Publications and Conference Presentations

Publications

J. Bromage, C. Dorrer, and J. D. Zuegel, "Temporal-Contrast Measurements of a White-Light-Seeded Noncollinear Optical Parametric Amplifier," J. Opt. **17**, 094006 (2015).

C. Dorrer, A. Consentino, D. Irwin, J. Qiao, and J. D. Zuegel, "OPCPA Front End and Contrast Optimization for the OMEGA EP Kilojoule, Picosecond Laser," J. Opt. **17**, 094007 (2015).

R. Florido and R. C. Mancini, "Assessment of Transient Effects on the X-Ray Spectroscopy of Implosion Cores at OMEGA," J. Phys. B: At. Mol. Opt. Phys. **48**, 224006 (2015).

T. Nagayama, R. C. Mancini, D. Mayes, R. Tommasini, and R. Florido, "An Important Criterion for Reliable Multi-Monochromatic X-Ray Imager Diagnostics and its Impact on the Reconstructed Images," High Power Laser Science and Engineering **3**, e23 (2015).

J. M. Ngoko Djiokap, S. X. Hu, L. B. Madsen, N. L. Manakov, A. V. Meremianin, and A. F. Starace, "Electron Vortices in Photoionization by Circularly Polarized Attosecond Pulses," Phys. Rev. Lett. **115**, 113004 (2015).

P. M. Nilson, A. A. Solodov, J. R. Davies, W. Theobald, C. Mileham, C. Stoeckl, I. A. Begishev, J. D. Zuegel, D. H. Froula, R. Betti, and D. D. Meyerhofer, "Time-Resolved K_α Spectroscopy Measurements of Hot-Electron Equilibration Dynamics in Thin-Foil Solid Targets: Collisional and Collective Effects," J. Phys. B: At. Mol. Opt. Phys. **48**, 224001 (2015).

L.-W. Pi, S. X. Hu, and A. F. Starace, "Favorable Target Positions for Intense Laser Acceleration of Electrons in Hydrogen-Like, Highly-Charged Ions," Phys. Plasmas **22**, 093111 (2015).

Forthcoming Publications

Y. Akbas, A. Stern, L. Q. Zhang, Y. Alimi, A. M. Song, I. Iñiguez-de-la-Torre, J. Mateos, T. González, G. W. Wicks, and R. Sobolewski, "Ultrahigh Responsivity of Optically Active Semiconducting Asymmetric Nanochannel Diodes," to be published in the Journal of Physics: Conference Series.

R. S. Craxton, K. S. Anderson, T. R. Boehly, V. N. Goncharov, D. R. Harding, J. P. Knauer, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, J. F. Myatt, A. J. Schmitt, J. D. Sethian, R. W. Short, S. Skupsky, W. Theobald, W. L. Kruer, K. Tanaka, R. Betti, T. J. B. Collins, J. A. Delettrez, S. X. Hu, J. A. Marozas, A. V. Maximov, D. T. Michel, P. B. Radha, S. P. Regan, T. C. Sangster, W. Seka, A. A. Solodov, J. M. Soures, C. Stoeckl, and J. D. Zuegel, "Direct-Drive Inertial Confinement Fusion: A Review," to be published in Physics of Plasmas.

R. Epstein, S. P. Regan, B. A. Hammel, L. J. Suter, H. A. Scott, M. A. Barrios, D. K. Bradley, D. A. Callahan, C. Cerjan, G. W. Collins, S. N. Dixit, T. Döppner, M. J. Edwards, D. R. Farley, K. B. Fournier, S. Glenn, S. H. Glenzer, I. E. Golovkin, A. Hamza, D. G. Hicks, N. Izumi, O. S. Jones, M. H. Key, J. D. Kilkenny, J. L. Kline, G. A. Kyrala, O. L. Landen, T. Ma, J. J. MacFarlane, A. J. Mackinnon, R. C. Mancini, R. L. McCrory, D. D. Meyerhofer, N. B. Meezan, A. Nikroo, H.-S. Park, P. K. Patel, J. E. Ralph, B. A. Remington, T. C. Sangster, V. A. Smalyuk, P. T. Springer, R. P. J. Town, and J. L. Tucker, "Applications and Results of X-Ray Spectroscopy in Implosion Experiments on the National Ignition Facility," to be published in Proceedings of Atomic Processes in Plasmas (invited).

S. X. Hu, L. A. Collins, V. N. Goncharov, J. D. Kress, R. L. McCrory, and S. Skupsky, "First-Principles Equation of State

of Polystyrene and its Effect on Inertial Confinement Fusion Implosions," to be published in Physical Review E.

