
Publications and Conference Presentations

Publications

- B. P. Chock, D. R. Harding, and T. B. Jones, "Dispensing Surfactant-Containing Water Droplets Using Electrowetting," in the *2016 AIChE Meeting Proceedings* (American Institute of Chemical Engineers, New York, 2016), Paper 560d/461784.
- C. Dorrer, W. A. Bittle, R. Cuffney, M. Spilatro, E. M. Hill, T. Z. Kosc, J. H. Kelly, and J. D. Zuegel, "Characterization and Optimization of an Eight-Channel Time-Multiplexed Pulse Shaping System," *J. Lightwave Technol.* **35**, 173 (2017).
- C. Dorrer and J. Hassett, "Model-Based Optimization of Near-Field Binary-Pixelated Beam Shapers," *Appl. Opt.* **56**, 806 (2017).
- 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 at the National Ignition Facility," *AIP Conf. Proc.* **1811**, 190004 (2017).
- J. R. Fein, J. P. Holloway, M. R. Trantham, P. A. Keiter, D. H. Edgell, D. H. Froula, D. Haberberger, Y. Frank, M. Fraenkel, E. Raicher, D. Shvarts, and R. P. Drake, "Mitigation of Hot Electrons from Laser-Plasma Instabilities in High-Z, Highly Ionized Plasmas," *Phys. Plasmas* **24**, 032707 (2017).
- C. J. Forrest, P. B. Radha, J. P. Knauer, V. Yu. Glebov, V. N. Goncharov, S. P. Regan, M. J. Rosenberg, T. C. Sangster, W. T. Shmayda, C. Stoeckl, and M. Gatu Johnson, "First Measurements of Deuterium-Tritium and Deuterium-Deuterium Fusion-Reaction Yields in Ignition-Scalable Direct-Drive Implosions," *Phys. Rev. Lett.* **118**, 095002 (2017).
- M. Gatu Johnson, A. B. Zylstra, A. Bacher, C. R. Brune, D. T. Casey, C. Forrest, H. W. Herrmann, M. Hohenberger, D. B. Sayre, R. M. Bionta, J.-L. Bourgade, J. A. Caggiano, C. Cerjan, R. S. Craxton, D. Dearborn, M. Farrell, J. A. Frenje, E. M. Garcia, V. Yu. Glebov, G. Hale, E. P. Hartouni, R. Hatarik, M. Hohensee, D. M. Holunga, M. Hoppe, R. Janezic, S. F. Khan, J. D. Kilkenny, Y. H. Kim, J. P. Knauer, T. R. Kohut, B. Lahmann, O. Landoas, C. K. Li, F. J. Marshall, L. Masse, A. McEvoy, P. McKenty, D. P. McNabb, A. Nikroo, T. G. Parham, M. Paris, R. D. Petrasso, J. Pino, P. B. Radha, B. Remington, H. G. Rinderknecht, H. Robey, M. J. Rosenberg, B. Rosse, M. Rubery, T. C. Sangster, J. Sanchez, M. Schmitt, M. Schoff, F. H. Séguin, W. Seka, H. Sio, C. Stoeckl, and R. E. Tipton, "Development of an Inertial Confinement Fusion Platform to Study Charged-Particle-Producing Nuclear Reactions Relevant to Nuclear Astrophysics," *Phys. Plasmas* **24**, 041407 (2017).
- R. F. Heeter, J. E. Bailey, R. S. Craxton, B. G. DeVolder, E. S. Dodd, E. M. Garcia, E. J. Huffman, C. A. Iglesias, J. A. King, J. L. Kline, D. A. Liedahl, P. W. McKenty, Y. P. Opachich, G. A. Rochau, P. W. Ross, M. B. Schneider, M. E. Sherrill, B. G. Wilson, R. Zhang, and T. S. Perry, "Conceptual Design of Initial Opacity Experiments on the National Ignition Facility," *J. Plasma Phys.* **83**, 595830103 (2017).
- I. V. Igumenshchev, D. T. Michel, R. C. Shah, E. M. Campbell, R. Epstein, C. J. Forrest, V. Yu. Glebov, V. N. Goncharov, J. P. Knauer, F. J. Marshall, R. L. McCrory, S. P. Regan, T. C. Sangster, C. Stoeckl, A. J. Schmitt, and S. Obenschain, "Three-Dimensional Hydrodynamic Simulations of OMEGA Implosions," *Phys. Plasmas* **24**, 056307 (2017) (invited).
- J. Li, S. X. Hu, and C. Ren, "Effects of Laser-Plasma Instabilities on Hydro Evolution in an OMEGA-EP Long-Scale-Length Experiment," *Phys. Plasmas* **24**, 022706 (2017).
- K. Mehrotra, B. N. Taylor, A. A. Kozlov, S. Papernov, and J. C. Lambropoulos, "Nano-Indentation and Laser-Induced Damage Testing in Optical Multilayer-Dielectric Gratings," *Appl. Opt.* **56**, 2494 (2017).

