Publications and Conference Presentations

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, P.-Y. Chang, "Laser-Driven Magnetized Liner Inertial Fusion on OMEGA," Phys. Plasmas **24**, 056310 (2017) (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. 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," Matter and Radiation at Extremes **2**, 37 (2017).

J. R. Davies, D. H. Barnak, R. Betti, E. M. Campbell, P.-Y. Chang, A. B. Sefkow, K. J. Peterson, D. B. Sinars, and M. R. Weis, "Laser-Driven Magnetized Liner Inertial Fusion," Phys. Plasmas **24**, 062701 (2017).

Y. H. Ding and S. X. Hu, "First-Principles Equation-of-State Table of Beryllium Based on Density-Functional Theory Calculations," Phys. Plasmas **24**, 062702 (2017).

D. H. Edgell, R. K. Follett, I. V. Igumenshchev, J. F. Myatt, J. G. Shaw, and D. H. Froula, "Mitigation of Cross-Beam Energy Transfer in Symmetric Implosions on OMEGA Using Wavelength Detuning," Phys. Plasmas **24**, 062706 (2017).

R. Epstein, C. Stoeckl, V. N. Goncharov, P. W. McKenty, F. J. Marshall, S. P. Regan, R. Betti, W. Bittle, D. R. Harding, S. X. Hu, I. V. Igumenshchev, D. Jacobs-Perkins, R. T. Janezic, J. H. Kelly, T. Z. Kosc, C. Mileham, S. F. B. Morse, P. B. Radha, B. 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," High Energy Density Phys. **23**, 167 (2017).

C. Fagan, M. Sharpe, W. T. Shmayda, and W. U. Schröder, "The Impact of Acid Treatments and Electropolishing Stainless-Steel Surfaces on Tritium Inventories," Fusion Sci. Technol. **71**, 275 (2017).

M. C. Gregor, D. E. Fratanduono, C. A. McCoy, D. N. Polsin, A. Sorce, J. R. Rygg, G. W. Collins, T. Braun, P. M. Celliers, J. H. Eggert, D. D. Meyerhofer, and T. R. Boehly, "Hugoniot and Release Measurements in Diamond Shocked up to 26 Mbar," Phys. Rev. B **95**, 144114 (2017).

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," Phys. Rev. E **95**, 043210 (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).

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," Phys. Rev. E **95**, 051202(R) (2017).

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," Phys. Plasmas **24**, 056308 (2017) (invited).

J. B. Oliver, "Impact of a Counter-Rotating Planetary Rotation System on Thin-Film Thickness and Uniformity," Appl. Opt. **56**, 5121 (2017).

T. Petersen, J. D. Zuegel, and J. Bromage, "High-Average-Power, 2-μm Femtosecond Optical Parametric Oscillator Synchronously Pumped by a Thin-Disk, Mode-Locked Laser," Opt. Express **25**, 8840 (2017).

B. S. Rice, J. Ulreich, C. Fella, J. Crippen, P. Fitzsimmons, and A. Nikroo, "Permeation Fill-Tube Design for Inertial Confinement Fusion Target Capsules," High Power Laser Sci.Eng. **5**, e6 (2017).

J. S. Ross, D. P. Higginson, D. Ryutov, F. Fiuza, R. Hatarik, C. M. Huntington, D. H. Kalantar, A. Link, B. B. Pollock, B. A. Remington, H. G. Rinderknecht, G. F. Swadling, D. P. Turnbull, S. Weber, S. Wilks, D. H. Froula, M. J. Rosenberg, T. Morita, Y. Sakawa, H. Takabe, R. P. Drake, C. Kuranz, G. Gregori, J. Meinecke, M. C. Levy, M. Koenig, A. Spitkovsky, R. D. Petrasso, C. K. Li, H. Sio, B. Lahmann, A. B. Zylstra, and H.-S. Park, "Transition from Collisional to Collisionless Regimes in Interpenetrating Plasma Flows on the National Ignition Facility," Phys. Rev. Lett. **118**, 185003 (2017).

J. D. Sadler, M. Sliwa, T. Miller, M. F. Kasim, N. Ratan, L. Ceurvorst, A. Savin, R. Aboushelbaya, P. A. Norreys, D. Haberberger, A. S. Davies, S. Bucht, D. H. Froula, J. Vieira, R. A. Fonseca, L. O. Silva, R. Bingham, K. Glize and R. M. G. M. Trines, "Robustness of Raman Plasma Amplifiers and Their Potential for Attosecond Pulse Generation," High Energy Density Phys. **23**, 212 (2017).

