
Publications and Conference Presentations

Publications

G. P. Cox, K. L. Marshall, J. C. Lambropoulos, M. Leitch, C. Fromen, and S. D. Jacobs, "Modeling the Effects of Microencapsulation on the Electro-Optic Behavior of Polymer Cholesteric Liquid Crystal Flakes," *J. Appl. Phys.* **106**, 124911 (2009).

A. S. Cross, D. Kochanowska, M. Witkowska-Baran, A. Mycielski, M. Mikulics, D. Grützmacher, and R. Sobolewski, "Femtosecond Electro-Optic Effect in (Cd,Mn)Te Single Crystals," *J. Phys. Conf. Series* **193**, 012057 (2009).

D. French, C. Dorrer, and I. Jovanovic, "Two-Beam SPIDER for Dual-Pulse Single-Shot Characterization," *Opt. Lett.* **34**, 3415 (2009).

E. Glowacki, C. W. Tang, and K. L. Marshall, "Photoswitchable Gas Permeation Membranes Based on Azobenzene-Doped Liquid Crystals," in *Liquid Crystals XIII*, edited by I. C. Khoo (SPIE, Bellingham, WA, 2009), Vol. 7414, p. 74140H (invited).

O. V. Gotchev, P. Y. Chang, J. P. Knauer, D. D. Meyerhofer, O. Polomarov, J. Frenje, C. K. Li, M. J.-E. Manuel, R. D. Petrasso, J. R. Rygg, F. H. Séguin, and R. Betti, "Laser-Driven Magnetic-Flux Compression in High-Energy-Density Plasmas," *Phys. Rev. Lett.* **103**, 215004 (2009).

W. Guan and J. R. Marciante, "Single-Frequency 1 W Hybrid Brillouin/Ytterbium Fiber Laser," *Opt. Lett.* **34**, 3131 (2009).

S. X. Hu, P. B. Radha, J. A. Marozas, R. Betti, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, V. N. Goncharov, I. V. Igumenshchev, F. J. Marshall, R. L. McCrory, D. D. Meyerhofer, S. P. Regan, T. C. Sangster, S. Skupsky, V. A. Smalyuk, Y. Elbaz, and D. Shvarts, "Neutron Yield Study of Direct-Drive, Low-Adiabatic Cryogenic D₂ Implosions on OMEGA Laser System," *Phys. Plasmas* **16**, 112706 (2009).

H. Irie and R. Sobolewski, "Picosecond Electric Pulse Excitation of Three-Branch Ballistic Nanodevices," *J. Phys. Conf. Series* **193**, 012097 (2009).

V. Kaushal, M. Margala, Q. Yu, P. Ampadu, G. Guarino, and R. Sobolewski, "Current Transport Modeling and Experimental Study of THz Room Temperature Ballistic Deflection Transistors," *J. Phys. Conf. Series* **193**, 012092 (2009).

C. Miao, J. C. Lambropoulos, H. Romanofsky, S. N. Shafrir, and S. D. Jacobs, "Contributions of Nanodiamond Abrasives and Deionized Water in Magnetorheological Finishing of Aluminum Oxynitride," in *Optical Manufacturing and Testing VIII*, edited by J. H. Burge, O. W. Föhnle, and R. Williamson (SPIE, Bellingham, WA, 2009), Vol. 7426, p. 74260D.

C. Miao, S. N. Shafrir, J. C. Lambropoulos, and S. D. Jacobs, "Normal Force and Drag Force in Magnetorheological Finishing," in *Optical Manufacturing and Testing VIII*, edited by J. H. Burge, O. W. Föhnle, and R. Williamson (SPIE, Bellingham, WA, 2009), Vol. 7426, p. 74260C.

P. M. Nilson, S. P. D. Mangles, L. Willingale, M. C. Kaluza, A. G. R. Thomas, M. Tatarakis, Z. Najmudin, R. J. Clarke, K. L. Lancaster, S. Karsch, J. Schreiber, R. G. Evans, A. E. Dangor, and K. Krushelnick, "Generation of Ultrahigh-Velocity Ionizing Shocks with Petawatt-Class Laser Pulses," *Phys. Rev. Lett.* **103**, 255001 (2009).