J. B. Oliver, "Impact of Non-Integer Planetary Revolutions on the Distribution of Evaporated Optical Coatings," *Appl. Opt.* **56**, 1460 (2017).

C. Stoeckl, R. Epstein, R. Betti, W. Bittle, J. A. Delettrez, C. J. Forrest, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, I. V. Igumenshchev, D. W. Jacobs-Perkins, R. T. Janezic, J. H. Kelly, T. Z. Kosc, R. L. McCrory, D. T. Michel, C. Mileham, P. W. McKenty, F. J. Marshall, S. F. B. Morse, S. P. Regan, P. B. Radha, B. Rice, T. C. Sangster, M. J. Shoup III, W. T.

Shmayda, C. Sorce, W. Theobald, J. Ulreich, M. D. Wittman, D. D. Meyerhofer, J. A. Frenje, M. Gatu Johnson, and R. D. Petrasso, "Monochromatic Backlighting of Direct-Drive Cryogenic DT Implosions on OMEGA," *Phys. Plasmas* **24**, 056304 (2017) (invited).

D. Turnbull, C. Goyon, G. E. Kemp, B. B. Pollock, D. Mariscal, L. Divol, J. S. Ross, S. Patankar, J. D. Moody, and P. Michel, "Refractive Index Seen by a Probe Beam Interacting with a Laser-Plasma System," *Phys. Rev. Lett.* **118**, 015001 (2017).

Forthcoming Publications

D. H. Barnak, J. R. Davies, R. Betti, M. J. Bonino, E. M. Campbell, V. Yu. Glebov, D. R. Harding, J. P. Knauer, S. P. Regan, A. B. Sefkow, A. J. Harvey-Thompson, K. J. Peterson, D. B. Sinars, S. A. Slutz, M. R. Weis, and P.-Y. Chang, "Laser-Driven Magnetized Liner Inertial Fusion on OMEGA," to be published in *Physics of Plasmas* (invited).

E. M. Campbell, V. N. Goncharov, T. C. Sangster, S. P. Regan, P. B. Radha, R. Betti, J. F. Myatt, D. H. Froula, M. J. Rosenberg, I. V. Igumenshchev, W. Seka, A. A. Solodov, A. V. Maximov, J. A. Marozas, T. J. B. Collins, D. P. Turnbull, F. J. Marshall, A. Shvydky, J. P. Knauer, R. L. McCrory, A. B. Sefkow, M. Hohenberger, P. A. Michel, T. Chapman, L. Masse, C. Goyon, S. Ross, J. W. Bates, M. Karasik, J. Oh, J. Weaver, A. J. Schmitt, K. Obenschain, S. P. Obenschain, S. Reyes, and B. Van Wonterghem, "Laser-Direct-Drive Program: Promise, Challenge, and Path Forward," to be published in *Matter and Radiation at Extremes*.

J. R. Davies, D. H. Barnak, R. Betti, E. M. Campbell, P.-Y. Chang, K. J. Peterson, A. B. Sefkow, D. B. Sinars, and M. R. Weis, "Laser-Driven Magnetized Liner Inertial Fusion," to be published in *Physics of Plasmas*.

