
Publications and Conference Presentations

Publications

- S. H. Chen and S. K.-H. Wei, "Modification of the Stokes–Einstein Equation with a Semiempirical Microfriction Factor for Correlation of Tracer Diffusivities in Organic Solvents," *Ind. Eng. Chem. Res.* **50**, 12,304 (2011).
- C. Dorrer, S. K.-H. Wei, P. Leung, M. Vargas, K. Wegman, J. Boulé, Z. Zhao, K. L. Marshall, and S. H. Chen, "High-Damage-Threshold Static Laser Beam Shaping Using Optically Patterned Liquid-Crystal Devices," *Opt. Lett.* **36**, 4035 (2011).
- D. E. Fratanduono, J. H. Eggert, T. R. Boehly, M. A. Barrios, D. D. Meyerhofer, B. J. Jensen, and G. W. Collins, "Index of Refraction of Shock-Released Materials," *J. Appl. Phys.* **110**, 083509 (2011).
- S. X. Hu, B. Militzer, V. N. Goncharov, and S. Skupsky, "First-Principles Equation-of-State Table of Deuterium for Inertial Confinement Fusion Applications," *Phys. Rev. B* **84**, 224109 (2011).
- I. Íñiguez-de-la-Torre, S. Purohit, V. Kaushal, M. Margala, M. Gong, R. Sobolewski, D. Wolpert, P. Ampadu, T. González, and J. Mateos, "Exploring Digital Logic Design Using Ballistic Deflection Transistors Through Monte Carlo Simulations," *IEEE Trans. Nanotech.* **10**, 1337 (2011).
- K. A. Marsh, C. E. Clayton, C. Joshi, W. Lu, W. B. Mori, A. Pak, L. O. Silva, N. Lemos, R. A. Fonseca, S. de Freitas Martins, F. Albert, T. Doeppner, C. Filip, D. Froula, S. H. Glenzer, D. Price, J. Ralph, and B. B. Pollock, "Laser Wake-field Accelerator Beyond 1 GeV Using Ionization Induced Injection," in the *Proceedings of the Particle Acceleration Conference* (IEEE, New York, 2011), pp. 707–711.
- K. Mehrotra, H. P. Howard, S. D. Jacobs, and J. C. Lambropoulos, "Nanoindentation of High-Aspect Ratio Pillar Structures on Optical Multilayer Dielectric Diffraction Gratings," *AIP Advances* **1**, 042179 (2011).
- B. B. Pollock, G. R. Tynan, F. Albert, C. Filip, S. H. Glenzer, J. Meinecke, A. Pak, J. E. Ralph, C. E. Clayton, C. Joshi, K. A. Marsh, J. Shaw, K. L. Herpoldt, and D. H. Froula, "The Effects of a Density Mismatch in a Two-Stage LWFA," in the *Proceedings of the Particle Acceleration Conference* (IEEE, New York, 2011), pp. 1421–1423.
- L. Willingale, P. M. Nilson, A. G. R. Thomas, J. Cobble, R. S. Craxton, A. Maksimchuk, P. A. Norreys, T. C. Sangster, R. H. Scott, C. Stoeckl, C. Zwick, and K. Krushelnick, "Proton Probe Imaging of Fields Within a Laser-Generated Plasma Channel," *IEEE Trans. Plasma Sci.* **39**, 2616 (2011).
- J.-H. Yang, R. S. Craxton, and M. G. Haines, "Explicit General Solutions to Relativistic Electron Dynamics in Plane-Wave Electromagnetic Fields and Simulations of Ponderomotive Acceleration," *Plasma Phys. Control. Fusion* **53**, 125006 (2011).
- J. Zhang, A. Belousov, J. Karpiński, B. Batlogg, and R. Sobolewski, "Time-Resolved Femtosecond Optical Characterization of Multi-Photon Absorption in High-Pressure-Grown $\text{Al}_{0.86}\text{Ga}_{0.14}\text{N}$ Single Crystals," *J. Appl. Phys.* **110**, 113112 (2011).

Forthcoming Publications

J. Bromage, C. Dorrer, and R. K. Jungquist, “Temporal Contrast Degradation at the Focus of Ultrafast Pulses from High-Frequency Spectral Phase Modulation,” to be published in the *Journal of the Optical Society of America B*.

D. H. Froula, I. V. Igumenshchev, D. T. Michel, D. H. Edgell, R. Follett, V. Yu. Glebov, V. N. Goncharov, J. Kwiatkowski, F. J. Marshall, P. B. Radha, W. Seka, C. Sorce, S. Stagnitto, C. Stoeckl, and T. C. Sangster, “Increasing Hydrodynamic Efficiency by Reducing Cross-Beam Energy Transfer in Direct-Drive Implosion Experiments,” to be published in *Physical Review Letters*.