P. M. Nilson, W. Theobald, J. F. Myatt, C. Stoeckl, J. D. Zuegel, R. Betti, D. D. Meyerhofer, and T. C. Sangster, "X-Ray Spectroscopy of Solid-Density Plasmas in High-Intensity Laser Interactions," in *Atomic Processes in Plasmas*, edited by K. B. Fournier (American Institute of Physics, New York, NY, 2009), Vol. CP1161, pp. 17–23.

G. P. Pepe, L. Parlato, N. Marrocco, V. Pagliarulo, G. Peluso, A. Barone, F. Tafuri, U. Scotti di Uccio, F. Miletto, M. Radovic, D. Pan, and R. Sobolewski, "Novel Superconducting Proximized Heterostructures for Ultrafast Photodetection," *Cryogenics* **49**, 660 (2009).

S. P. Regan, B. Yaakobi, T. R. Boehly, R. Epstein, J. A. Delettrez, V. Yu. Glebov, V. N. Goncharov, P. A. Jaanimagi, J. P. Knauer, F. J. Marshall, R. L. McCrory, D. D. Meyerhofer, P. B. Radha, T. C. Sangster, V. A. Smalyuk, J. Soures, C. Stoeckl, R. C. Mancini, D. A. Haynes, Jr., L. Welser-Sherrill, J. A. Koch, R. Tommasini, and H. Sawada, "Applied Plasma Spectroscopy: Laser-Fusion Experiments," *High Energy Density Phys.* **5**, 234 (2009).

S. N. Shafrir, H. J. Romanofsky, M. Skarlinski, M. Wang, C. Miao, S. Salzman, T. Chartier, J. Mici, J. C. Lambropoulos, R. Shen, H. Yang, and S. D. Jacobs, "Zirconia Coated Carbonyl Iron Particle-Based Magnetorheological Fluid for Polishing," in *Optical Manufacturing and Testing VIII*, edited by J. H. Burge, O. W. Föhnle, and R. Williamson (SPIE, Bellingham, WA, 2009), Vol. 7426, p. 74260B.

S. N. Shafrir, H. J. Romanofsky, M. Skarlinski, M. Wang, C. Miao, S. Salzman, T. Chartier, J. Mici, J. C. Lambropoulos, R. Shen, H. Yang, and S. D. Jacobs, "Zirconia-Coated Carbonyl-Iron-Particle-Based Magnetorheological Fluid for Polishing Optical Glasses and Ceramics," *Appl. Opt.* **48**, 6797 (2009).

V. A. Smalyuk, S. X. Hu, J. D. Hager, J. A. Delettrez, D. D. Meyerhofer, T. C. Sangster, and D. Shvarts, "Spherical Rayleigh–Taylor Growth of Three-Dimensional Broadband Perturbations on OMEGA," *Phys. Plasmas* **16**, 112701 (2009).

W. Theobald, K. S. Anderson, R. Betti, R. S. Craxton, J. A. Delettrez, J. A. Frenje, V. Yu. Glebov, O. V. Gotchev, J. H. Kelly, C. K. Li, A. J. Mackinnon, F. J. Marshall, R. L. McCrory, D. D. Meyerhofer, J. F. Myatt, P. A. Norreys, P. M. Nilson, P. K. Patel, R. D. Petrasso, P. B. Radha, C. Ren, T. C. Sangster, W. Seka, V. A. Smalyuk, A. A. Solodov, R. B. Stephens, C. Stoeckl, and B. Yaakobi, "Advanced-Ignition-Concept Exploration on OMEGA," *Plasma Phys. Control. Fusion* **51**, 124052 (2009).

B. Yaakobi, O. V. Gotchev, R. Betti, and C. Stoeckl, "Study of Fast-Electron Transport in Laser-Illuminated Spherical Targets," *Phys. Plasmas* **16**, 102703 (2009).

L. Zeng, T. Y.-H. Lee, P. B. Merkel, and S. H. Chen, "A New Class of Non-Conjugated Bipolar Hybrid Hosts for Phosphorescent Organic Light-Emitting Diodes," *J. Mater. Chem.* **19**, 8772 (2009).

