

## Publications and Conference Presentations

### Publications

- H. Abu-Shawareb *et al.*, “Lawson Criterion for Ignition Exceeded in an Inertial Fusion Experiment,” *Phys. Rev. Lett.* **129**, 075001 (2022).
- D. Barlow, T. Goffrey, K. Bennett, R. H. H. Scott, K. Glize, W. Theobald, K. Anderson, A. A. Solodov, M. J. Rosenberg, M. Hohenberger, N. C. Woolsey, P. Bradford, M. Khan, and T. D. Arber, “Role of Hot Electrons in Shock Ignition Constrained by Experiment at the National Ignition Facility,” *Phys. Plasmas* **29**, 082704 (2022).
- G. Bruhaug, G. W. Collins, H. G. Rinderknecht, J. R. Rygg, J. L. Shaw, M. S. Wei, M. S. Freeman, F. E. Merrill, L. P. Neukirch, and C. H. Wilde, “Analysis Methods for Electron Radiography Based on Laser-Plasma Accelerators,” in *Proc. NAPAC2022* (JACoW Publishing, Geneva, Switzerland, 2022), pp. 274–277.
- Z. Chen, S. X. Hu, and N. P. Bigelow, “Imprinting a Three-Dimensional Skyrmion in a Bose–Einstein Condensate Via a Raman Process,” *J. Low Temp. Phys.* **208**, 172 (2022).
- K. Churnetski, K. M. Woo, W. Theobald, P. B. Radha, R. Betti, V. Gopalaswamy, I. V. Igumenshchev, S. T. Ivancic, M. Michalko, R. C. Shah, C. Stoeckl, C. A. Thomas, and S. P. Regan, “Three-Dimensional Hot-Spot X-Ray Emission Tomography from Cryogenic Deuterium–Tritium Direct-Drive Implosions on OMEGA,” *Rev. Sci. Instrum.* **93**, 093530 (2022).
- S. X. Coffing, C. L. Fryer, H. F. Robey, C. J. Fontes, S. R. Wood, P. M. Kozlowski, H. M. Johns, D. D. Meyerhofer, T. Byvank, A. Liao, and T. J. Urbatsch, “Inferring the Temperature Profile of the Radiative Shock in the COAX Experiment with Shock Radiography, Dante, and Spectral Temperature Diagnostics,” *Phys. Plasmas* **29**, 083302 (2022).
- A. Colaïtis, D. P. Turnbull, I. V. Igumenshchev, D. Edgell, R. C. Shah, O. M. Mannion, C. Stoeckl, D. Jacobs-Perkins, A. Shvydky, R. Janezic, A. Kalb, D. Cao, C. J. Forrest, J. Kwiatkowski, S. Regan, W. Theobald, V. N. Goncharov, and D. H. Froula, “3D Simulations Capture the Persistent Low-Mode Asymmetries Evident in Laser-Direct-Drive Implosions on OMEGA,” *Phys. Rev. Lett.* **129**, 095001 (2022).
- T. Cordova, M. J. MacDonald, T. Döppner, F. N. Beg, M. Dozieres, B. Koziowski, N. A. Pablant, C. M. Sorce, and N. G. Whiting, “Absolute Calibration of the Conical Crystal Configuration of the Zinc Spectrometer (ZSPEC) at the OMEGA Laser Facility,” *Rev. Sci. Instrum.* **93**, 083509 (2022).
- C. Dorrer, I. A. Begishev, S.-W. Bahk, and J. Bromage, “High-Resolution Mapping of Phase-Matching Conditions in Second-Order Nonlinear Crystals,” *Opt. Mater. Express* **12**, 3679 (2022).
- F. García-Rubio, R. Betti, J. Sanz, and H. Aluie, “Theory of the Magnetothermal Instability in Coronal Plasma Flows,” *Phys. Plasmas* **29**, 092106 (2022).
- V. Yu. Glebov, C. J. Forrest, J. Kendrick, J. P. Knauer, O. M. Mannion, H. McClow, S. P. Regan, C. Stoeckl, B. Stanley, and W. Theobald, “A New Neutron Time-of-Flight Detector for Yield and Ion-Temperature Measurements on OMEGA Laser Facility,” *Rev. Sci. Instrum.* **93**, 093522 (2022).
- V. Gopalaswamy, R. Betti, P. B. Radha, A. J. Crilly, K. M. Woo, A. Lees, C. Thomas, I. V. Igumenshchev, S. C. Miller, J. P. Knauer, C. Stoeckl, C. J. Forrest, O. M. Mannion, Z. L. Mohamed, H. G. Rinderknecht, and P. V. Heuer, “Analysis of Limited Coverage Effects on Areal Density Measurements in Inertial Confinement Fusion Implosions,” *Phys. Plasmas* **29**, 072706 (2022).
- B. M. Haines, D. E. Keller, K. P. Long, M. D. McKay, Jr., Z. J. Medin, H. Park, R. M. Rauenzahn, H. A. Scott, K. S. Anderson, T. J. B. Collins, L. M. Green, J. A. Marozas, P. W. McKenty, J. H. Peterson, E. L. Vold, C. Di Stefano, R. S. Lester, J. P. Sauppe, D. J. Stark, and J. Velechovsky, “The Development of a High-Resolution Eulerian Radiation-Hydrodynamics Simulation Capability for Laser-Driven Hohlraums,” *Phys. Plasmas* **29**, 083901 (2022).