J. F. Myatt, J. Zhang, J. A. Delettrez, A. V. Maximov, R. W. Short, W. Seka, D. H. Edgell, D. F. DuBois, D. A. Russell, and H. X. Vu, “The Dynamics of Hot-Electron Heating in Direct-Drive Implosion Experiments Due to the Two-Plasmon-Decay Instability,” to be published in *Physics of Plasmas*.

P. M. Nilson, J. R. Davies, W. Theobald, P. A. Jaanimagi, C. Mileham, R. Jungquist, C. Stoeckl, I. A. Begishev, A. A. Solodov, J. F. Myatt, J. D. Zuegel, T. C. Sangster, R. Betti, and D. D. Meyerhofer, “Time-Resolved Measurements of Hot-Electron Equilibration Dynamics in High-Intensity Laser Interactions with Thin-Foil Solid Targets,” to be published in *Physical Review Letters*.

A. V. Okishev, C. Dorrer, Y. Fisher, and M. Pavia, “A Multiwavelength, Variable-Pulse-Width, Diode-Pumped Laser System,” to be published in the *Proceedings of SPIE*.

A. Trajkovska-Petkoska and S. D. Jacobs, “The Manufacture, Characterization, and Manipulation of Polymer Cholesteric Liquid Crystal Flakes and Their Possible Applications,” to be published in the *Journal of Materials Science and Engineering*.

A. Visco, M. J. Grosskopf, S. H. Glenzer, D. H. Froula, G. Gregori, T. Döppner, F. W. Doss, and R. P. Drake, “Measurement of Radiative Shock Properties by X-Ray Thomson Scattering,” to be published in *Physical Review Letters*.

S. K.-H. Wei, S. H. Chen, K. L. Marshall, C. Dorrer, and S. D. Jacobs, “Azimuthal Anchoring Energy and Pixel Resolution in a Photopatterned Liquid Crystal Cell Using Coumarin-Based Photoalignment Layers,” to be published in the *Japanese Journal of Applied Physics*.

B. Yaakobi, P.-Y. Chang, A. A. Solodov, C. Stoeckl, D. H. Edgell, R. S. Craxton, S. X. Hu, J. F. Myatt, F. J. Marshall, W. Seka, and D. H. Froula, “Fast-Electron Generation in Long-Scale-Length Plasmas,” to be published in *Physics of Plasmas*.

Conference Presentations

The following presentations were made at the 8th International Laser Operations Workshop, Aldermaston, U.K., 4–6 October 2011:

D. Canning, S. F. B. Morse, J. Qiao, T. Nguyen, B. E. Kruschwitz, and A. Kalb, “OMEGA EP Grating Compressor Chamber Operations.”

B. E. Kruschwitz, M. D. Moore, and R. Jungquist, “OMEGA EP Focal-Spot Improvement Activities.”

S. F. B. Morse, “A Polar-Drive-Irradiation Platform for NIF is Being Developed Using OMEGA.”

J. Puth, “Omega Facility Status and Performance.”

S. J. Stagnitto, J. Kwiatkowski, S. F. B. Morse, M. Labuzeta, and V. Guiliano, “Characterizing Debris-Shield Transmission Degradation and Estimating On-Target Energy.”

G. Fiksel, A. Bhattacharjee, W. Fox, R. Betti, P.-Y. Chang, M. Hohenberger, and P. M. Nilson, “Studies of Magnetized and HED Plasmas—Recent Results and Future Plans,” presented at the Center for Magnetized Self-Organization Meeting, Durham, NH, 17–20 October 2011.

S. Friedrich, T. J. Clancy, M. J. Eckart, M. J. Shoup III, T. Buczek, and V. Yu. Glebov, "High-Speed Diamond Detectors for Fast-Neutron Analysis of Inertial Confinement Fusion," presented at the IEEE Nuclear Science Symposium, Valencia, Spain, 23–29 October 2011.

J. H. Kelly, "The Optics of Inertial Confinement Fusion," presented at The Institute of Optics Colloquium, Rochester, NY, 31 October 2011.

J. Bromage, C. Dorrer, M. Millecchia, J. Bunkenburg, R. K. Jungquist, and J. D. Zuegel, "A Front End for Ultra-Intense OPCPA," presented at Light at Extreme Intensities, Szeged, Hungary, 14–18 November 2011.

