Publications and Conference Presentations

Publications

V. Bagnoud, I. A. Begishev, M. J. Guardalben, J. Puth, and J. D. Zuegel, "5 Hz, >250 mJ Optical Parametric Chirped-Pulse Amplifier at 1053 nm," Opt. Lett. **30**, 1843 (2005).

V. Bagnoud, J. Puth, I. Begishev, M. Guardalben, J. D. Zuegel, N. Forget, and C. Le Blanc, "A Multiterawatt Laser Using a High-Contrast, Optical Parametric Chirped-Pulse Preamplifier," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper JFA1.

S. Costea, S. Pisana, N. P. Kherani, F. Gaspari, T. Kosteski, W. T. Shmayda, and S. Zukotynski, "Use of Tritium in the Study of Defects in Amorphous Silicon," Fusion Sci. Technol. **48**, 712 (2005).

J. E. DeGroote, A. E. Marino, K. E. Spencer, and S. D. Jacobs, "Power Spectral Density Plots Inside MRF Spots Made with a Polishing Abrasive-Free MR Fluid," in *Optifab 2005* (SPIE, Bellingham, WA, 2005), Vol. TD03, pp. 134–138.

W. R. Donaldson, M. Millecchia, and R. Keck, "A Multichannel, High-Resolution, UV Spectrometer for Laser-Fusion Applications," Rev. Sci. Instrum. **76**, 073106 (2005).

R. A. Forties and F. J. Marshall, "*In Situ* Characterization of High-Intensity Laser Beams on OMEGA," Rev. Sci. Instrum. **76**, 073505 (2005).

H. L. Helfer, "The Local Dark Matter," in *Progress in Dark Matter Research*, edited by J. Val Blain (Nova Science, New York, 2005), Chap. 4, pp. 121–147.

D. G. Hicks, T. R. Boehly, P. M. Celliers, J. H. Eggert, E. Vianello, D. D. Meyerhofer, and G. W. Collins, "Shock Compression of Quartz in the High-Pressure Fluid Regime," Phys. Plasmas **12**, 082702 (2005).

Z. Jiang and J. R. Marciante, "Mode-Area Scaling of Helical-Core Dual-Clad Fiber Lasers and Amplifiers," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper CThR3.

T. Z. Kosc, K. L. Marshall, S. D. Jacobs, and J. C. Lambropoulos, "Polymer Cholesteric Liquid-Crystal Flake Reorientation in an Alternating-Current Electric Field," J. Appl. Phys. **98**, 013509 (2005).

T. Kosteski, N. P. Kherani, W. T. Shmayda, S. Costea, and S. Zukotynski, "Nuclear Batteries Using Tritium and Thin Film Hydrogenated Amorphous Silicon," Fusion Sci. Technol. **48**, 700 (2005).

I. A. Kozhinova, H. J. Romanofsky, A. Maltsev, S. D. Jacobs, W. I. Kordonski, and S. R. Gorodkin, "Minimizing Artifact Formation in Magnetorheological Finishing of Chemical Vapor Deposition ZnS Flats," Appl. Opt. **44**, 4671 (2005).

S. G. Lukishova, A. W. Schmid, R. Knox, P. Freivald, R. W. Boyd, C. R. Stroud, Jr., and K. L. Marshall, "Deterministically Polarized Fluorescence from Single Dye Molecules Aligned in Liquid Crystal Host," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper QTuE6.

J. R. Marciante and J. D. Zuegel, "High-Gain, Polarization-Preserving, Yb-Doped Fiber Amplifier for Low-Duty-Cycle Pulse Amplification," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper JWB60.

M. Mikulics, R. Adam, M. Marso, A. Förster, P. Kordoš, H. Lüth, S. Wu, X. Zheng, and R. Sobolewski, "Ultrafast Low-Temperature-Grown Epitaxial GaAs Photodetectors Transferred on Flexible Plastic Substrates," IEEE Photonics Technol. Lett. **17**, 1725 (2005).

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N. G. Usechak and G. P. Agrawal, "An Analytic Technique for Investigating Mode-Locked Lasers," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper CTuCC1.

N. G. Usechak and G. P. Agrawal, "Pulse Switching and Stability in FM Mode-Locked Fiber Lasers," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science and Photonic Applications, Systems and Technologies 2005* (Optical Society of America, Washington, DC, 2005), Paper JWB46.