J. Zhang, A. Belousov, J. Karpinski, B. Batlogg, and R. Sobolewski, "Femtosecond Optical Spectroscopy Studies of High-Pressure-Grown (Al,Ga)N Single Crystals," *J. Phys. Conf. Series* **193**, 012058 (2009).

Forthcoming Publications

J. Bromage, C. Dorrer, J. R. Marciante, M. J. Shoup III, and J. D. Zuegel, "Modal Measurement of a Large-Mode-Area Photonic-Crystal Fiber Amplifier Using Spatially Resolved Spectral Interferometry," to be published in *Solid State Diode Laser Technology Review*.

W. R. Donaldson, J. R. Marciante, and R. G. Roides, "An Optical Replicator for Single-Shot Measurements at 10 GHz with a Dynamic Range of 1800:1," to be published in the *IEEE Journal of Quantum Electronics*.

R. Florido, R. C. Mancini, T. Nagayama, R. Tommasini, J. A. Delettrez, S. P. Regan, V. A. Smalyuk, R. Rodríguez, and J. M. Gil, "Argon *K*-Shell and Bound-Free Emission from OMEGA Direct-Drive Implosion Cores," to be published in *High Energy Density Physics*.

W. Guan and J. R. Marciante, "Power Scaling of Single-Frequency Hybrid Brillouin/Ytterbium Fiber Lasers," to be published in *IEEE Journal of Quantum Electronics*.

J. Kitaygorsky, R. Shouten, S. Dorenbos, E. Reiger, V. Zwiller, and R. Sobolewski, "Resolving Dark Pulses from Photon Pulses in NbN Superconducting Single-Photon Detectors," to be published in the *Journal of Modern Optics*.

P. W. McKenty, R. S. Craxton, F. J. Marshall, T. C. Sangster, J. A. Marozas, A. M. Cok, M. J. Bonino, D. R. Harding, D. D. Meyerhofer, R. L. McCrory, J. D. Kilkenny, A. Nikroo, J. Fooks, M. Hoppe, J. M. Edwards, A. J. MacKinnon, D. H. Munro, and R. J. Wallace, "Design of High-Neutron-Yield Polar-Drive Targets for Diagnostic Activation Experiments on the NIF," to be published in the *Journal of Physics: Conference Series*.

A. V. Okishev, "Optical Differentiation and Multimillijoule ~150-ps Pulse Generation in a Regenerative Amplifier with a Temperature-Tuned Intracavity Volume Bragg Grating," to be published in *Applied Optics*.

H. F. Robey, T. R. Boehly, R. E. Olson, A. Nikroo, P. M. Celliers, O. L. Landen, and D. D. Meyerhofer, "Experimental Validation of a Diagnostic Technique for Tuning the Fourth Shock Timing on National Ignition Facility," to be published in *Physics of Plasmas*.

J. E. Schoenly, W. Seka, and P. Rechmann, "Investigation into the Optimum Beam Shape and Fluence for Selective Ablation of Dental Calculus at $\lambda = 400$ nm," to be published in *Lasers in Surgery and Medicine*.

R. Shen, S. N. Shafrir, C. Miao, M. Wang, J. C. Lambropoulos, S. D. Jacobs, and H. Yang, "Synthesis and Corrosion Study of Zirconia Coated Carbonyl Iron Particles," to be published in the *Journal of Colloid and Interface Science*.

L. Sun, S. Jiang, and J. R. Marciante, "All-Fiber Optical Magnetic-Field Sensor Based on Faraday Rotation in Highly Terbium-Doped Fiber," to be published in *Optics Express*.

L. Sun, S. Jiang, J. D. Zuegel, and J. R. Marciante, "All-Fiber Optical Isolator Based on Faraday Rotation in Highly Terbium-Doped Fiber," to be published in *Optics Letters*.