R. Epstein, C. Stoeckl, V. N. Goncharov, P. W. McKenty, F. J. Marshall, S. P. Regan, R. Betti, W. A. Bittle, D. R. Harding, S. X. Hu, I. V. Igumenshchev, D. W. Jacobs-Perkins, R. T. Janezic, J. H. Kelly, T. Z. Kosc, C. Mileham, S. F. B. Morse, P. B. Radha, B. S. Rice, T. C. Sangster, M. J. Shoup III, W. T. Shmayda, C. Sorce, J. Ulreich, and M. D. Wittman, "Simulation and Analysis of Time-Gated Monochromatic Radiographs of Cryogenic Implosions on OMEGA," to be published in *High Energy Density Physics*.

C. Fagan, M. Sharpe, W. T. Shmayda, and W. U. Schröder, "The Impact of Acid Treatments and Electropolishing Stainless-Steel Surfaces on Tritium Inventories," to be published in *Fusion Science and Technology*.

M. C. Gregor, D. E. Fratanduono, C. A. McCoy, D. N. Polsin, T. Braun, P. M. Celliers, J. H. Eggert, J. R. Rygg, G. W. Collins, D. D. Meyerhofer, and T. R. Boehly, "Hugoniot and Release Measurements in Diamond Shocked up to 25 Mbar," to be published in *Physical Review B*.

S. X. Hu, R. Gao, Y. Ding, L. A. Collins, and J. D. Kress, "First-Principles Equation-of-State Table of Silicon and Its Effects on High-Energy-Density Plasma Simulations," to be published in *Physical Review E*.

D. T. Michel, S. X. Hu, A. K. Davis, V. Yu. Glebov, V. N. Goncharov, I. V. Igumenshchev, P. B. Radha, C. Stoeckl, and D. H. Froula, "Measurement of the Shell Decompression in Direct-Drive Inertial-Confinement-Fusion Implosions," to be published in *Physical Review E*.

J. F. Myatt, R. K. Follett, J. G. Shaw, D. H. Edgell, D. H. Froula, I. V. Igumenshchev, and V. N. Goncharov, "A Wave-Based Model for Cross-Beam Energy Transfer in Direct-Drive Inertial Confinement Fusion," to be published in *Physics of Plasmas* (invited).

T. Petersen, J. Bromage, and J. D. Zuegel, "High-Average-Power, 2- μm Femtosecond Optical Parametric Oscillator Synchronously Pumped by a Thin-Disk, Mode-Locked Laser," to be published in *Optics Express*.

B. S. Rice, J. Ulreich, C. Fella, J. Crippen, P. Fitzsimmons, and A. Nikroo, "Permeation Fill-Tube Design for Inertial Confinement Fusion Target Capsules," to be published in *High Power Laser Science and Engineering*.

J. Serafini, A. Hossain, R. B. James, M. Guziewicz, A. Kruszka, W. Słysz, and R. Sobolewski, "Photoconductive and Electro-Optic Effects in (Cd,Mg)Te Single Crystals Measured in an Experiment-on-Chip Configuration," to be published in *Applied Physics Letters*.

P. Tzeferacos, A. Rigby, A. Bott, A. R. Bell, R. Bingham, A. Casner, F. Cattaneo, E. M. Churazov, J. Emig, N. Flocke, F. Fiuza, C. B. Forest, J. Foster, C. Graziani, J. Katz, M. Koenig, C.-K. Li, J. Meinecke, R. Petrasso, H.-S. Park, B. A. Remington, J. S. Ross, D. Ryu, D. Ryutov, K. Weide, T. G. White, B. Reville, F. Miniati, A. A. Schekochihin, D. H. Froula, G. Gregori, and D. Q. Lamb, "Numerical Modeling of Laser-Driven Experiments Aiming to Demonstrate Magnetic Field Amplification via Turbulent Dynamo," to be published in *Physics of Plasmas*.

Conference Presentations

S. G. Demos and R. W. Wood, "Simultaneous White-Light and Protoporphyrin-IX Fluorescence Imaging for Optimized Cystoscopic Detection of Non-Muscle-Invasive Bladder Cancer," SPIE Photonics West, San Francisco, CA, 28 January–2 February 2017.