The following presentations were made at the 53rd Annual Meeting of the APS Division of Plasma Physics, Salt Lake City, UT, 14–18 November 2011:

K. S. Anderson, R. Betti, P. W. McKenty, T. J. B. Collins, R. S. Craxton, J. A. Marozas, R. Nora, S. Skupsky, and L. J. Perkins, "Simulations of Shock-Ignition Targets for the NIF."

T. R. Boehly, V. N. Goncharov, W. Seka, S. X. Hu, J. A. Marozas, D. D. Meyerhofer, P. M. Celliers, D. G. Hicks, M. A. Barrios, D. E. Fratanduono, G. W. Collins, "Multiple Spherically Converging Shock Waves in Liquid Deuterium."

P.-Y. Chang, G. Fiksel, M. Hohenberger, J. P. Knauer, R. Betti, F. H. Séguin, C. K. Li, M. E. Manuel, and R. D. Petrasso, "Experiments and Simulations of Laser-Driven Magnetized ICF Targets on OMEGA."

T. J. B. Collins, J. A. Marozas, K. S. Anderson, R. Betti, R. S. Craxton, J. A. Delettrez, V. N. Goncharov, D. R. Harding, F. J. Marshall, R. L. McCrory, D. D. Meyerhofer, P. W. McKenty, P. B. Radha, A. Shvydky, S. Skupsky, J. D. Zuegel, "A Polar-Drive-Ignition Design for the National Ignition Facility" (invited).

R. S. Craxton, P. W. McKenty, E. J. Bond, S. Le Pape, A. J. MacKinnon, P. A. Michel, and J. D. Moody, "Three-Dimen-

sional Distributions of Scattered Light in NIF 'Exploding-Pusher' Polar-Drive Experiments."

J. A. Delettrez, W. Seka, D. H. Froula, and T. J. B. Collins, "Three-Dimensional Numerical Investigation of Oblique Laser Irradiation of Planar Targets."

D. H. Edgell, J. Magoon, T. C. Sangster, M. J. Shoup III, F. J. Marshall, C. Stoeckl, V. Yu. Glebov, A. MacPhee, G. Krauter, S. Burns, J. Celeste, M. J. Eckart, J. R. Kimbrough, J. D. Kilkenny, G. Lacaille, N. B. Meezan, J. Parker, Z. Sober, and M. Thayne, "First Results from the South Pole Bang Time (SPBT) Diagnostic on the NIF."

R. Epstein, S. P. Regan, F. J. Marshall, T. C. Sangster, S. W. Hamlin, R. L. McCrory, D. D. Meyerhofer, B. A. Hammel, L. J. Suter, H. Scott, M. A. Barrios, D. A. Callahan, N. Izumi, N. B. Meezan, I. E. Golovkin, J. J. MacFarlane, R. C. Mancini, and K. J. Peterson, "Analysis of Diagnostic X-Ray Spectra of Implosions at the National Ignition Facility."

G. Fiksel, P.-Y. Chang, M. Hohenberger, J. P. Knauer, F. J. Marshall, D. D. Meyerhofer, R. Betti, F. H. Séguin, and R. D. Petrasso, "Fusion-Yield Enhancement in Magnetized Laser-Driven Implosions."

C. J. Forrest, V. Yu. Glebov, V. N. Goncharov, J. P. Knauer, D. D. Meyerhofer, P. B. Radha, T. C. Sangster, and C. Stoeckl, "Measurement of the Areal Density (ρR) Using nT Elastic Backscattering on OMEGA."

D. E. Fratanduono, M. A. Barrios, T. R. Boehly, D. D. Meyerhofer, J. H. Eggert, D. G. Hicks, R. F. Smith, D. Braun, P. M. Celliers, and G. W. Collins, "Refractive Index of Lithium Fluoride Ramp Compressed to 800 GPa" (invited).

D. H. Froula, I. V. Igumenshchev, D. T. Michel, C. Sorce, R. Follett, D. H. Edgell, W. Seka, and V. N. Goncharov, "Measurements of an Increased Neutron Yield with Reduced CBET."

L. Gao, P. M. Nilson, I. V. Igumenshchev, S. X. Hu, C. Stoeckl, D. H. Froula, and D. D. Meyerhofer, "Magnetic-Field Generation in Planar Plastic Targets on OMEGA EP."

V. Yu. Glebov, C. Stoeckl, T. C. Sangster, C. Forrest, J. P. Knauer, V. N. Goncharov, and P. B. Radha, "Measurements of DD Neutron Yield and Ion Temperature in DT Implosions on OMEGA."

V. N. Goncharov, T. C. Sangster, R. Epstein, S. X. Hu, I. V. Igumenshchev, D. H. Froula, R. L. McCrory, D. D. Meyerhofer, P. B. Radha, W. Seka, S. Skupsky, and C. Stoeckl, "Cryogenic Deuterium-Tritium Implosions on OMEGA."

