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In Brief

The key article in this volume of the LLE Review, covering April–June 2004, deals with "Multidimensional Simulations of Plastic-Shell Implosions on the OMEGA Laser" by P. B. Radha, V. N. Goncharov, T. J. B. Collins, J. A. Delettrez, D. E. Keller, P. W. McKenty, J. P. Knauer, J. A. Marozas, S. Skupsky, V. Yu. Glebov, F. J. Marshall, D. D. Meyerhofer, S. P. Regan, T. C. Sangster, and C. Stoeckl; and R. P. J. Town (LLNL) (p. 139). In it, the multidimensional hydrodynamic code *DRACO* is applied to studies of shell stability during the acceleration phase in the presence of nonuniform illumination and target roughness. Simulations show that for thick shells remaining integral during the acceleration, the target yield is reduced by a combination of long-wavelength modes due to surface roughness and beam-to-beam imbalance and intermediate modes due to single-beam nonuniformities. Compared to 1-D predicitions, the neutron-production rate for these shells truncates. Diminished yield for thin shells is mainly due to shell breakup at short-wavelength scales of the order of the in-flight shell thickness. *DRACO* simulation results are consistent with experimental observations.

Additional highlights of recent research presented in this issue include the following:

- D. R. Harding, L. M. Elasky, S. Verbridge, W. Seka, R. S. Craxton, L. D. Lund, D. Edgell, M. D. Wittman, and E. L. Alfonso provide a comprehensive overview of the methodology of, and issues involved in, the preparation of deuterium-ice layers in OMEGA targets (p.160). The process of first forming and then smoothing the ice layer is governed by multiple parameters that, when optimally controlled, yield ice layers approaching a 1-μm-rms roughness in low-spatial-frequency modes.
- O. V. Gotchev, P. A. Jaanimagi, J. P. Knauer, F. J. Marshall, and D. D. Meyerhofer describe the development and fielding of a new, modular x-ray streaked imager that combines a four-mirror Kirkpatrick–Baez microscope with a high-current PJX streak tube (p. 183). Performance optimized for use at 1.5 keV, the instrument provides better-than-5-μm spatial resolution over its central 200-μm field of view
- V. Bagnoud, I. A. Begishev, M. J. Guardalben, J. Puth, and J. D. Zuegel; and T. Mooney and P. Dumas (QED Technologies) report on improving laser power-amplifier performance through compensating laser-rod bulk inhomogeneities by magnetorheological single-surface wavefront correction (p. 194). Large-aperture rods corrected in this manner render nearly diffraction limited output-beam performance.
- V. N. Glebov, C. Stoeckl, T. C. Sangster, and S. Roberts; and G. J. Schmid, R. A. Lerche, and M. J. Moran (LLNL) discuss several prototypes of NIF neutron-time-of-flight detectors developed and tested on OMEGA (p. 202). Based on OMEGA results, these detectors will be able to measure ion temperatures of, and neutron yields from, NIF targets generating between 10⁹ and 10¹⁹ neutrons.

- R. Rey-de-Castro, D. Wang, X. Zheng, A. Verevkin, M. Mikulics, P. Kordoš, A. Mycielski, and R. Sobolewski report on ultrafast current sensing that has reached a new level of sensitivity and speed by taking advantage of the magneto-optic Faraday effect in CdMnTe single crystals (p. 208). To date, response times of a few hundred femtoseconds can be realized at a current sensitivity of ~0.1 mA at 10 K.
- J. Li, W. R. Donaldson, and T. Y. Hsiang introduce a submicron-scale ultraviolet photodiode based on a metal-semiconductor-metal structure on GaN (p. 212). The authors built, tested, and then simulated the circuit by a distributed-circuit approach that yielded close agreement between theory and observation of the impulse-response, space-charge-screening broadening found in the device.
- Q. Guo, X. Teng, and H. Yang offer a new method for patterning nanoparticles and self-assembled monolayers through the use of elastomeric stamps and their controlled deformation by overpressure (p. 218). Their method enables pattern formation on a scale length up to an order of magnitude smaller than the original stamps as well as patterns that do not exist in the original masters. As one example, magnetic ring and anti-ring structures are being fabricated for memory-device applications.

Ansgar W. Schmid *Editor*