M. Margala, H. Wu, and R. Sobolewski, "Ballistic Deflection Transistors and Their Application to THz Amplification," to be published in the Journal of Physics: Conference Series.

B. W. Plansinis, W. R. Donaldson, and G. P. Agrawal, "What is the Temporal Analog of Reflection and Refraction of Optical Beams?" to be published in Physical Review Letters.

P. B. Radha, V. N. Goncharov, M. Hohenberger, T. C. Sangster, R. Betti, R. S. Craxton, D. H. Edgell, R. Epstein, D. H. Froula, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, S. X. Hu, W. Seka, A. Shvydky, S. Skupsky, J. A. Frenje, M. Gatu Johnson, R. D. Petrasso, T. Ma, S. Le Pape, and A. J. Mackinnon, "Direct-Drive–Implosion Physics: Results from OMEGA and the National Ignition Facility," to be published in the Journal of Physics: Conference Series.

M. Rutkauskas, C. Farrell, C. Dorrer, K. L. Marshall, T. R. Lundquist, P. Vedagarbha, and D. T. Reid, "High-Resolution Sub-Surface Microscopy of CMOS Integrated Circuits Using Radially Polarized Light," to be published in Optics Letters.

S. Salzman, H. J. Romanofsky, S. D. Jacobs, and J. C. Lambropoulos, "Surface-Texture Evolution of Different Chemical-Vapor-Deposited Zinc-Sulfide Flats Polished with Various Magnetorheological Fluids," to be published in Precision Engineering.

J. Serafini, Y. Akbas, L. Crandall, R. Bellman, C. K. Williams, and R. Sobolewski, "Nonequilibrium Carrier Dynamics in Ultrathin Si-on-Glass Films," to be published in the Journal of Physics: Conference Series.

J. Serafini, Y. Wang, R. Bellman, C. K. Williams, and R. Sobolewski, "Time-Resolved Carrier Dynamics of Thin Film Si-on-Glass Absorbers for Photovoltaic Cells," to be published in Semiconductor Science and Technology.

W. T. Shmayda, M. Sharpe, A. M. Boyce, R. Shea, B. Petroski, and W. U. Schröder, "Tritium-Release Dependence on Temperature and Water Vapor from Stainless Steel," to be published in Fusion Science and Technology.

Conference Presentations

R. Shrestha, A. Koroliov, and R. Sobolewski, "Terahertz Spectroscopy on Graphene-Polymer Nanocomposites," Xerox Engineering Research Fellows Program, Rochester, NY, 30 July 2015.

E. D. Burnham-Fay, D. W. Jacobs-Perkins, and J. D. Ellis, "Interferometric Strain Measurements with a Fiber-Optic Probe," SPIE Optical Engineering and Applications, San Diego, CA, 9–13 August 2015.

J. Katz, W. R. Donaldson, R. Huff, E. Hill, J. H. Kelly, J. Kwiatkowski, and R. B. Brannon, "3ω Beam-Timing Diagnostic for the OMEGA Laser System," Target Diagnostics Physics and Engineering for Inertial Confinement Fusion IV, San Diego, CA, 9–13 August 2015.

K. L. Marshall, E. R. Sekera, and K. Xiao, "Computational Chemistry Modeling and Design of Photoswitchable Alignment Materials for Optically Addressable Liquid Crystal Devices," Organic Photonics and Electronics, San Diego, CA, 9–13 August 2015 (invited).

P. Fiala, C. Dorrer, and K. L. Marshall, "Twisted-Nematic Liquid Crystal Polarization Rotators for Broadband Laser Applications," Ultrafast Optics 2015, Beijing, China, 16–21 August 2015.

R. Betti, W. Theobald, R. Nora, W. Seka, M. Lafon, K. S. Anderson, M. Hohenberger, F. J. Marshall, D. T. Michel, A. Shvydky, A. A. Solodov, C. Stoeckl, D. H. Edgell, B. Yaakobi, A. Casner, C. Reverdin, X. Ribeyre, A. Vallet, J. Peebles, F. N. Beg, and M. S. Wei, "Laser-Driven Gigabar Shocks for Applications to Inertial Fusion and Basic Sciences,"

The 5th International Conference on High Energy Density Physics, San Diego, CA, 23–27 August 2015.

