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Contents

In Brief

This volume of the LLE Review, covering July–September 2001, features an article by C. Stoeckl, V. Yu. Glebov, J. D. Zuegel, and D. D. Meyerhofer (p. 171) that describes a simple, low-cost, wide-dynamic-range, neutron bang time (NBT) detector. This instrument complements the capabilities of the streak camera–based neutron temporal diagnostic (NTD), which is also installed on the OMEGA laser. The new NBT measures the neutron bang time of D_2- and DT-filled inertial confinement fusion (ICF) implosion capsules at neutron yields between 10^7 and 10^{11} with an absolute timing accuracy of better than 100 ps. This level of accuracy allows the modeling of the implosions to be effectively guided using hydrocode calculations.

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

- J. Taniguchi, N. E. LeBarron, J. Howe, D. J. Smith, C. Stolz, C. Weizapfel, and J. Kimmons (p. 177) report that the current substrate cleaning and handling methods used in the application of high-reflectance optical coatings are so effective that it is necessary to test large parts in order to achieve statistically meaningful assessments. This has led LLE's Optical Manufacturing Group to use coating-conditioning equipment designed by Lawrence Livermore National Laboratory (LLNL) for large National Ignition Facility (NIF) optics to test new coating designs. The equipment facilitates testing of full-sized NIF substrates by automatically scanning the optic relative to a system that subjects a small area to representative laser pulses and simultaneously detects any resulting damage. Repeated scans at increasing fluence were used to quantify the performance of three candidate coating designs.

- S. Skupsky, R. Betti, T. J. B. Collins, V. N. Goncharov, D. R. Harding, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, and R. P. J. Town (p. 183) present direct-drive target designs for both the NIF and OMEGA. Their calculations show that the use of CH foam shells that are wetted with DT fuel improves laser absorption, leading to better implosion stability and higher neutron yield in comparison to the more-conventional all-DT designs. The techniques necessary to perform "wetted-foam" implosions are being developed.

- R. Sobolewski (p. 188) reviews various concepts for the creation of ultrafast input/output (I/O) interfaces suitable for implementation of digital superconducting electronics in ultrafast telecommunication routers. Separate sections describe the progress in the development of multi-GHz-bandwidth, optical-to-electrical (input), and electrical-to-optical (output) transducers. The article ends with a brief summary, including a personal assessment of the current state of the art in superconducting optoelectronics.

- F. Y. Tsai, D. R. Harding, S. H. Chen, and E. L. Alfonso (p. 196) are working on the development of polyimide as an ablator material for inertial confinement fusion (ICF) targets because of its superior mechanical and thermal properties. They report on a parametric study of the fabrication techniques used to produce spherical polyimide shells using a vapor-deposition polymerization (VDP) method. The production rate, yield, and reproducibility of the process were optimized so that polyimide shells can be reproducibly prepared with dimensions required for ICF targets.

- This volume concludes with reports on LLE's Summer High School Research Program (p. 206), the FY01 Laser Facility Report (p. 208), and the National Laser Users' Facility News (p. 210).

Thomas H. Hinterman
Editor