J. D. Sadler, R. M. G. M. Trines, M. Tabak, D. Haberberger, D. H. Froula, A. S. Davies, S. Bucht, L. O. Silva, E. P. Alves, F. Fiúza, L. Ceurvorst, N. Ratan, M. F. Kasim, R. Bingham, and P. A. Norreys, "Optimization of Plasma Amplifiers," Phys. Rev. E **95**, 053211 (2017).

R. B. Spielman, D. H. Froula, G. Brent, E. M. Campbell, D. B. Reisman, M. E. Savage, M. J. Shoup III, W. A. Stygar, and M. L. Wisher, "Conceptual Design of a 15-TW Pulsed-Power Accelerator for High-Energy-Density–Physics Experiments," Matter and Radiation at Extremes **2**, 204 (2017).

C. R. Stillman, P. M. Nilson, S. T. Ivancic, I. E. Golovkin, C. Mileham, I. A. Begishev, and D. H. Froula, "Picosecond Time-Resolved Measurements of Dense Plasma Line Shifts," Phys. Rev. E **95**, 063204 (2017).

G. F. Swadling, J. S. Ross, D. Manha, J. Galbraith, P. Datte, C. Sorce, J. Katz, D. H. Froula, K. Widman, O. S. Jones, L. Divol, O. L. Landen, J. D. Kilkenny, and J. D. Moody, "Initial Experimental Demonstration of the Principles of a Xenon Gas Shield Designed to Protect Optical Components from Soft X-Ray Induced Opacity (Blanking) in High Energy Density Experiments," Phys. Plasmas **24**, 032705 (2017).

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," Phys. Plasmas **24**, 041404 (2017).

Forthcoming Publications

S. X. Hu, "Continuum Lowering and Fermi-Surface Rising in Strongly Coupled and Degenerate Plasmas," to be published in Physical Review Letters.

A. Jukna, J. Gradauskas, A. Sužiedelis, A. Maneikis, K. Šliužienė, and R. Sobolewski, "Investigation of the I–V Characteristics as Asymmetry in Semiconducting Y-Ba-Cu-O Diodes," to be published in Micro and Nano Letters.

J. M. Ngoko Djiokap, A. V. Meremianin, N. L. Manakov, S. X. Hu, L. B. Madsen, and A. F. Starace, "Kinematical Vortices in Double Photoionization of Helium by Attosecond Pulses," to be published in Physical Review A.

T. Petersen, J. D. Zuegel, and J. Bromage, "Thermal Effects in an Ultrafast BiB_3O_6 Optical Parametric Oscillator at High Average Powers," to be published in Applied Optics.

J. Serafini, A. Hossain, R. B. James, M. Guziewicz, R. Kruszka, W. Słysz, D. Kochanowska, J. Z. Domagala, A. Mycielski, 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.

Conference Presentations

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," presented at the 44th IOP Plasma Physics Conference, Oxford, UK, 3–6 April 2017.

A. Shramuk, J. Serafini, and R. Sobolewski, "Superconducting Single-Photon Detectors as Smart Sensors: Photon-Energy and Photon-Number Resolution," presented at the CEIS University Technology Showcase, Rochester, NY, 13 April 2017.

Y. Yiming, R. Shrestha, G. Chen, A. Jukna, and R. Sobolewski, "Optimization Analysis for THz Time-Domain Spectroscopy of Carbon Nanotubes," presented at the Undergraduate Research Expo, Rochester, NY, 21 April 2017.

The following presentations were made at SPIE Optics and Optoelectronics 2017, Prague, Czech Republic, 24–27 April 2017:

Y. Akbas, T. Plecenik, P. Ďurina, A. Plecenik, A. Jukna, G. Wicks, and R. Sobolewski, "Ultra-High Optical Responsivity of Semiconducting Asymmetric Nano-Channel Diodes for Photon Detection."

J. Kitaygorsky, W. Słysz, R. Shouten, S. Dorenbos, E. Reiger, V. Zwiller, and R. Sobolewski, "Amplitude Distributions of Dark Counts and Photon Counts in NbN Super Conducting Single-Photon Detectors Integrated with the HEMT Readout."

W. Lang, B. Aichner, G. Zechner, F. Jausner, A. Klimov, R. Puźniak, W. Słysz, M. Guziewicz, R. Kruszka, M. Węgrzecki, and R. Sobolewski, "Superconducting Order Parameter Fluctuations in NbN/NiCu and NbTiN/NiCu Bilayer Nanostripes for Photon Detection."

J. Serafini, S. Trivedi, D. Kochanowska, M. Witkowska-Baran, A. Mycielski, J. P. Knauer, and R. Sobolewski, "(Cd,Mg)Te and (Cd,Mn)Te Single Crystals for Time-Resolved Detection of X-Ray Photons."