D. T. Michel, R. E. Bahr, N. Chrein, R. S. Craxton, A. K. Davis, J. A. Delettrez, D. H. Edgell, R. Epstein, R. K. Follett, C. J. Forrest, V. Yu. Glebov, V. N. Goncharov, R. J. Henchen, M. Hohenberger, S. X. Hu, I. V. Igumenshchev, P. A. Jaanimagi, J. A. Marozas, A. V. Maximov, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, C. Mullarkey, J. F. Myatt, P. B. Radha, S. P. Regan, T. C. Sangster, W. Seka, R. W. Short, A. Shvydky, A. A. Solodov, C. Sorce, C. Stoeckl, N. Whiting, D. H. Froula, J. A. Frenje, M. Gatu Johnson, R. D. Petrasso, J. A. Mackinnon, S. Le Pape, and T. Ma, "Nuclear Fusion in the Direct-Drive Configuration at the Laboratory for Laser Energetics: Strategies to Demonstrate Ignition," CEA Seminar, Bruyeres le Chatel, France, 1 September 2015.

W. T. Shmayda, M. D. Wittman, R. Earley, J. L. Reid, and N. P. Redden, "The Laboratory for Laser Energetics' Hydrogen Isotope Separation System," 12th International Symposium on Fusion Nuclear Technology, Jeju Island, S. Korea, 14–18 September 2015.

The following presentations were made at IFSA 2015, Seattle, WA, 20–25 September 2015:

R. Betti, A. R. Christopherson, A. Bose, K. M. Woo, J. Howard, K. S. Anderson, E. M. Campbell, J. A. Delettrez, V. N. Goncharov, F. J. Marshall, R. L. McCrory, S. P. Regan, T. C. Sangster, C. Stoeckl, W. Theobald, M. J. Edwards, R. Nora, B. K. Spears, J. Sanz, O. A. Hurricane, P. K. Patel, J. D. Lindl, and D. Shvarts, "Alpha Heating and Burning Plasmas in Inertial Confinement Fusion."

J. Bromage, S.-W. Bahk, I. A. Begishev, C. Dorrer, R. G. Roides, C. Mileham, J. B. Oliver, D. Weiner, D. Haberberger, C. Stoeckl, P. M. Nilson, D. H. Froula, and J. D. Zuegel, "MTW-OPAL: A Technology Development Platform for Ultra-Intense OPCPA Lasers and Applications."

A. R. Christopherson, J. Howard, R. Betti, W. Theobald, E. M. Campbell, J. A. Delettrez, C. Stoeckl, D. H. Edgell, W. Seka, and D. H. Froula, "Probing Hot-Electron Preheat and Hot-Spot Asymmetries in Inertial Confinement Fusion Implosions."

T. J. B. Collins, J. A. Marozas, S. Skupsky, D. Cao, P. W. McKenty, J. A. Delettrez, and G. Moses, "Design Options for Polar-Direct-Drive Targets—From Alpha Heating to Ignition."

D. H. Crandall, E. M. Campbell, T. C. Sangster, M. J. Edwards, R. P. J. Town, D. B. Sinars, S. H. Batha, S. P. Obenschain, R. D. Petrasso, C. A. Back, J. D. Kilkenny, and N. Petta, "The Quest for Laboratory Inertial Fusion Burn in the U.S."

J. K. Crane, S. T. Yang, M. W. Bowers, T. Budge, J. Chou, S. N. Dixit, G. Erbert, J.-M. G. DiNicola, R. P. Hackel, J. E. Heebner, M. Johnston, M. Rushford, M. Shaw, L. Smith, P. J. Wegner, B. E. Kruschwitz, C. Dorrer, D. Canning, A. Consentino, E. M. Hill, J. H. Kelly, J. Kwiatkowski, and J. D. Zuegel, "Preliminary Measurements of Performance of National Ignition Facility Beamlines for Future Experiments to Support Polar Direct Drive."

D. H. Froula, I. V. Igumenshchev, T. J. Kessler, G. Fiksel, V. N. Goncharov, J. A. Delettrez, S. X. Hu, H. Huang, D. D. Meyerhofer, D. T. Michel, S. P. Regan, T. C. Sangster, A. Shvydky, and J. D. Zuegel, "Cross Beam Energy Transfer Mitigation to Achieve 80-Gbar Direct-Drive Implosions on OMEGA."

