Publications and Conference Presentations

Publications

T. R. Boehly, V. N. Goncharov, W. Seka, M. A. Barrios, P. M. Celliers, D. G. Hicks, G. W. Collins, S. X. Hu, J. A. Marozas, and D. D. Meyerhofer, "Velocity and Timing of Multiple Spherically Converging Shock Waves in Deuterium," Phys. Rev. Lett. **106**, 195005 (2011).

J. Bromage, J. M. Fini, C. Dorrer, and J. D. Zuegel, "Characterization and Optimization of Yb-Doped Photonic-Crystal Fiber Rod Amplifiers Using Spatially Resolved Spectral Interferometry," Appl. Opt. **50**, 2001 (2011).

D. E. Fratanduono, T. R. Boehly, M. A. Barrios, D. D. Meyerhofer, J. H. Eggert, R. F. Smith, D. G. Hicks, P. M. Celliers, D. G. Braun, and G. W. Collins, "Refractive Index of Lithium Fluoride Ramp Compressed to 800 GPa," J. Appl. Phys. **109**, 123521 (2011).

M. C. Ghilea, D. D. Meyerhofer, and T. C. Sangster, "Neutron-Induced Nucleation Inside Bubble Chambers Using Freon 115 as the Active Medium," Nucl. Instrum. Methods Phys. Res. A **648**, 210 (2011).

S. X. Hu, "Attosecond Timing the Ultrafast Charge-Transfer Process in Atomic Collisions," Phys. Rev. A **83**, 041401(R) (2011).

G. Li, R. Yan, C. Ren, J. Tonge, and W. B. Mori, "Three-Dimensional Particle-in-Cell Simulations of Laser Channeling in Fast Ignition," Phys. Plasmas **18**, 042703 (2011).

D. D. Meyerhofer, R. L. McCrory, 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, V. N. Goncharov, D. R. Harding, S. X. Hu, I. V. Igumenshchev, J. P. Knauer, C. K. Li, J. A. Marozas, F. J. Marshall, P. W. McKenty, P. M. Nilson, S. P. Padalino, R. D. Petrasso, P. B. Radha, S. P. Regan, T. C. Sangster, F. H. Séguin, W. Seka, R. W. Short, D. Shvarts, S. Skupsky, J. M. Soures, C. Stoeckl, W. Theobald, and B. Yaakobi, "High-Performance Inertial Confinement Fusion Target Implosions on OMEGA," Nucl. Fusion **51**, 053010 (2011).

P. M. Nilson, A. A. Solodov, J. F. Myatt, W. Theobald, P. A. Jaanimagi, L. Gao, C. Stoeckl, R. S. Craxton, J. A. Delettrez, B. Yaakobi, J. D. Zuegel, B. E. Kruschwitz, C. Dorrer, J. H. Kelly, K. U. Akli, P. K. Patel, A. J. Mackinnon, R. Betti, T. C. Sangster, and D. D. Meyerhofer, "Scaling Hot-Electron Generation to Long-Pulse, High-Intensity Laser–Solid Interactions," Phys. Plasmas **18**, 056703 (2011).

P. M. Nilson, W. Theobald, C. Mileham, C. Stoeckl, J. F. Myatt, J. A. Delettrez, J. MacFarlane, I. A. Begishev, J. D. Zuegel, R. Betti, T. C. Sangster, and D. D. Meyerhofer, "Target-Heating Effects on the $K_{\alpha_{1,2}}$-Emission Spectrum from Solid Targets Heated by Laser-Generated Hot Electrons," Phys. Plasmas **18**, 042702 (2011).

A. V. Okishev, "Characterization of Highly Stable Mid-IR, GaSb-Based Laser Diodes," Opt. Express **19**, 9863 (2011).

S. Papernov, A. Tait, W. Bittle, A. W. Schmid, J. B. Oliver, and P. Kupinski, "Near-Ultraviolet Absorption and Nanosecond-Pulse-Laser Damage in HfO_2 Monolayers Studied by Sub-micrometer-Resolution Photothermal Heterodyne Imaging and Atomic Force Microscopy," J. Appl. Phys. **109**, 113106 (2011).

P. B. Radha, R. Betti, T. R. Boehly, J. A. Delettrez, D. H. Edgell, V. N. Goncharov, I. V. Igumenshchev, J. P. Knauer, J. A. Marozas, F. J. Marshall, R. L. McCrory, D. D. Meyerhofer, S. P. Regan, T. C. Sangster, W. Seka, S. Skupsky, A. A. Solodov, C. Stoeckl, W. Theobald, J. A. Frenje, D. T. Casey, C. K. Li, and R. D. Petrasso, "Inertial Confinement Fusion Using the OMEGA Laser System," IEEE Trans. Plasma Sci. **39**, 1007 (2011).

S. P. Regan, H. Sawada, V. N. Goncharov, D. Li, P. B. Radha, R. Epstein, J. A. Delettrez, S. X. Hu, V. A. Smalyuk, B. Yaakobi, T. R. Boehly, T. C. Sangster, D. D. Meyerhofer, R. L. McCrory, and R. C. Mancini, "Spectroscopic Observa-

tions of Fermi-Degenerate Aluminum Compressed and Heated to Four Times Solid Density and 20 eV," High Energy Density Phys. **7**, 259 (2011).