- S. S. Harilal, M. C. Phillips, D. H. Froula, K. K. Anoop, R. C. Issac, and F. N. Beg, "Optical Diagnostics of Laser-Produced Plasmas," *Rev. Mod. Phys.* **94**, 035002 (2022).
- B. J. Henderson, J. R. Rygg, M. C. Marshall, M. K. Ginnane, L. E. Hansen, E. Davies, P. M. Celliers, and G. W. Collins, "Shocked Silica Aerogel Radiance Transition," *J. Appl. Phys.* **132**, 095902 (2022).
- P. V. Heuer, L. S. Leal, J. R. Davies, E. C. Hansen, D. H. Barnak, J. L. Peebles, F. García-Rubio, B. Pollock, J. Moody, A. Birkel, and F. Séguin, "Diagnosing Magnetic Fields in Cylindrical Implosions with Oblique Proton Radiography," *Phys. Plasmas* **29**, 072708 (2022).
- M. P. Jeske, W. Zhang, and M. Anthamatten, "Two-Photon Printing of Shape-Memory Microstructures and Metasurfaces via Radical-Mediated Thiol-Vinyl Hydrothiolation," *Adv. Mater. Technol.* **7**, 2101725 (2022).
- T. R. Joshi, R. C. Shah, W. Theobald, K. Churnetski, P. B. Radha, D. Cao, C. A. Thomas, J. Baltazar, and S. P. Regan, "Diagnosis of the Imploding Shell Asymmetry in Polar-Direct-Drive Deuterium-Tritium Cryogenic Target Implosions on OMEGA," *Rev. Sci. Instrum.* **93**, 093524 (2022).
- K. R. P. Kafka, T. Z. Kosc, and S. G. Demos, "Methods and Apparatus for Comprehensive Characterization of Performance Attributes and Damage Thresholds of Ultrafast Laser Optics," *Opt. Eng.* **61**, 071605 (2022).
- J. H. Kunimune, H. G. Rinderknecht, P. J. Adrian, P. V. Heuer, S. P. Regan, F. H. Séguin, M. Gatu Johnson, R. P. Bahukutumbi, J. P. Knauer, B. L. Bachmann, and J. A. Frenje, "Knock-On Deuteron Imaging for Diagnosing the Morphology of an ICF Implosion at OMEGA," *Phys. Plasmas* **29**, 072711 (2022).
- A. L. Milder, J. Zielinski, J. Katz, W. Rozmus, D. Edgell, A. Hansen, M. Sherlock, C. Bruulsema, J. P. Palastro, D. Turnbull, and D. H. Froula, "Direct Measurement of the Return Current Instability in a Laser-Produced Plasma," *Phys. Rev. Lett.* **129**, 115002 (2022).
- S. C. Miller and V. N. Goncharov, "Instability Seeding Mechanisms Due to Internal Defects in Inertial Confinement Fusion Targets," *Phys. Plasmas* **29**, 082701 (2022).
- M. Oliver, C. H. Allen, L. Divol, Z. Karmiol, O. L. Landen, Y. Ping, R. Wallace, M. Schölmerich, W. Theobald, T. Döppner, and T. G. White, "Diffraction Enhanced Imaging Utilizing a Laser Produced X-Ray Source," *Rev. Sci. Instrum.* **93**, 093502 (2022).
