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LLE Review

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Contents

In Brief

This volume of the LLE Review, covering the period January–March 1999, features two articles concerning issues relevant to 2-D SSD laser-beam smoothing on OMEGA. In the first article J. D. Zuegel and J. A. Marozas present the design of an efficient, bulk phase modulator operating at approximately 10.5 GHz, which can produce substantial phase-modulated bandwidth with modest microwave drive power. This modulator is the cornerstone of the 1-THz UV bandwidth operation planned for OMEGA this year. In the second article J. A. Marozas and J. H. Kelly describe a recently developed code—Waasese—that simulates the collective behavior of the optical components in the SSD driver line. The measurable signatures predicted by the code greatly enhance the diagnostic capability of the SSD driver line.

Additional highlights of the research presented in this issue are

- F. J. Marshall, J. A. Delettrez, V. Yu. Glebov, R. P. J. Town, B. Yaakobi, R. L. Kremens, and M. D. Cable report results of a 60-beam implosion experiment of hollow shell targets. A survey of target performance based on laser-irradiation uniformity and laser pulse shape was conducted, and compression of the shell material to areal densities of ~60 to 130 mg/cm^2 was observed.

- R. D. Petrasso, P. B. Radha, D. G. Hicks, C. K. Li, F. H. Seguin, V. Yu. Glebov, C. Stoeckl, and J. M. Soures demonstrate on OMEGA the diagnostic capability of the two charged-particle magnetic spectrometers, which LLE has developed in collaboration with MIT and LLNL. As an initial application, simultaneous measurements of the fuel areal density, shell areal density, and fuel temperature have been carried out on OMEGA using D^{3}He-filled imploding capsules.

- M. D. Skeldon describes the modeling of an aperture-coupled-stripline (ACSL), electrical-waveform generator that produces an optical seed pulse for OMEGA. Details of the on-target pulse shape are related critically to the details of the seed-pulse shape. The ACSL pulse-shaping system will be implemented on OMEGA in the next few months. The model is based on a numerical solution of the telegraph equations using the method of characteristics.

- K. Green and R. Sobolewski present a measurement technique that enables the complete characterization of electronic devices having any dynamic temporal and spectral frequency response, such as the photoconductive microwave switches on OMEGA's pulse-shaping system. The technique is a superset of a form of input–output relationships called the scattering or *S* parameter; this technique can also be applied to any microwave or millimeter-wave device whose properties vary rapidly, such as photoconductive attenuators, phase shifters, and directional couplers.

- A. L. Rigatti, D. L. Smith. A. W. Schmid, S. Papernov, and J. H. Kelly examine the damage to OMEGA's stage-C-input, C-output, D-input, E-input, and F-input fused-silica, spatial-filter lenses. LLE has implemented a plan to maintain the quality of OMEGA optics that includes frequent inspections and *in-situ* cleaning of optics. With the establishment of safe operational damage criteria, laser operation has not been impeded. The implications, morphologies, possible causes, and ongoing long-term experiments of spatial-filter lens damage are discussed.

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Editor