The following presentations were made at the NIF and JLF User Group Meeting, Livermore, CA, 6–8 February 2017:

L. A. Ceurvorst, N. Ratan, M. F. Kasim, J. Sadler, P. A. Norreys, H. Habara, K. A. Tanaka, S. Zhang, M. S. Wei, S. Ivancic, D. H. Froula, and W. Theobald, "Channeling Optimization of High-Intensity Laser Beams in Millimeter-Scale Plasmas."

M. J. Rosenberg, A. A. Solodov, W. Seka, J. F. Myatt, S. P. Regan, M. Hohenberger, A. V. Maximov, T. J. B. Collins, V. N. Goncharov, R. Epstein, R. W. Short, D. P. Turnbull, D. H. Froula, P. B. Radha, P. Michel, T. Chapman, J. D. Moody, L. Masse, C. Goyon, J. E. Ralph, M. A. Barrios, J. W. Bates, and A. J. Schmitt, "Planar Laser-Plasma Interaction Experiments at Direct-Drive Ignition-Relevant Scale Lengths at the National Ignition Facility."

D. Turnbull, P. Michel, C. Goyon, G. E. Kemp, B. B. Pollock, T. Chapman, D. Mariscal, L. Divol, J. S. Ross, S. Patankar, J. D. Moody, D. H. Froula, D. H. Edgell, R. K. Follett, J. F. Myatt, and E. M. Campbell, "Refractive Index Seen by a Probe Beam Interacting with a Laser-Plasma System."

The following presentations were made at the IAEC–NNSA Meeting on Hydrodynamic Instabilities in HED Systems, Livermore, CA, 8–10 February 2017:

R. Betti, "Deceleration Phase Hydrodynamic Instabilities, Pressure Degradation from Low to High (Mid) Modes."

R. Betti, D. Barnak, J. Davies, M. J. Bonino, V. Glebov, and M. Campbell, "Magnetized Liner Inertial Fusion."

A. Shvydky, M. Hohenberger, P. B. Radha, M. J. Rosenberg, K. S. Anderson, V. N. Goncharov, J. A. Marozas, F. J. Marshall, P. W. McKenty, S. P. Regan, T. C. Sangster, J. M. DiNicola, J. M. Koning, M. M. Marinak, and L. Masse, "Hydrodynamic Instability Growth and Imprint Experiments at the National Ignition Facility."

D. R. Harding, B. P. Chock, N. D. Viza, T. B. Jones, Z. Bei, W. Wang, and M. Moynihan, "Next-Generation Lab-on-Chip Methods for Making Plastic Targets for Inertial Confinement Fusion Experiments," NNSA Technical Seminars, Washington, DC, 14 February 2017.

J. F. Myatt, "The Laser-Plasma Simulation Environment (*LPSE*): A Flexible Tool for the ICF and HEDP Communities," NNSA Technical Seminars, Washington, DC, 28 February 2017.

The following presentations were made at the 22nd Target Fabrication Meeting, Las Vegas, NV, 12–16 March 2017:

M. J. Bonino, M. D. Wittman, D. R. Harding, N. Satoh, and M. Takagi, “Characterization of Polystyrene Shells.”

B. P. Chock, D. R. Harding, and T. B. Jones, “Extending the Digital Microfluidics Process to Form Emulsions Using Low-Surface-Energy Fluids.”

J. M. García Figueroa and D. R. Harding, “Effect of High Ion and Electron Densities, and Substrate Temperature on the Properties of Glow-Discharge Polymer Films.”

D. R. Harding, J. Ulreich, R. Chapman, M. D. Wittman, R. Taylor, C. Taylor, M. J. Bonino, R. Q. Gram, and N. P. Redden, “Improvements to the Target and Cryogenic Equipment to Increase the Hot-Spot Pressure in Implosions on OMEGA.”

N. P. Redden, W. T. Shmayda, M. D. Wittman, J. L. Reid, R. F. Earley, J. Magoon, K. Heung, S. Xiao, T. Sessions, and S. Redd, “The Laboratory for Laser Energetics’ Hydrogen Isotope Separation System.”

