume of LLE Review 170 covers the period from January–March 2022. Articles appearing in this volume are the principal summarized results for long-form research articles. Readers seeking a more-detailed account of research activities are invited to seek out the primary materials appearing in print, detailed in the publications and presentations section at the end of this volume.

Highlights of research presented in this volume include:

- S. C. Miller and V. N. Goncharov model instability seeding mechanisms caused by internal defects in inertial confinement fusion targets (p. 1).
- A. Colaïtis *et al.* present detailed calculations that capture the persistent low-mode asymmetries evident in laser-direct-drive implosions on the OMEGA Laser System (p. 5).
- V. Gopalaswamy *et al.* present an analysis of limited coverage effects on areal-density measurements in inertial confinement fusion implosions on the OMEGA Laser System (p. 10).
- P. V. Heuer *et al.* report on diagnosing magnetic fields in cylindrical implosions with oblique proton radiography on the OMEGA Laser System (p. 16).
- L. S. Leal *et al.* model the effect of laser preheat in magnetized liner inertial fusion at the Omega Laser Facility (p. 19).
- K. M. Woo *et al.* present an analysis of core asymmetries in inertial confinement fusion implosions using 3-D hot-spot reconstruction of experimental data from the OMEGA Laser System (p. 21).
- J. R. Davies and P. V. Heuer conduct an evaluation of the direct inversion of proton radiographs in the context of cylindrical implosions (p. 24).
- H. Wen *et al.* report particle-in-cell modeling of plasma-jet merging in the large-Hall-parameter regime (p. 27).
- K. Weichman *et al.* present progress in modeling relativistic laser–plasma interaction with kilotesla-level applied magnetic fields (p. 30).
- G. Bruhaug *et al.* report the first single-shot electron radiography images using an electron beam from a 100-J-class laser-plasma accelerator (p. 35).
- G. Bruhaug *et al.* present on the development of a hardened THz energy meter for use on the kilojoule-scale, short-pulse OMEGA EP laser (p. 38).
- C. Dorrer and J. L Shaw demonstrate a single-shot cross-correlator based on the sum–frequency generation of counter-propagating beams in SBN61 ($Sr_xBa_{1-x}Nb_20_6$ with $x = 0.61$) using the Multi-Terawatt laser ($\lambda_A = 1053$ nm) and the idler of the MTW-OPAL laser ($\lambda_B = 1170$ nm) (p. 41).
- K. L. Marshall *et al.* report on the multiparameter laser performance characterization of liquid crystals for polarization control devices in the nanosecond regime (p. 44).
- M. Sharpe, W. T. Shmayda, and J. Ruby report on the experimentally determined influence of heat treatments on the near-surface tritium concentration profiles in 316 stainless steel (p. 47).
- G. Chen *et al.* experimentally determine the electron effective mass in highly resistive GaAs by exploiting the influence of a magnetic field on optically excited transient THz surface emissions (p. 50).

- J. L. Peebles *et al.* provide an assessment of generating quasi-static magnetic fields using laser-driven "capacitor" coils (p. 53).
- R. B. Spielman discusses pulsed-power innovations for next-generation, high-current drivers (p. 57).
- J. Puth *et al*. summarize operations of the Omega Laser Facility during the second quarter of FY22 (p. 60).

Milton Shoup III
Editor