M. Hohenberger, P.-Y. Chang, G. Fiksel, J. P. Knauer, D. D. Meyerhofer, R. Betti, F. J. Marshall, F. H. Séguin, and R. D. Petrasso, "Inertial Confinement Fusion Implosions with Seeded Magnetic Fields on OMEGA" (invited).

S. X. Hu, G. Fiksel, V. N. Goncharov, S. Skupsky, and V. A. Smalyuk, "Analysis of Laser-Imprinting Reduction in Spherical-RT Experiments with Si-/Ge-Doped Plastic Targets."

I. V. Igumenshchev, W. Seka, D. H. Edgell, D. H. Froula, V. N. Goncharov, R. S. Craxton, L. Divol, R. Follett, J. H. Kelly, T. Z. Kosc, D. T. Michel, P. Michel, R. L. McCrory, A. V. Maximov, D. D. Meyerhofer, J. F. Myatt, T. C. Sangster, A. Shvydky, S. Skupsky, and C. Stoeckl, "Crossed-Beam Energy Transfer in Direct-Drive Implosions" (invited).

S. Ivancic, W. Theobald, C. Stoeckl, P. M. Nilson, T. C. Sangster, D. D. Meyerhofer, S. X. Hu, and L. Willingale, "Initial Channeling of a Kilojoule-Class Laser in Long-Scale-Length Plasmas."

J. P. Knauer, V. Yu. Glebov, D. D. Meyerhofer, T. C. Sangster, C. Stoeckl, E. J. Bond, J. A. Caggiano, T. J. Clancy, M. J. Eckart, S. Friedrich, R. Hatarik, R. A. Lerche, A. J. Mackinnon, J. M. McNaney, M. J. Moran, D. H. Munro, S. J. Padalino, and J. D. Kilkenny, "Neutron Spectra Measured with Time-of-Flight Detectors on the National Ignition Facility."

J. A. Marozas, T. J. B. Collins, D. H. Edgell, I. V. Igumenshchev, and J. F. Myatt, "Two-Dimensional Analysis of Crossed-Beam Energy Transfer (CBET) in Direct-Drive ICF Target Implosions."

F. J. Marshall, P. B. Radha, R. Epstein, V. Yu. Glebov, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, "High-Convergence-Ratio Polar-Drive Experiments on OMEGA."

A. V. Maximov, J. F. Myatt, R. W. Short, I. V. Igumenshchev, D. H. Edgell, and W. Seka, "Energy Transfer Between Crossing Laser Beams in the Plasmas of Direct-Drive ICF"

P. W. McKenty, R. S. Craxton, F. J. Marshall, A. Shvydky, R. Epstein, A. M. Cok, J. A. Marozas, T. J. B. Collins, S. Skupsky, C. Stoeckl, T. C. Sangster, M. J. Bonino,

R. Janezic, D. R. Harding, W. T. Shmayda, S. F. B. Morse, D. D. Meyerhofer, and R. L. McCrory, "Numerical Evaluation of Subtangential Focusing in OMEGA Target Implosions."

D. D. Meyerhofer, S.-W. Bahk, J. Bromage, C. Dorrer, J. H. Kelly, B. E. Kruschwitz, S. J. Loucks, R. L. McCrory, S. F. B. Morse, J. Qiao, C. Stoeckl, L. J. Waxer, and J. D. Zuegel, "Status of the OMEGA EP Laser System."

D. T. Michel, B. Yaakobi, S. X. Hu, R. W. Short, J. F. Myatt, C. Stoeckl, D. H. Edgell, W. Seka, V. N. Goncharov, and D. H. Froula, "Measurements of Hot Electrons Produced by Two-Plasmon Decay in Near Direct-Drive-Ignition Plasma Conditions."

J. F. Myatt, J. Zhang, A. V. Maximov, R. W. Short, D. F. DuBois, D. A. Russell, and H. X. Vu, "A Self-Consistent Quasilinear Model for the Two-Plasmon-Decay Instability in Inhomogeneous Plasmas."

R. Nora, R. Betti, K. S. Anderson, W. Theobald, A. Casner, M. Lafon, X. Ribeyre, and G. Schurtz, "Cryogenic Shock-Ignition Target Designs for OMEGA."

P. B. Radha, F. J. Marshall, T. R. Boehly, T. J. B. Collins, R. S. Craxton, R. Epstein, V. N. Goncharov, J. A. Marozas, R. L. McCrory, D. D. Meyerhofer, A. Shvydky, S. Skupsky, J. A. Frenje, and R. D. Petrasso, "Polar-Drive Designs for OMEGA."