Conference Presentations

The following presentations were made at *Frontiers in Optics 2009*, San Jose, CA, 11–15 October 2009:

W. Guan and J. R. Marciante, "Power Scaling of Single-Frequency Hybrid Brillouin/Ytterbium Fiber Lasers."

J. R. Marciante, "Spatial-Filtering Properties of Large-Mode-Area Fibers with Confined Gain Dopants."

L. Sun, S. Jiang, J. D. Zuegel, and J. R. Marciante, "All-Fiber Isolator Based on Faraday Rotation."

C. Dorrer, "Signal Reconstruction Techniques for Optical Pulse Characterization," *Signal Recovery and Synthesis*, San Jose, CA, 13–14 October 2009.

The following presentations were made at the 51st Annual Meeting of the APS Division of Plasma Physics, Atlanta, GA, 2–6 November 2009:

K. S. Anderson, R. Betti, P. Y. Chang, R. Nora, M. Fatenejad, and D. Shvarts, "Single- and Multidimensional Robustness Studies of the NIF Ignition Point Design."

M. A. Barrios, D. G. Hicks, T. R. Boehly, D. E. Fratanduono, J. H. Eggert, P. M. Celliers, G. W. Collins, and D. D. Meyerhofer, "High-Precision Measurements of the Equation of State (EOS) of Hydrocarbons at 1 to 10 Mbar Using Laser-Driven Shock Waves" (invited).

R. Betti, K. S. Anderson, P. Y. Chang, R. Nora, C. D. Zhou, B. Spears, J. Edwards, S. W. Haan, and J. Lindl, "ICF Ignition, the Lawson Criterion, and Comparison with MFE Ignition" (invited).

T. R. Boehly, V. N. Goncharov, W. Seka, D. E. Fratanduono, M. A. Barrios, S. X. Hu, J. A. Marozas, T. C. Sangster, D. D. Meyerhofer, D. G. Hicks, and P. M. Celliers, "Shock-Timing Measurements in Directly Driven Spherical Inertial Confinement Fusion Targets."

P. Y. Chang, R. Betti, K. S. Anderson, R. Nora, B. Spears, M. Fatenejad, and D. Shvarts, "A Measurable Three-Dimensional Ignition Criterion for Inertial Confinement Fusion."

T. J. B. Collins, P. W. McKenty, K. S. Anderson, M. M. Marinak, M. A. Barrios, D. G. Braun, T. R. Boehly, and P. M. Celliers, "Simulations of the Direct-Drive NIF Shock-Timing Diagnostic Commissioning Experiments."

R. S. Craxton, W. Theobald, W. Seka, S. Ivancic, G. Li, C. Ren, and D. Weiner, "Hydrodynamic Simulations and Optical

Diagnosis of a Long-Scale-Length Channeling Experiment on OMEGA EP.”

J. A. Delettrez, J. P. Knauer, V. N. Goncharov, P. B. Radha, C. Stoeckl, A. V. Maximov, J. A. Frenje, and D. Shvarts, “Analysis of the Effect of a High-Z-Doped CH Ablator and Glass Ablators on Preheat and Hard X-Ray Radiation from Two-Plasmon Decay Electrons.”

D. H. Edgell, W. Seka, J. A. Delettrez, R. S. Craxton, V. N. Goncharov, I. V. Igumenshchev, J. F. Myatt, A. V. Maximov, R. W. Short, T. C. Sangster, and R. E. Bahr, “Cross-Beam Energy Transport in Direct-Drive-Implosion Experiments.”

R. Epstein, J. A. Delettrez, V. N. Goncharov, P. W. McKenty, F. J. Marshall, D. D. Meyerhofer, P. B. Radha, S. P. Regan, T. C. Sangster, V. A. Smalyuk, and W. Theobald, “Simulation and Analysis of Backlit Images of Cryogenic Implosions on OMEGA.”

D. E. Fratanduono, M. A. Barrios, T. R. Boehly, D. D. Meyerhofer, R. Smith, J. H. Eggert, D. G. Hicks, P. M. Celliers, G. W. Collins, and R. Rygg, “Measurements of Strain-Induced Refractive Index Changes in LiF Using Direct-Drive Ramp Compression.”