D. Wang, A. Verevkin, R. Sobolewski, R. Adam, A. van der Hart, and R. Franchy, "Magneto-optical Kerr Effect Measurements of Spin Dynamics in Cobalt Nanodots," IEEE Trans. Nanotech. **4**, 460 (2005).

L. J. Waxer, D. N. Maywar, J. H. Kelly, T. J. Kessler, B. E. Kruschwitz, S. J. Loucks, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, C. Stoeckl, and J. D. Zuegel, "High-Energy Petawatt Capability for the OMEGA Laser," Opt. Photonics News **16**, 30 (2005).

B. Yaakobi, T. R. Boehly, D. D. Meyerhofer, T. J. B. Collins, B. A. Remington, P. G. Allen, S. M. Pollaine, H. E. Lorenzana, and J. H. Eggert, "EXAFS Measurements of Iron bcc-to-hcp Phase Transformation in Nanosecond-Laser Shocks," Phys. Rev. Lett. **95**, 075501 (2005).

B. Yaakobi, T. R. Boehly, D. D. Meyerhofer, T. J. B. Collins, B. A. Remington, P. G. Allen, S. M. Pollaine, H. E. Lorenzana, and J. H. Eggert, "Extended X-Ray Absorption Fine Structure Measurement of Phase Transformation in Iron Shocked by Nanosecond Laser," Phys. Plasmas **12**, 092703 (2005).

Forthcoming Publications

Y. V. Artemova, G. S. Bisnovatyi-Kogan, I. V. Igumenshchev, and I. D. Novikov, "Black Hole Advective Accretion with Optical Depth Transition," to be published in the Astrophysical Journal.

R. Betti and C. Zhou, "High-Density and High-ρR Fuel Assembly for Fast-Ignition Inertial Confinement Fusion," to be published in Physics of Plasmas.

A. C.-A. Chen, J. U. Wallace, L. Zeng, A. K.-H. Wei, and S. H. Chen, "Novel Light-Emitting Organic Materials with Variable Electron and Hole Conductivities," to be published in the Proceedings of SPIE.

D. Clay, D. Poslunsy, M. Flinders, S. D. Jacobs, and R. Cutler, "Effect of $LiAl_5O_8$ Additions on the Sintering and Optical Transparency of LiAlON," to be published in the Journal of European Ceramic Society.

J. E. DeGroote, A. E. Marino, J. P. Wilson, K. E. Spencer, and S. D. Jacobs, "Effects of Nanodiamond Abrasive Friability in Experimental MR Fluids with Phosphate Laser Glass LHG-8 and Other Optical Glasses," in to be published in the Proceedings of SPIE.

J. A. Delettrez, J. Myatt, P. B. Radha, C. Stoeckl, S. Skupsky, and D. D. Meyerhofer, "Hydrodynamic Simulations of

Integrated Experiments Planned for the OMEGA/OMEGA EP Laser Systems," to be published in Plasma Physics and Controlled Fusion.

D. H. Edgell, W. Seka, R. S. Craxton, L. M. Elasky, D. R. Harding, R. L. Keck, and M. D. Wittman, "Analysis of Cryogenic Target Shadowgraphs at LLE," to be published in Fusion Science and Technology.

D. R. Harding, T. C. Sangster, D. D. Meyerhofer, P. W. McKenty, L. D. Lund, and T. H. Hinterman, "Producing Cryogenic Deuterium Targets for Experiments on OMEGA," to be published in Fusion Science and Technology.

A. Jukna, I. Barboy, G. Jung, S. S. Banerjee, Y. Myasoedov, V. Plausinaitiene, A. Abrutis, X. Li, D. Wang, and R. Sobolewski, "Laser Processed Channels of Easy Vortex Motion in $YBa_2Cu_3O_{7-\delta}$ films," to be published in Applied Physics Letters.

A. K. Knight and D. R. Harding, "Modeling the Sensitivity of a Polymer Vapor Deposition Process to Different Operating Conditions and Parameters," to be published in Fusion Science and Technology.

K. L. Marshall, K. Adelsberger, B. Kolodzie, G. Mhyre, and D. W. Griffin, "A Second-Generation Liquid Crystal Phase-Shifting Point-Diffraction Interferometer Employing Structured Substrates," to be published in the Proceedings of SPIE.