J. D. Zuegel, "100-PW-Class Optical Parametric Chirped-Pulse Amplification: Prospects and Challenges."

The following presentations were made at the Ninth Omega Laser Facility Users Group Workshop, Rochester, NY, 26–28 April 2017:

C. Dorrer, A. Kalb, W. Bittle, J. Bromage, R. Cuffney, E. Hill, and L. Waxer, "The Ultrafast Temporal Diagnostic Upgrade Will Provide Improved On-Target Short-Pulse Shape Predictions on OMEGA EP."

J. Katz, M. Bedzyk, D. H. Edgell, C. Rogoff, M. Sickles, J. Szczepanski, D. Turnbull, D. Wiener, and D. H. Froula, "Characterization of Ultrafast Gated Optical Imagers for the OMEGA Beamlets Diagnostic."

S. F. B. Morse, "Omega Laser Facility OLUG 2017 Update: Progress on Recommendations and Items of General Interest."

S. L. Ramesh and K. L. Marshall, "Characterization of the Electrical Properties of Contaminated Dielectric Oils for Pulsed-Power Research."

A. T. Sorce, J. D. Kendrick, R. Boni, M. C. Gregor, D. N. Polsin, B. Saltzman, B. Henderson, J. Zou, M. Couch, C. M. Rogoff, and T. R. Boehly, "Recent Work to Improve the Omega Laser Facility's VISAR and Streaked Optical Pyrometer Diagnostics."

L. H. Xiao, R. S. Craxton, D. Barnak, and J. Davies, "Simulations of Laser-Driven Magnetized Liner Inertial Fusion."

W. Theobald, "Test Results and Progress of SLOS-TRXI on OMEGA," presented at the CEA-NNSA Joint Diagnostic Meeting, Salives, France, 3–4 May 2017.

The following presentations were made at CLEO 2017, San Jose, CA, 14–19 May 2017:

S.-W. Bahk, C. Dorrer, and J. Bromage, "Two-Dimensional Characterization of Spatiotemporal Coupling of Ultrashort Pulses Based on Chromatic Diversity."

C. Dorrer and J. Hassett, "High-Accuracy, Model-Based Laser Near-Field Beam Shaping."

C. Dorrer, A. Kalb, G. Gibney, A. Sharma, and S.-W. Bahk, "An Apodized-Imaged Hartmann Mask for Quantitative Wavefront Measurements in Laser Systems."

P. B. Radha, "Importance of Validated Equation-of State Models for Direct-Drive Inertial Confinement Fusion Designs," presented at the EOS Workshop, Rochester, NY, 31 May–2 June 2017.

The following presentations were made at the Sixth International Conference on High Energy Density Physics, Shirahama, Japan, 5–9 June 2017:

A. B. Sefkow, "Adventures in ICF and HEDP with Magnetic Fields."

A. B. Sefkow, J. M. Koning, M. R. Gomez, S. B. Hansen, K. Cochrane, C. Thoma, D. R. Welch, and M. M. Marinak, "Unprecedented Stability in Z-Pinch Implosions Due to Magnetic Fields and Plasma Physics."

The following presentations were made at the 47th Annual Anomalous Absorption Conference, Florence, OR, 11–16 June 2017:

S. Bucht, D. Haberberger, J. Bromage, and D. H. Froula, "Transforming the Idler to Seed Raman Amplification."

A. Davies, S. Bucht, J. Katz, D. Haberberger, J. Shaw, D. Turnbull, I. A. Begishev, S.-W. Bahk, J. Bromage, J. D. Zuegel, D. H. Froula, J. Sadler, P. A. Norreys, R. Trines, and R. Bingham, "Picosecond Thermal Dynamics in an Underdense Plasma Measured with Thomson Scattering."

Y. H. Ding and S. X. Hu, "A First-Principles Equation-of-State Table of Beryllium for High-Energy-Density Plasma Simulations."

D. H. Edgell, R. K. Follett, I. V. Igumenshchev, J. F. Myatt, J. G. Shaw, and D. H. Froula, "Three-Dimensional Modeling of Cross-Beam Energy Transfer and Its Mitigation in OMEGA Implosions."

R. K. Follett, D. H. Edgell, D. H. Froula, V. N. Goncharov, I. V. Igumenshchev, J. G. Shaw, and J. F. Myatt, "Comparisons Between Ray- and Wave-Based Calculations of Cross-Beam Energy Transfer."

E. C. Hansen, D. H. Barnak, J. R. Davies, R. Betti, A. B. Sefkow, J. Peebles, V. Yu. Glebov, J. P. Knauer, E. M. Campbell, S. P. Regan, A. Harvery-Thompson, K. J. Peterson, D. B. Sinars, S. A. Slutz, A. Birkel, and C. K. Li, "Experiments and Simulations of Laser-Driven Magnetized Liner Inertial Fusion."