S. P. Regan, V. N. Goncharov, T. C. Sangster, E. M. Campbell, R. Betti, T. Bernat, A. Bose, T. R. Boehly, M. J. Bonino, D. Cao, R. Chapman, T. J. B. Collins, R. S. Craxton, A. K. Davis, J. A. Delettrez, D. H. Edgell, R. Epstein, M. Farrell, C. J. Forrest, J. A. Frenje, D. H. Froula, M. Gatu Johnson, C. Gibson, V. Yu. Glebov, A. Greenwood, D. R. Harding, M. Hohenberger, S. X. Hu, H. Huang, J. Hund, I. V. Igumenshchev, D. W. Jacobs-Perkins, R. T. Janezic, M. Karasik, R. L. Keck, J. H. Kelly, T. J. Kessler, J. P. Knauer, T. Z. Kosci, S. J. Loucks, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, J. F. Myatt, S. P. Obenshain, R. D. Petrasso, N. Petta, P. B. Radha, M. J. Rosenberg, A. J. Schmitt, M. J. Schmitt, M. Schoff, W. Seka, W. T. Shmayda, M. J. Shoup III, A. Shvydky, A. A. Solodov, C. Stoeckl, W. Sweet, C. Taylor, R. Taylor, W. Theobald, J. Ulreich, M. D. Wittman, K. M. Woo, and J. D. Zuegel, “The National Direct-Drive Program: OMEGA to the National Ignition Facility.”

N. D. Viza and D. R. Harding, “Performance of Different ‘Lab-on-Chip’ Geometries for Making Double Emulsions for Polystyrene Shells.”

M. D. Wittman, M. J. Bonino, C. Fella, and D. R. Harding, “Effect of Tritium-Induced Damage to Plastic Targets from High-Density D-T Permeation.”

D. N. Polsin, T. R. Boehly, J. A. Delettrez, G. W. Collins, J. R. Rygg, M. C. Gregor, B. J. Henderson, C. A. McCoy, D. E. Fratanduono, R. F. Smith, R. G. Kraus, J. H. Eggert, F. Coppari, A. Jenei, D. C. Swift, and P. M. Celliers, “The First Observation of the bcc Phase in Compressed Aluminum,” March APS Annual Meeting, New Orleans, LA, 13–17 March 2017.

The following presentations were made at the 13th Direct Drive and Fast Ignition Workshop, Salamanca, Spain, 22–24 March 2017:

S. P. Regan, V. N. Goncharov, T. C. Sangster, E. M. Campbell, R. Betti, T. Bernat, A. Bose, T. R. Boehly, M. J. Bonino, D. Cao, R. Chapman, T. J. B. Collins, R. S. Craxton, A. K. Davis, J. A. Delettrez, D. H. Edgell, R. Epstein, M. Farrell, C. J. Forrest, J. A. Frenje, D. H. Froula, M. Gatu Johnson, C. Gibson, V. Yu. Glebov, A. Greenwood, D. R. Harding, M. Hohenberger, S. X. Hu, H. Huang, J. Hund, I. V. Igumenshchev, D. W. Jacobs-Perkins, R. T. Janezic, M. Karasik, R. L. Keck, J. H. Kelly, T. J. Kessler, J. P. Knauer, T. Z. Kosci, S. J. Loucks, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, J. F. Myatt, S. P. Obenshain, R. D. Petrasso, N. Petta, P. B. Radha, M. J. Rosenberg, A. J. Schmitt, M. J. Schmitt, M. Schoff, W. Seka, W. T. Shmayda, M. J. Shoup III, A. Shvydky, A. A. Solodov, C. Stoeckl, W. Sweet, C. Taylor, R. Taylor, W. Theobald, J. Ulreich, M. D. Wittman, K. M. Woo, and J. D. Zuegel, “The National Direct-Drive Program: OMEGA to the National Ignition Facility.”

M. J. Rosenberg, A. A. Solodov, W. Seka, J. F. Myatt, S. P. Regan, A. V. Maximov, R. Epstein, T. J. B. Collins, V. N. Goncharov, R. W. Short, D. P. Turnbull, D. H. Froula, P. B. Radha, R. K. Follett, P. A. Michel, M. Hohenberger, T. Chapman, J. D. Moody, L. Masse, C. Goyon, M. A. Barrios, J. W. Bates, A. J. Schmitt, “Planar Laser–Plasma Interaction Experiments at Direct-Drive Ignition-Relevant Scale Lengths at the National Ignition Facility.”