- J. L. Peebles, J. R. Davies, D. H. Barnak, F. García-Rubio, P. V. Heuer, G. Brent, R. Spielman, and R. Betti, "An Assessment of Generating Quasi-Static Magnetic Fields Using Laser-Driven 'Capacitor' Coils," *Phys. Plasmas* **29**, 080501 (2022).
- A. Pineau, K. R. P. Kafka, S. G. Demos, T. Z. Kosc, V. N. Goncharov, S. X. Hu, and G. Duchateau, "Benchmarking Solid-to-Plasma Transition Modeling for Inertial Confinement Fusion Laser-Imprint with a Pump-Probe Experiment," *Phys. Rev. Research* **4**, 033178 (2022).
- H. Poole, D. Cao, R. Epstein, I. Golovkin, T. Walton, S. X. Hu, M. Kasim, S. M. Vinko, J. R. Rygg, V. N. Goncharov, G. Gregori, and S. P. Regan, "A Case Study of Using X-Ray Thomson Scattering to Diagnose the In-Flight Plasma Conditions of DT Cryogenic Implosions," *Phys. Plasmas* **29**, 072703 (2022).
- S. Ressel, J. J. Ruby, G. W. Collins, and J. R. Rygg, "Density Reconstruction in Convergent High-Energy-Density Systems Using X-Ray Radiography and Bayesian Inference," *Phys. Plasmas* **29**, 072713 (2022).
- H. G. Rinderknecht, P. V. Heuer, J. Kunimune, P. J. Adrian, J. P. Knauer, W. Theobald, R. Fairbanks, B. Brannon, L. Ceurvorst, V. Gopalaswamy, C. A. Williams, P. B. Radha, S. P. Regan, M. Gatu Johnson, F. H. Séguin, and J. A. Frenje, "A Knock-On Deuteron Imager for Measurements of Fuel and Hotspot Asymmetry in Direct-Drive Inertial Confinement Fusion Implosions," *Rev. Sci. Instrum.* **93**, 093507 (2022) (invited).
- A. K. Schwemmlein, C. Stoeckl, C. J. Forrest, W. T. Shmayda, S. P. Regan, and W. U. Schröder, "First Demonstration of a Triton Beam Using Target Normal Sheath Acceleration," *Nucl. Instrum. Methods Phys. Res. B* **522**, 27 (2022).
- R. C. Shah, D. Cao, L. Alghaian, B. Bachmann, R. Betti, E. M. Campbell, R. Epstein, C. J. Forrest, A. Forsman, V. Yu. Glebov, V. N. Goncharov, V. Gopalaswamy, D. R. Harding, S. X. Hu, I. V. Igumenshchev, R. T. Janezic, L. Keaty, J. P. Knauer, D. Kobs, A. Lees, O. M. Mannion, Z. L. Mohamed, D. Patel, M. J. Rosenberg, W. T. Shmayda, C. Stoeckl, W. Theobald, C. A. Thomas, P. Volegov, K. M. Woo, and S. P. Regan, "Bound on Hot-Spot Mix in High-Velocity, High-Adiabatic Direct-Drive Cryogenic Implosions Based on Comparison of Absolute X-Ray and Neutron Yields," *Phys. Rev. E* **106**, L013201 (2022).