R. L. McCrory, S. P. Regan, S. J. Loucks, D. D. Meyerhofer, S. Skupsky, R. Betti, T. R. Boehly, R. S. Craxton, T. J. B. Collins, J. A. Delettrez, D. H. Edgell, R. Epstein, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, R. L. Keck, J. P. Knauer, J. Marciante, J. A. Marozas, F. J. Marshall, A. V. Maximov, P. W. McKenty, J. Myatt, P. B. Radha, T. C. Sangster, W. Seka, V. A. Smalyuk, J. M. Soures, C. Stoeckl, B. Yaakobi, J. D. Zuegel, C. K. Li, R. D. Petrasso, F. H. Séguin, J. A. Frenje, S. Padalino, C. Freeman, and K. Fletcher, "Direct-Drive Inertial Confinement Fusion Research at the Laboratory for Laser Energetics: Charting the Path to Thermonuclear Ignition," to be published in Nuclear Fusion.

A. G. Noto and K. L. Marshall, "Application of Computational Chemistry Methods to the Prediction of Chirality and Helical Twisting Power in Liquid Crystal Systems," to be published in the Proceedings of SPIE.

W. T. Shmayda, R. Janezic, T. W. Duffy, D. R. Harding, and L. D. Lund, "Tritium Operations at the Laboratory for Laser Energetics," to be published in Fusion Science and Technology.

V. A. Smalyuk, O. Sadot, J. A. Delettrez, D. D. Meyerhofer, S. P. Regan, and T. C. Sangster, "Fourier-Space, Nonlinear Rayleigh–Taylor Growth Measurements of 3-D Laser-Imprinted Modulations in Planar Targets," to be published in Physical Review Letters.

C. Stoeckl, T. R. Boehly, R. B. Stephens, J. A. Delettrez, S. P. Hatchett, J. A. Frenje, V. Yu. Glebov, C. K. Li, J. Miller, R. D. Petrasso, F. H. Séguin, V. A. Smalyuk, W. Theobald, B. Yaakobi, and T. C. Sangster, "Fuel-Assembly Experiments with Gas-Filled, Cone-in-Shell, Fast-Ignitor Targets on OMEGA," to be published in Plasma Physics and Controlled Fusion.

C. Stoeckl, J. A. Delettrez, J. H. Kelly, T. J. Kessler, B. E. Kruschwitz, S. J. Loucks, R. L. McCrory, D. D. Meyerhofer, D. N. Maywar, S. F. B. Morse, J. Myatt, A. L. Rigatti, L. J. Waxer, J. D. Zuegel, and R. B. Stephens, "High-Energy Petawatt Project at the University of Rochester's Laboratory for Laser Energetics," to be published in Fusion Science and Technology.

S. Wu, J. Karpinski, J.-R. Park, and R. Sobolewski, "Long-Lived Coherent Acoustic Oscillators in GaN Single Crystals," to be published in Applied Physics Letters.

L. Zheng, J. C. Lambropoulos, and A. W. Schmid, "Molecular Dynamics Study of UV-Laser-Induced Densification of Fused Silica. II. Effects of Laser Pulse Duration, Pressure, and Temperature, and Comparison with Pressure-Induced Densification," to be published in the Journal of Non-Crystalline Solids.

J. D. Zuegel, S. Borneis, C. Barty, B. LeGarrec, C. Danson, N. Miyanaga, P. K. Rambo, T. J. Kessler, A. W. Schmid, L. J. Waxer, B. E. Kruschwitz, R. Jungquist, N. Blanchot, E. Moses, J. Britten, C. LeBlanc, F. Amiranoff, J. L. Porter, J. Schwarz, M. Geissel, I. C. Smith, I. Jovanovic, and J. Dawson, "Laser Challenges for Fast Ignition," to be published in Fusion Science and Technology.

Conference Presentations

S. G. Lukishova, A. W. Schmid, R. Knox, P. Freivald, R. W. Boyd, C. R. Stroud, Jr., and K. L. Marshall, "Deterministically Polarized Fluorescence from Single-Dye Molecules Aligned in Liquid Crystal Host," IQEC/CLEO 2005, Tokyo, Japan, 11–15 July 2005.

The following presentations were made at the SPIE 50th Annual Meeting, San Diego, CA, 31 July–4 August 2005:

A. C.-A. Chen, J. U. Wallace, L. Zeng, A. K.-H. Wei, and S. H. Chen, "Novel Light-Emitting Organic Materials with Variable Electron and Hole Conductivities."