V. Yu. Glebov, C. Stoeckl, W. Theobald, T. C. Sangster, K. L. Marshall, M. Cruz, M. J. Shoup III, T. Buczek, A. Pruyne, M. Fox, T. Duffy, M. J. Moran, and R. Lauck, “Development of Scintillator Detectors for Fast-Ignition Experiments and Down-Scattered Neutron Measurements.”

V. N. Goncharov, T. C. Sangster, T. R. Boehly, R. L. McCrory, D. D. Meyerhofer, P. B. Radha, V. A. Smalyuk, S. Skupsky, J. A. Frenje, and R. D. Petrasso, “Multiple-Picket Cryogenic Target Designs and Performance for OMEGA and the National Ignition Facility.”

J. D. Hager, J. P. Knauer, S. X. Hu, D. D. Meyerhofer, T. C. Sangster, and V. A. Smalyuk, “Rayleigh–Taylor Measurements in Planar CH and SiO₂ Foils on OMEGA.”

S. X. Hu, B. Militzer, V. N. Goncharov, T. R. Boehly, P. B. Radha, and S. Skupsky, “Theoretical Investigation of Strong Coupling and Degeneracy Effects in ICF Implosions.”

I. V. Igumenshchev, D. H. Edgell, V. N. Goncharov, W. Seka, J. F. Myatt, A. V. Maximov, A. Shvydky, and J. A. Delettrez,

“Modeling Crossed-Beam Energy Transfer in Implosion Experiments on OMEGA.”

J. P. Knauer, O. V. Gotchev, P. Y. Chang, D. D. Meyerhofer, A. Polomarov, R. Betti, J. A. Frenje, C. K. Li, M. J.-E. Manuel, R. D. Petrasso, J. R. Rygg, and F. H. Séguin, “Compressing Magnetic Fields with High-Energy Lasers” (invited).

J. A. Marozas, T. J. B. Collins, and J. D. Zuegel, “2-D Simulations of a 1-MJ CH-Foam Ignition Target on the NIF with 0.5 THz of 1-D Multi-FM SSD Bandwidth Using an Analytic Model.”

F. J. Marshall, R. S. Craxton, R. Epstein, V. Yu. Glebov, V. N. Goncharov, J. P. Knauer, P. W. McKenty, P. B. Radha, A. Shvydky, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, “Polar-Driven Implosions on OMEGA: Observations and Simulations of Low-Mode Perturbations in the Main Fuel Layer and Hot Spot.”

A. V. Maximov, J. F. Myatt, R. W. Short, W. Seka, J. A. Delettrez, and C. Stoeckl, “Growth and Saturation of Two-Plasmon-Decay Instability Driven by Crossing Laser Beams in OMEGA Plasmas.”

P. W. McKenty, R. S. Craxton, J. A. Marozas, A. M. Cok, M. J. Bonino, D. R. Harding, D. D. Meyerhofer, R. L. McCrory, J. D. Kilkenny, A. Nikroo, J. Fooks, M. L. Hoppe, M. J. Edwards, A. J. MacKinnon, D. H. Munro, and R. J. Wallace, “Design of High-Neutron-Yield, Polar-Drive Targets for Diagnostic Activation Experiments on the NIF.”

D. D. Meyerhofer, R. Betti, T. R. Boehly, J. H. Kelly, S. J. Loucks, R. L. McCrory, S. F. B. Morse, P. M. Nilson, S. P. Regan, T. C. Sangster, V. A. Smalyuk, C. Stoeckl, W. Theobald, and L. J. Waxer, “Initial Results from the OMEGA EP Laser System.”

J. F. Myatt, J. A. Delettrez, A. V. Maximov, R. W. Short, D. H. Edgell, W. Seka, D. F. DuBois, D. A. Russell, and H. X. Vu, “Extended Zakharov Modeling of Preheat Caused by the Two-Plasmon Decay Instability in Direct-Drive ICF Plasmas.”

P. M. Nilson, W. Theobald, J. F. Myatt, L. Gao, C. Stoeckl, P. A. Jaanimagi, J. A. Delettrez, B. Yaakobi, J. D. Zuegel, R. Betti, D. D. Meyerhofer, T. C. Sangster, A. J. MacKinnon, P. K. Patel, and K. Akli, “Fast-Electron Generation with Multi-kJ Pulses on OMEGA EP.”