V. N. Goncharov, S. P. Regan, T. C. Sangster, R. Betti, T. R. Boehly, M. J. Bonino, E. M. Campbell, T. J. B. Collins, R. S. Craxton, A. K. Davis, J. A. Delettrez, D. H. Edgell, R. Epstein, C. J. Forrest, D. H. Froula, V. Yu. Glebov, D. R. Harding, S. X. Hu, I. V. Igumenshchev, R. T. Janezic, J. H. Kelly, T. J. Kessler, T. Z. Kosc, S. J. Loucks, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. T. Michel, J. F. Myatt, P. B. Radha, W. Seka, W. T. Shmayda, A. Shvydky, S. Skupsky, C. Stoeckl, W. Theobald, F. Weilacher, B. Yaakobi, D. D. Meyerhofer, J. A. Frenje, M. Gatu Johnson, R. D. Petrasso, S. P. Obenchain, and M. Karasik, "Demonstrating Ignition Hydrodynamic Equivalence in Direct-Drive Cryogenic Implosions on OMEGA."

D. R. Harding, N. P. Redden, and M. D. Wittman, "Cryogenic Target Research for Ignition Experiments at the National Ignition Facility."

M. Hohenberger, A. Shvydky, P. B. Radha, M. J. Rosenberg, V. N. Goncharov, S. Le Pape, F. J. Marshall, D. T. Michel, J. P. Knauer, S. P. Regan, T. C. Sangster, S. R. Nagel, A. Nikroo, V. A. Smalyuk, and R. J. Wallace, "Hydrodynamic Instability

Growth in Polar-Direct-Drive Implosions at the National Ignition Facility."

S. X. Hu, V. N. Goncharov, T. R. Boehly, R. Epstein, R. L. McCrory, S. Skupsky, L. A. Collins, J. D. Kress, and B. Militzer, "First-Principles Studies on the Equation of State and Thermal Conductivity of Polystyrene (CH) Under Extreme Conditions."

T. J. Kessler and H. Huang, "Focal-Spot Zooming Using Radial Diffusion and Dispersion."

T. Z. Kosc, J. H. Kelly, E. M. Hill, and L. J. Waxer, "The Multiple-Pulse Driver Line on the OMEGA Laser."

J. A. Marozas, T. J. B. Collins, J. D. Zuegel, P. W. McKenty, D. Cao, S. Fochs, and P. B. Radha, "Continuous Distributed Phase Plate Design Advances for High-Energy Laser Systems."

F. J. Marshall, V. N. Goncharov, V. Yu. Glebov, S. P. Regan, T. C. Sangster, and C. Stoeckl, "Framed X-Ray Imaging of Cryogenic Target Implosion Cores on OMEGA."

D. D. Meyerhofer, E. M. Campbell, D. R. Harding, R. L. McCrory, S. F. B. Morse, S. P. Regan, T. C. Sangster, and J. M. Soures, "Precision High-Energy-Density Science at the Omega Laser Facility" (invited).

D. T. Michel, T. C. Sangster, V. N. Goncharov, A. K. Davis, I. V. Igumenshchev, R. Epstein, V. Yu. Glebov, S. X. Hu, D. D. Meyerhofer, S. P. Regan, W. Seka, A. Shvydky, C. Stoeckl, and D. H. Froula, "Measurements of the Conduction-Zone Length and Mass Ablation Rate in Cryogenic Direct-Drive Implosions on OMEGA."

J. F. Myatt, J. G. Shaw, V. N. Goncharov, J. Zhang, A. V. Maximov, R. W. Short, R. K. Follett, W. Seka, D. H. Edgell, D. H. Froula, D. F. DuBois, D. A. Russell, and H. X. Vu, "Laser–Plasma Instabilities in Direct-Drive-Ignition Plasmas."

P. M. Nilson, G. Fiksel, C. Stoeckl, P. A. Jaanimagi, C. Mileham, W. Theobald, J. R. Davies, J. F. Myatt, A. A. Solodov, D. H. Froula, R. Betti, and D. D. Meyerhofer, "Streaked X-Ray Imaging of Ultrafast Ionization Fronts Inside a Metal."

P. B. Radha, M. Hohenberger, T. R. Boehly, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, D. H. Froula, V. N. Goncharov, S. X. Hu, J. P. Knauer, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, J. F. Myatt, S. P. Regan, M. J. Rosenberg, T. C. Sangster, W. Seka, A. Shvydky, S. Skupsky, J. A. Frenje, R. D. Petrasso, H. Sio, A. B. Zylstra, S. N. Dixit, S. Le Pape, A. J. Mackinnon, J. W. Bates, M. Karasik, and S. P. Obenschein, "Polar-Direct-Drive Experiments at the National Ignition Facility."