J. E. DeGroote, A. E. Marino, J. P. Wilson, K. E. Spencer, and S. D. Jacobs, "Effects of Nanodiamond Abrasive Friability in Experimental MR Fluids with Phosphate Laser Glass LHG-8 and Other Optical Glasses."

E. Fess, J. Schoen, M. Bechtold, and D. Mohring, "Ultraform Finishing Process for Optical Materials."

M. Haurylau, S. P. Anderson, K. L. Marshall, and P. M. Fauchet, "Electrical Tuning of Silicon-Based 2-D Photonic Bandgap Structures."

K. L. Marshall, K. Adelsberger, B. Kolodzie, G. Mhyre, and D. W. Griffin, "A Second-Generation Liquid Crystal Phase-Shifting Point-Diffraction Interferometer Employing Structured Substrates."

A. G. Noto and K. L. Marshall, "Application of Computational Chemistry Methods to the Prediction of Chirality and Helical Twisting Power in Liquid Crystal Systems."

The following presentations were made at the 14th APS Topical Conference on Shock Compression of Condensed Matter, Baltimore, MD, 31 July–5 August 2005:

T. R. Boehly, D. G. Hicks, J. H. Eggert, E. Vianello, J. E. Miller, J. F. Hansen, P. M. Celliers, G. W. Collins, and D. D. Meyerhofer, "Direct-Density Measurements of Multi-Mbar Shock Waves for Absolute Equation-of-State Studies."

D. D. Meyerhofer, "Creating Extreme Material Properties with High-Energy Laser Systems."

J. E. Miller, T. R. Boehly, E. Vianello, W. J. Armstrong, C. Sorce, W. Theobald, D. D. Meyerhofer, D. G. Hicks, J. H. Eggert, and P. M. Celliers, "Streaked Optical Pyrometer for Shock Wave and EOS Studies."

E. Vianello, T. R. Boehly, J. E. Miller, R. S. Craxton, V. N. Goncharov, I. V. Igumenshchev, D. D. Meyerhofer, D. G. Hicks, and P. M. Celliers, "Laser-Driven Shock-Timing Experiments in Planar CH and Cryogenic Deuterium Targets."

The following presentations were made at IFSA 2005, Biarritz, France, 4–9 September 2005:

R. Betti and C. Zhou, "Low-Adiabat Implosions for Fast-Ignition Inertial Confinement Fusion."

J. Bromage, J. D. Zuegel, S.-W. Bahk, D. S. Vickery, L. J. Waxer, D. Irwin, V. Bagnoud, R. Boni, M. D. Moore, R. Jungquist, and C. Stoeckl, "High-Intensity Laser Diagnostics for OMEGA EP."

D. H. Edgell, W. Seka, R. S. Craxton, L. M. Elasky, D. R. Harding, R. L. Keck, L. D. Lund, and M. D. Wittman, "Characterization of Cryogenic Direct-Drive ICF Targets During Layering Studies and Just Prior to Shot Time."

V. N. Goncharov, O. V. Gotchev, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, T. C. Sangster, S. Skupsky, and C. Cherfils-Clérouin, "Ablative Richtmyer–Meshkov Instability: Theory and Experimental Results."

J. H. Kelly, L. J. Waxer, V. Bagnoud, I. A. Begishev, J. Bromage, B. E. Kruschwitz, T. J. Kessler, S. J. Loucks, D. N. Maywar, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, J. B. Oliver, A. L. Rigatti, A. W. Schmid, C. Stoeckl, S. Dalton, L. Folnsbee, M. J. Guardalben, R. Jungquist, J. Puth, M. J. Shoup III, D. Weiner, and J. D. Zuegel, "OMEGA EP: High-Energy Petawatt Capability for the OMEGA Laser Facility."

B. E. Kruschwitz, R. Jungquist, J. Qiao, S. Abbey, S. E. Dean, D. N. Maywar, M. D. Moore, L. J. Waxer, and M. E. Wilson, "Large-Aperture Deformable Mirror Correction of Tiled-Grating Wavefront Error."

F. J. Marshall, R. S. Craxton, M. J. Bonino, R. Epstein, V. Yu. Glebov, D. Jacobs-Perkins, J. P. Knauer, J. A. Marozas, P. W. McKenty, S. G. Noyes, P. B. Radha, W. Seka, S. Skupsky, V. A. Smalyuk, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, "Polar-Direct-Drive Experiments on OMEGA."