- O. Polomarov, P. Y. Chang, O. V. Gotchev, and R. Betti, "Effects of External and Self-Generated Magnetic Fields on Laser-Driven Implosions."
- P. B. Radha, C. Stoeckl, V. N. Goncharov, J. A. Delettrez, T. C. Sangster, R. Betti, R. L. McCrory, D. D. Meyerhofer, S. P. Regan, W. Seka, D. Shvarts, S. Skupsky, and V. A. Smalyuk, "Intensity Dependence of Target Performance in Low-Adiabatic Warm Implosions on OMEGA."
- S. P. Regan, P. B. Radha, T. R. Boehly, V. N. Goncharov, R. L. McCrory, D. D. Meyerhofer, T. C. Sangster, V. A. Smalyuk, K. Falk, G. Gregori, T. Doeppner, S. H. Glenzer, and O. L. Landen, "Inferring Electron Temperature of Shocked Liquid Deuterium Using Inelastic X-Ray Scattering."
- T. C. Sangster, V. N. Goncharov, R. Betti, T. R. Boehly, D. T. Casey, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, K. A. Fletcher, J. A. Frenje, V. Yu. Glebov, D. R. Harding, S. X. Hu, I. V. Igumenshchev, J. P. Knauer, S. J. Loucks, C. K. Li, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, P. M. Nilson, S. P. Padalino, R. D. Petrasso, P. B. Radha, S. P. Regan, F. H. Séguin, W. Seka, R. W. Short, D. Shvarts, S. Skupsky, V. A. Smalyuk, J. M. Soures, C. Stoeckl, W. Theobald, and B. Yaakobi, "Shock-Tuned Cryogenic DT-Implosion Performance on OMEGA" (invited).
- W. Seka, D. H. Edgell, J. F. Myatt, A. V. Maximov, R. W. Short, R. S. Craxton, D. Russell, D. F. DuBois, and H. X. Vu, "Mitigation of Fast-Electron Production by the Two-Plasmon-Decay Instability in Directly Driven Targets."
- R. W. Short, "Anisotropy and Angular Dependence of Two-Plasmon Decay Driven by Multiple Overlapping Laser Beams in Direct-Drive Geometry."
- A. Shvydky, P. W. McKenty, J. A. Delettrez, I. V. Igumenshchev, D. H. Edgell, S. Skupsky, and R. L. McCrory, "Numerical Investigation of the Effects of Cross-Beam Energy Transfer on the Drive Uniformity of OMEGA Implosions."
- A. A. Solodov, M. Storm, J. F. Myatt, R. Betti, D. D. Meyerhofer, P. M. Nilson, W. Theobald, and C. Stoeckl, "Simulations of Electron-Beam Transport in Solid-Density Targets and the Role of Magnetic Collimation."
- C. Stoeckl, W. Theobald, R. Betti, R. S. Craxton, J. A. Delettrez, O. V. Gotchev, V. Yu. Glebov, F. J. Marshall, D. D. Meyerhofer, W. Seka, T. C. Sangster, C. D. Zhou, J. A. Frenje, and R. D. Petrasso, "Shock-Ignition Experiments on OMEGA at NIF-Relevant Intensities."
- W. Theobald, C. Stoeckl, V. Yu. Glebov, F. J. Marshall, K. L. Marshall, K. S. Anderson, R. Betti, R. S. Craxton, D. D. Meyerhofer, P. M. Nilson, T. C. Sangster, A. A. Solodov, J. A. Frenje, N. Sinenian, R. D. Petrasso, P. A. Norreys, D. Hey, M. H. Key, P. K. Patel, R. Lauck, and R. B. Stephens, "Integrated Fast-Ignition Experiments on OMEGA."
- J.-H. Yang and R. S. Craxton, "An Empirical Model for the Interaction of Ultra-Intense Laser Pulses with Fully Ionized Plasmas Including Electrostatic Effects."