S. P. Regan, R. Epstein, B. A. Hammel, L. J. Suter, J. Ralph, H. Scott, M. A. Barrios, D. K. Bradley, D. A. Callahan, C. J. Cerjan, G. W. Collins, S. N. Dixit, T. Doepfner, M. J. Edwards, D. R. Farley, S. Glenn, S. H. Glenzer, I. E. Golovkin, S. W. Haan, A. Hamza, D. G. Hicks, N. Izumi, J. D. Kilkenny, J. L. Kline, G. A. Kyrala, O. L. Landen, T. Ma, J. J. MacFarlane, R. C. Mancini, R. L. McCrory, N. B. Meezan, D. D. Meyerhofer, A. Nikroo, K. J. Peterson, T. C. Sangster, P. Springer, and R. P. J. Town, "Hot-Spot Mix in Ignition-Scale Implosions at the National Ignition Facility" (invited).

T. C. Sangster, W. T. Shmayda, V. Versteeg, D. R. Harding, R. Janezic, V. N. Goncharov, D. H. Edgell, D. H. Froula, V. Yu. Glebov, S. X. Hu, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, J. F. Myatt, P. B. Radha, W. Seka, C. Stoeckl, B. Yaakobi, J. A. Frenje, M. Gatu-Johnson, and R. D. Petrasso, "Cryogenic-DT-Implosion Performance with Improved Target-Surface Quality."

W. Seka, I. V. Igumenshchev, D. H. Froula, D. H. Edgell, J. F. Myatt, R. W. Short, V. N. Goncharov, and A. V. Maximov, "Absorption by the Two-Plasmon-Decay Instability in Direct-Drive Implosions."

R. W. Short and J. F. Myatt, "Convective Multibeam Two-Plasmon Decay for Spherical and Planar Irradiation Geometries."

A. Shvydky, P. W. McKenty, M. Hohenberger, G. Fiksel, T. J. B. Collins, J. A. Marozas, J. D. Zuegel, and T. C. Sangster, "Preparing for OMEGA EP Validation of 1-D Multi-FM SSD for the NIF."

A. A. Solodov, K. S. Anderson, A. Shvydky, W. Theobald, R. Betti, J. F. Myatt, and C. Stoeckl, "Simulations of Implosion Core Heating for Integrated Cone-in-Shell Fast-Ignition Experiments on OMEGA."

A. Sorokovikova, M. S. Wei, R. B. Stephens, J. Jaquez, R. Nishra, H. Sawada, W. Theobald, P. Patel, H. McLean, Y. Sentoku, and F. N. Beg, "Study of Dependence of Fast Electron Transport on Target Material Using the 10 ps, 1.5 kJ Omega EP Laser."

C. Stoeckl, P. B. Radha, R. E. Bahr, J. A. Delettrez, D. H. Edgell, V. Yu. Glebov, V. N. Goncharov, I. V. Igumenshchev, T. C. Sangster, W. Seka, J. A. Frenje, and R. D. Petrasso, "Pre-heat Studies Using Low-Adiabatic Plastic-Shell Implosions with Triple-Picket Pulses on OMEGA."

W. Theobald, M. Hohenberger, S. X. Hu, K. S. Anderson, R. Betti, T. R. Boehly, A. Casner, D. H. Edgell, D. E. Fratanduono, M. Lafon, D. D. Meyerhofer, R. Nora, X. Ribeyre, T. C. Sangster, G. Schurtz, W. Seka, C. Stoeckl, B. Yaakobi, "High-Intensity Shock-Ignition Experiments in Planar Geometry."

R. Yan, A. V. Maximov, C. Ren, and F. S. Tsung, "Energetic-Electron Generation in Two-Plasmon-Decay Instabilities in Inertial Confinement Fusion."

The following presentations were made at the International Collaboration on High Energy Density Science Workshop, Kanazawa, Japan, 25–29 November 2011:

T. R. Boehly, D. E. Fratanduono, M. A. Barrios, D. D. Meyerhofer, J. H. Eggert, D. G. Hicks, R. F. Smith, D. Braun, P. M. Celliers, and G. W. Collins, "Refractive-Index Measurements of LiF Ramp Compressed to 800 GPa."

T. R. Boehly, V. N. Goncharov, W. Seka, S. X. Hu, J. A. Marozas, D. D. Meyerhofer, P. M. Celliers, D. G. Hicks, M. A. Barrios, D. E. Fratanduono, and G. W. Collins, "Radiative Precursors and Temperature Measurements in Shock Deuterium."