R. L. McCrory, D. D. Meyerhofer, S. J. Loucks, S. Skupsky, R. Betti, T. R. Boehly, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, K. A. Fletcher, C. Freeman, J. A. Frenje, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, I. V. Igumenshchev, R. L. Keck, J. D. Kilkenny, J. P. Knauer, C. K. Li, J. R. Marciante, J. A. Marozas, F. J. Marshall, A. V. Maximov, P. W. McKenty, S. F. B. Morse, J. Myatt, S. Padalino, R. D. Petrasso, P. B. Radha, S. P. Regan, T. C. Sangster, F. H. Séguin, W. Seka, V. A. Smalyuk, J. M. Soures, C. Stoeckl, B. Yaakobi, and J. D. Zuegel, "Progress in Direct-Drive Inertial Confinement Fusion Research at the Laboratory for Laser Energetics."

S. Skupsky, R. S. Craxton, F. J. Marshall, R. Betti, T. J. B. Collins, R. Epstein, V. N. Goncharov, I. V. Igumenshchev, J. A. Marozas, P. W. McKenty, P. B. Radha, J. D. Kilkenny, D. D. Meyerhofer, T. C. Sangster, and R. L. McCrory, "Polar Direct Drive—Ignition at 1-MJ."

J. D. Zuegel, V. Bagnoud, J. Bromage, I. A. Begishev, J. Puth, "High-Performance OPCPA Laser System."

S. D. Allen, S. I. Kudryashov, S. Papernov, and A. W. Schmid, "Nano-Spallation on Silica Film Surfaces by Acoustic Wave Emitted by Laser-Heated Artificial Absorbing Inclusions," 8th International Conference on Laser Ablation, Banff, Canada, 11–16 September 2005.

The following presentations were made at the Boulder Damage Symposium XXXVII, Boulder, CO, 19–21 September 2005:

J. Keck, J. B. Oliver, T. J. Kessler, H. Huang, J. Barone, J. Hettrick, A. L. Rigatti, T. Hoover, K. L. Marshall, A. W. Schmid, A. Kozlov, and T. Z. Kosc, "Manufacture and Development of Multilayer Diffraction Gratings."

J. B. Oliver, T. J. Kessler, H. Huang, J. Keck, A. L. Rigatti, A. W. Schmid, A. Kozlov, and T. Z. Kosc, "Thin-Film Design for Multilayer Diffraction Gratings."

J. B. Oliver, A. L. Rigatti, J. D. Howe, J. Keck, J. Szczepanski, A. W. Schmid, S. Papernov, A. Kozlov, and T. Z. Kosc, "Thin-Film Polarizers for the OMEGA EP Laser System."

S. Papernov, A. W. Schmid, A. L. Rigatti, J. B. Oliver, and J. D. Howe, "Damage Behavior of HfO_2 Monolayer Film Containing Gold Nanoparticles as Artificial Absorbing Defects."

K. L. Marshall, A. Trajkovska-Petkoska, T. Z. Kosc, and S. D. Jacobs, "Polymer Cholesteric Liquid Crystal (PCLC) Flake/Fluid Host Suspensions: A Novel Electro-Optical Medium for Reflective Color Display Applications," Eurodisplay 2005, Edinburgh, Scotland, 19–22 September 2005.

The following presentations were made at the 5th International Laser Operations Workshop, Livermore, CA, 20–22 September 2005:

M. J. Bonino, "Fielding Targets to Support OMEGA Experiments."

B. Kruschwitz, "High-Energy Capability for the OMEGA Laser Facility."

S. J. Loucks, "Laboratory for Laser Energetics Overview."

S. F. B. Morse, "Activation Operations Plan: OMEGA EP."

G. Pien, "Shot Specification Input Flow, Operational Use, and Lead Time Requirements."

K. A. Thorp, "OMEGA Availability and Experimental Effectiveness Data Collection and Analysis to Improve System Performance."

M. Bobeica, R. Q. Gram, and D. R. Harding, "An Experimental Method for Measuring the Response of a Target to the Thermal Environment of the Fusion Reaction Chamber," IEEE/NPSS Symposium on Fusion Engineering, Knoxville, TN, 26–29 September 2005.