W. Theobald, A. A. Solodov, C. Stoeckl, K. S. Anderson, R. Betti, T. R. Boehly, R. S. Craxton, J. A. Delettrez, C. Dorrer, J. A. Frenje, V. Yu. Glebov, H. Habara, K. A. Tanaka, J. P. Knauer, F. J. Marshall, K. L. Marshall, D. D. Meyerhofer, P. M. Nilson, P. K. Patel, H. Chen, T. C. Sangster, W. Seka, N. Sinenian, T. Ma, F. N. Beg, E. Giraldez, and R. B. Stephens, "Initial Cone-in-Shell Fast-Ignition Experiments on OMEGA," Phys. Plasmas **18**, 056305 (2011).

Forthcoming Publications

J. Bromage, J. Rothhardt, S. Hädrich, C. Dorrer, C. Jocher, S. Demmler, J. Limpert, A. Tünnermann, and J. D. Zuegel, "Analysis and Suppression of Parasitic Processes in Noncollinear Optical Parametric Amplifiers," to be published in Optics Express.

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

E. D. Głowacki, K. L. Marshall, C. W. Tang, and N. S. Sariciftci, "Doping of Organic Semiconductors Induced by Lithium Fluoride/Aluminum Electrodes Studied by Electron Spin Resonance and Infrared Reflection-Absorption Spectroscopy," to be published in Applied Physics Letters.

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 Nanometer-Scale Devices Through Monte Carlo Simulations," to be published in IEEE Transactions on Nanotechnology.

C. Miao, R. Shen, M. Wang, S. N. Shafrir, H. Yang, and S. D. Jacobs, "Rheological Study of Aqueous Magnetorheological Fluid Using Dual Oxide Coated Carbonyl Iron Particles," to be published in the Journal of the American Ceramic Society.

M. Mikulics, P. Kordoš, D. Gregušová, R. Adam, M. Kočan, S. Wu, J. Zhang, R. Sobolewski, D. Grützmacher, and M. Marso, "Monolithic Integration of Ultrafast Photodetector and MESFET in the GaN Material System," to be published in IEEE Photonics Technology Letters.

R. Nora and R. Betti, "One-Dimensional Planar Hydrodynamic Theory of Shock Ignition," to be published in Physics of Plasmas.

B. B. Pollock, C. E. Clayton, J. E. Ralph, F. Albert, A. Davidson, L. Divol, C. Filip, S. H. Glenzer, K. Herpoldt, W. Lu, K. Marsh, J. Meinecke, W. B. Mori, A. Pak, T. C. Rensink, J. S. Ross, J. Shaw, G. R. Tynan, C. Joshi, and D. H. Froula, "Demonstration of a Narrow Energy Spread, ~0.5 GeV Electron Beam from a Two-Stage Laser Wakefield Accelerator," to be published in Physical Review Letters.

B. Xu and S. X. Hu, "Effects of Electron-Ion Temperature Equilibration on Inertial Confinement Fusion Implosions," to be published in Physical Review E.

J.-H. Yang and R. S. Craxton, "An Empirical Model of Collective Electrostatic Effects for Laser-Beam Channeling in Long-Scale-Length Relativistic Plasmas," to be published in Physics of Plasmas.

Conference Presentations

The following presentations were made at the Omega Laser Facility Users Group Workshop, Rochester, NY, 27–29 April 2011:

D. H. Froula, M. Bedzyk, R. Boni, R. Brown, R. S. Craxton, T. Duffy, F. Ehrne, S. Ivancic, R. Jungquist, J. Puth, W. Seka, M. J. Shoup, III, C. Stoeckl, W. Theobald, D. Weiner, and N. Kugland "The OMEGA EP 4ω Probe and Associated Plasma Diagnostics."

V. N. Goncharov, "Tuning Low-Adiabat Cryogenic Implosions on OMEGA."

B. E. Kruschwitz, "Static Wavefront Correction on OMEGA EP."

P. W. McKenty, K. S. Anderson, R. Nora, C. Stoeckl, W. Theobald, J. Bates, A. Schmitt, M. Lafon, X. Ribeyre, G. Schurtz, S. Weber,

V. Tykhonchuk, S. Atzeni, J. Perkins, and O. Klimo, "Overview of the Current Status of Shock Ignition."

S. F. B. Morse, "Omega Facility Update: Progress on OLUG Recommendations."

G. Pien, "OMEGA Experimental Operations 2011 OLUG Status Report."

The following presentations were made at CLEO 2011, Baltimore, MD, 1–6 May 2011:

C. Dorrer, "Characterization of a High-Contrast Front-End Prototype for the Omega EP Laser Facility."

C. Dorrer, A. Consentino, and D. Irwin, "Direct Estimation of the Intensity Contrast of High-Energy Laser Pulses."

A. V. Okishev, "A Highly Efficient Diode-Pumped Pulsed Laser Based on Room-Temperature Yb:YAG Ceramics."

R. Xin and J. D. Zuegel, "Amplification to the Period-Doubling Limit in an All-Fiber Regenerative Amplifier for High-Intensity Laser Systems."