S. P. Regan, V. N. Goncharov, T. C. Sangster, R. Epstein, P. B. Radha, R. Betti, T. R. Boehly, R. Earley, C. J. Forrest, D. H. Froula, V. Yu. Glebov, D. R. Harding, E. M. Hill, S. X. Hu, I. V. Igumenshchev, R. T. Janezic, J. H. Kelly, T. J. Kessler, J. P. Knauer, T. Z. Kosc, J. Kwiatkowski, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, J. F. Myatt, J. C. Puth, N. P. Redden, J. Reid, W. Seka, W. T. Shmayda, A. Shvydky, C. Stoeckl, M. D. Wittman, J. A. Frenje, M. Gatu Johnson, and R. D. Petrasso, "Mitigation of Cross-Beam Energy Transfer in Layered DT Cryogenic Direct-Drive Implosions."

M. J. Rosenberg, H. G. Rinderknecht, F. H. Séguin, A. B. Zylstra, J. A. Frenje, H. Sio, M. Gatu Johnson, C. K. Li, R. D. Petrasso, N. M. Hoffmann, G. Kagan, H. W. Herrmann, R. E. Olson, P. A. Amendt, S. LePape, T. Ma, A. J. Mackinnon, J. R. Rygg, S. C. Wilks, L. Berzak Hopkins, D. T. Casey, O. L. Landen, J. D. Lindl, J. Pino, H. F. Robey, S. Atzeni, O. Larroche, V. Yu. Glebov, C. Stoeckl, W. Seka, F. J. Marshall, J. A. Delettrez, P. W. McKenty, M. Hohenberger, R. Betti, V. N. Goncharov, P. B. Radha, J. P. Knauer, T. C. Sangster, and A. Nikroo, "Studies of Ion Kinetic Effects Using Exploding-Pusher Implosions on OMEGA and the National Ignition Facility."

A. A. Solodov, M. J. Rosenberg, J. F. Myatt, R. Epstein, S. P. Regan, W. Seka, J. G. Shaw, M. Hohenberger, J. D. Moody, J. E. Ralph, and D. P. Turnbull, "Two-Plasmon-Decay at Polar-Direct-Drive Ignition-Relevant Plasma Conditions at the National Ignition Facility."

C. Stoeckl, R. Boni, F. Ehrne, C. J. Forrest, V. Yu. Glebov, J. Katz, D. J. Lonobile, J. Magoon, S. P. Regan, M. J. Shoup III, A. Sorce, C. Sorce, and T. C. Sangster, "A Neutron Temporal Diagnostic for High-Yield DT Cryogenic Implosions on OMEGA."

W. Theobald, R. Betti, R. Nora, W. Seka, M. Lafon, K. S. Anderson, M. Hohenberger, F. J. Marshall, D. T. Michel, A. Shvydky, A. A. Solodov, C. Stoeckl, D. H. Edgell, B. Yaakobi, A. Casner, C. Reverdin, X. Ribeyre, A. Vallet,

J. Peebles, F. N. Beg, M. S. Wei, and R. Yan, "Gigabar Shocks and Hot-Electron Production in Various Ablator Materials for Shock Ignition Fusion."

J. D. Zuegel, P. J. Wegner, M. W. Bowers, T. G. Brown, T. J. B. Collins, C. W. Carr, J. K. Crane, J.-M. G. Di Nicola, S. N. Dixit, C. Dorrer, G. Erbert, R. P. Hackel, J. E. Heebner, E. M. Hill, M. Hohenberger, T. J. Kessler, J. Kwiatkowski, B. E. Kruschwitz, B. J. MacGowan, J. A. Marozas, K. L. Marshall, K. P. McCandless, P. W. McKenty, J. A. Menapace, J. B. Oliver, A. L. Rigatti, R. A. Sacks, T. C. Sangster, K. Sharma, D. Saulnier, A. Shvydky, L. R. Siegel, C. J. Stolz, D. Weiner, C. Widmayer, and S. T. Yang, "Laser Science and Technology Progress Toward Polar Direct Drive at the National Ignition Facility."

S. Papernov, A. A. Kozlov, J. B. Oliver, C. Smith, L. Jensen, D. Ristau, S. Günster, and H. Mädebach, "The Role of Film Interfaces in Near-Ultraviolet Absorption and Pulsed-Laser Damage in Ion-Beam–Sputtered Coatings Based on HfO_2/SiO_2 Thin-Film Pairs," Laser Damage Symposium, Boulder, CO, 27–30 September 2015.

The following presentations were made at the Undergraduate Research Fair, Rochester, NY 30 September 2015:

R. Shrestha, A. Koroliov, and R. Sobolewski, "Terahertz Spectroscopy on Graphene-Polymer Nanocomposites."

A. Stern, Y. Akbas, G. Wicks, and R. Sobolewski, "Optically-Active Semiconducting Asymmetric Nano-Channel Diodes."