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

A. B. Sefkow, "Adventures in ICF and HEDP with Magnetic Fields."

A. B. Sefkow, J. M. Koning, M. R. Gomez, S. B. Hansen, K. Cochrane, C. Thoma, D. R. Welch, and M. M. Marinak, "Unprecedented Stability in Z-Pinch Implosions Due to Magnetic Fields and Plasma Physics."

W. Seka, J. F. Myatt, P. Michel, M. J. Rosenberg, A. A. Solodov, T. Chapman, S. P. Regan, R. W. Short, D. T. Michel, and R. K. Follett, "Observation of Stimulated Raman Scattering and Two-Plasmon–Decay Instabilities on OMEGA and the National Ignition Facility."

R. W. Short, A. V. Maximov, and W. Seka, "Absolute Stimulated Raman Sidescattering in Direct-Drive Irradiation Geometries."

A.A. Solodov, M. J. Rosenberg, J. F. Myatt, W. Seka, R. Epstein, R. W. Short, S. P. Regan, D. H. Froula, P. B. Radha, V. N. Goncharov, J. W. Bates, A. J. Schmitt, P. Michel, M. Hohenberger, T. Chapman, and J. D. Moody, "Hot-Electron

Generation at the Direct-Drive Ignition-Relevant Plasma Conditions at the National Ignition Facility."

D. Turnbull, D. H. Froula, T.J. Kessler, D. Haberberger, J. L. Shaw, A. Davies, S. Bucht, P. Michel, C. Goyon, G. E. Kemp, B. B. Pollock, T. Chapman, D. Mariscal, L. Divol, J. S. Ross, S. Patankar, J. D. Moody, E. Tubman, and N. Woolsey, "Plasma-Based Photonic Devices: Wave Plates, Polarizers, and Amplifiers."

The following presentations were made at the 16th International Superconductive Electronics Conference, Sorrento, Italy, 12–16 June 2017:

J. Kitaygorsky, R. Shouten, S. Dorenbos, E. Reiger, V. Zwiller, W. Słysz, and R. Sobolewski, "Photon-Energy and Photon-Number Resolution Capabilities of NbN Superconducting Single-Photon Detectors."

W. Lang, B. Aichner, G. Zechner, F. Jausner, R. Puzniak, A. Klimov, W. Słysz, M. Guziewicz, R. Kruszka, M. Wegrzecki, and R. Sobolewski, "Superconducting Fluctuations and Magnetic Properties of NbN/NiCu and NbTiN/NiCu Bilayer Nanostructures for Photon Detection."

C. R. Stillman, P. M. Nilson, S. T. Ivancic, I. E. Golovkin, C. Mileham, I. A. Begishev, and D. H. Froula, "Picosecond Time-Resolved Observations of Dense Plasma Shifts," presented at the Stewardship Science Graduate Fellowship Program Review, Albuquerque, NM, 18–23 June 2017.

S.-W. Bahk, C. Dorrer, and J. Bromage, "Two-Dimensional Single-Shot Characterization of Spatiotemporal Coupling of Ultrashort Pulses Using Chromatic Diversity," presented at OSA Imaging and Applied Optics Congress, San Francisco, CA, 26–29 June 2017.

J. F. Myatt, R. K. Follett, J. G. Shaw, A. A. Solodov, I. V. Igumenshchev, V. N. Goncharov, D. H. Edgell, D. H. Froula, T. J. Kessler, W. Seka, R. Betti, T. R. Boehly, M. J. Bonino, E. M. Campbell, T. J. B. Collins, R. S. Craxton, A. K. Davis, J. A. Delettrez, R. Epstein, C. J. Forrest, V. Yu. Glebov, D. R. Harding, S. X. Hu, R. T. Janezic, J. H. Kelly, T. Z. Kosc, S. J. Loucks, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. T. Michel, P. B. Radha, M. Rosenberg, W. T. Shmayda, A. Shvydky, S. Skupsky, C. Stoeckl, W. Theobald, F. Weilacher, B. Yaakobi, P. Michel, T. Chapman, L. Masse, C. S. Goyon, J. E. Ralph, J. D. Moody, M. A. Barrios, O. A. Hurricane, M. Hohenberger, M. M. Marinak, R. Nora, M. Tabak, J. Bates, J. Weaver, M. Karasik, A. J. Schmitt, S. P. Obenschain, J. Hund, N Petta, M. Farrell, M Schoff, A. Greenwood, M. Schmitt, and R. Shah, "The Scaling of Laser–Plasma Instabilities in Direct-Drive Inertial Confinement Fusion from OMEGA to the National Ignition Facility," presented at the 44th EPS Conference on Plasma Physics, Belfast, Northern Ireland, 26–30 June 2017.