The following presentations were made at Siemens PLM Connection, Las Vegas, NV, 2–5 May 2011:

C. Robillard, "The Engineer's Notebook."

T. Smith, "TDM to Teamcenter Meta Data Migration Strategy."

The following presentations were made at the Third International Conference on High Energy Density Physics, Lisbon, Portugal, 17–20 May 2011:

T. R. Boehly, "The Velocity and Timing of Multiple Spherically Converging Shock Waves in Liquid Deuterium."

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

S. P. Regan, R. Epstein, B. Hammel, L. J. Suter, J. Ralph, H. Scott, M. A. Barrios, D. K. Bradley, D. A. Callahan, G. W. Collins, S. Dixit, M. J. Edwards, D. R. Farley, 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, "National Ignition Facility (NIF) Implosions: Hydrodynamic Mixing Experiments."

The following presentations were made at the NAS/NAE Committee on the Prospects for IFE Systems, Rochester, NY, 17 June 2011:

V. N. Goncharov, "Modeling of Cryogenic Implosions on OMEGA is Approaching Precision Required for Ignition."

T. J. Kessler, "Diffractive Optics Technology for ICF."

R. L. McCrory, "Laser-Driven Inertial Fusion Energy: Direct-Drive Targets Overview."

J. B. Oliver and A. L. Rigatti, "High-Damage Threshold Coating for ICF Laser Applications."

J. M. Soures, "The Omega Facility is Operated as a User Facility and has Produced the World's Largest ICF Physics and High-Energy-Density-Science Database."

W. Theobald, "Shock-Ignition and Fast-Ignition Research at LLE."

J. D. Zuegel, "New Laser Technologies for OMEGA EP."

The following presentations were made at the 41st Annual Anomalous Absorption Conference, San Diego, CA, 19–24 June 2011:

S. F. DuBois, D. A. Russell, H. X. Vu, and J. F. Myatt, "Strong Langmuir Turbulence in the Nonlinear Saturation of Parametric Instabilities Driven by Coherent Electromagnetic Waves."

D. H. Edgell, I. V. Igumenshchev, W. Seka, J. F. Myatt, V. N. Goncharov, R. S. Craxton, J. A. Delettrez, A. V. Maximov, R. W. Short, P. W. McKenty, "Crossed-Beam Energy Transfer in Polar Direct-Drive Implosions."

D. H. Froula, D. H. Edgell, I. V. Igumenshchev, P. B. Radha, and V. N. Goncharov, "Thomson Scattering Study of the Coronal Plasma Conditions in Direct-Drive Implosions."

S. X. Hu, D. H. Edgell, D. H. Froula, V. N. Goncharov, W. Seka, S. Skupsky, and B. Yaakobi, "Simulations and Analyses of Long-Scale-Length Plasma Experiments on the Omega EP Laser Facility."

A. V. Maximov, J. F. Myatt, R. W. Short, I. V. Igumenshchev, D. H. Edgell, and W. Seka, "Modeling of Energy Transfer Between Spatially Incoherent Crossing Laser Beams."

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

W. Seka, I. V. Igumenshchev, D. H. Froula, D. H. Edgell, J. F. Myatt, V. N. Goncharov, R. W. Short, and A. V. Maximov, "Reducing the Cross-Beam Energy Transfer in Direct-Drive Implosion Targets Through Laser-Irradiation Control."

R. W. Short and J. F. Myatt, "Convective Multibeam Two-Plasmon Decay for Beam Configurations Relevant to Polar Direct Drive."

A. A. Solodov, R. Betti, K. S. Anderson, J. F. Myatt, W. Theobald, and C. Stoeckl, "Controlling the Divergence of Laser-Generated Fast Electrons Through Resistivity Gradients in Fast-Ignition Targets."

H. X. Vu, D. F. DuBois, J. F. Myatt, and D. A. Russell, "Langmuir Turbulence and Suprathermal Electron Production from the Two-Plasmon Decay Instability Driven by Crossed Laser Beams in an Inhomogeneous Plasma."

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

J. P. Knauer, V. Yu. Glebov, C. Stoeckl, T. C. Sangster, D. D. Meyerhofer, J. A. Caggiano, M. J. Moran, R. Hatarik, J. M. McNaney, S. Friedrich, E. J. Bond, M. J. Eckart, S. J. Padalino, and J. D. Kilkenny, "Neutron Time-of-Flight Measurements on the National Ignition Facility," 38th IEEE International Conference on Plasma Science, Chicago, IL, 26–30 June 2011.

T. R. Boehly, V. N. Goncharov, M. A. Barrios, D. E. Fratanduono, S. X. Hu, T. J. B. Collins, J. A. Marozas, T. C. Sangster, D. D. Meyerhofer, P. M. Celliers, H. F. Robey, D. G. Hicks, and G. W. Collins, "Shock-Timing Measurements in ICF Targets Filled with Cryogenic Deuterium," 2011 APS Shock Compression of Condensed Matter, Chicago, IL, 26 June–1 July 2011.