S. Singh, A. L. Coleman, S. Zhang, F. Coppari, M. G. Gorman, R. F. Smith, J. H. Eggert, R. Briggs, and D. E. Fratanduono, “Quantitative Analysis of Diffraction by Liquids Using a Pink-Spectrum X-Ray Source,” *J. Synchrotron Radiat.* **29**, 1033 (2022).

H. Sio, O. Larroche, A. Bose, S. Atzeni, J. A. Frenje, N. V. Kabadi, M. Gatu Johnson, C. K. Li, V. Glebov, C. Stoeckl, B. Lahmann, P. J. Adrian, S. P. Regan, A. Birkel, F. H. Séguin, and R. D. Petrasso, “Fuel–Shell Mix and Yield Degradation in Kinetic Shock-Driven Inertial Confinement Fusion Implosions,” *Phys. Plasmas* **29**, 072710 (2022).

R. Sobolewski, “Optical Detectors and Sensors,” in *Handbook of Superconductivity: Characterization and Applications*, 2nd ed., edited by D. A. Cardwell, D. C. Larbalestier, and A. I. Braginski (Taylor & Francis, New York, 2022), Vol. III, Chap. H4.5, pp. 780–796.

R. B. Spielman, “Pulsed-Power Innovations for Next-Generation, High-Current Drivers,” *IEEE Trans. Plasma Sci.* **50**, 2621 (2022).

B. A. Storer, M. Buzzicotti, H. Khatri, S. M. Griffies, and H. Aluie, “Global Energy Spectrum of the General Oceanic Circulation,” *Nat. Commun.* **13**, 5314 (2022).

D. Turnbull, J. Katz, D. E. Hinkel, P. Michel, T. Chapman, L. Divol, E. Kur, S. MacLaren, A. L. Milder, M. Rosen, A. Shvydky, G. B. Zimmerman, and D. H. Froula, “Beam Spray Thresholds in ICF-Relevant Plasmas,” *Phys. Rev. Lett.* **129**, 025001 (2022).

N. D. Urban, K. R. P. Kafka, K. L. Marshall, and S. G. Demos, “Laser-Induced Damage Characteristics of Fused Silica Surfaces Polished to Different Depths Using Fluid Jet Polishing,” *Opt. Eng.* **61**, 071604 (2022).

K. M. Woo, R. Betti, C. A. Thomas, C. Stoeckl, K. Churnetski, C. J. Forrest, Z. L. Mohamed, B. Zirps, S. P. Regan, T. J. B. Collins, W. Theobald, R. C. Shah, O. M. Mannion, D. Patel, D. Cao, J. P. Knauer, V. Yu. Glebov, V. N. Goncharov, P. B. Radha, H. G. Rinderknecht, R. Epstein, V. Gopalaswamy, F. J. Marshall, S. T. Ivancic, and E. M. Campbell, “Analysis of Core Asymmetries in Inertial Confinement Fusion Implosions Using Three-Dimensional Hot-Spot Reconstruction,” *Phys. Plasmas* **29**, 082705 (2022).

Y. Zou, L. Chamandy, J. Carroll-Nellenback, E. G. Blackman, and A. Frank, “Jets from Main Sequence and White Dwarf Companions During Common Envelope Evolution,” *Mon. Not. R. Astron. Soc.* **514**, 3041 (2022).

### Forthcoming Publications

H. Aluie, S. Rai, H. Yin, A. Lees, D. Zhao, S. M. Griffies, A. Adcroft, and J. K. Shang, “Effective Drift Velocity from Turbulent Transport by Vorticity,” to be published in *Physical Review Fluids*.

A. F. Antoniadis, D. Drikakis, P. S. Farmakis, L. Fu, I. Kokkinakis, X. Nogueira, P. A. S. F. Silva, M. Skote, V. Titarev, P. Tsoutsanis, “UCNS3D: An Open-Source High-Order Finite-Volume Unstructured CFD Solver,” to be published in *Computer Physics Communications*.

N. Birge, V. Geppert-Kleinrath, C. Danly, B. Haines, S. T. Ivancic, J. Jorgenson, J. Katz, E. Mendoza, A. T. Sorce, L. Tafoya, C. Wilde, and P. Volegov, “Instrument Design for an Inertial Confinement Fusion Ion Temperature Imager,” to be published in *Review of Scientific Instruments*.

E. G. Blackman and S. V. Lebedev, “Persistent Mysteries of Jet Engines, Formation, Propagation, and Particle Acceleration: Have They Been Addressed Experimentally?” to be published in *New Astronomy Reviews*.

L. Ceurvorst, W. Theobald, M. J. Rosenberg, P. B. Radha, C. Stoeckl, R. Betti, K. S. Anderson, J. A. Marozas, V. N. Goncharov, E. M. Campbell, C. M. Shulldberg, R. W. Luo, W. Sweet, L. Aghaian, L. Carlson, B. Bachmann, T. Döppner, M. Hohenberger, K. Glize, R. H. H. Scott, A. Colaitis, and S. P. Regan, “Development of an X-Ray Radiography Platform to Study Laser-Direct-Drive Energy Coupling at the National Ignition Facility,” to be published in *Review of Scientific Instruments*.

F. Coppari, D. E. Fratanduono, M. Millot, R. G. Kraus, A. Lazicki, J. R. Rygg, R. F. Smith, and J. H. Eggert, “X-Ray Diffraction Measurements and Pressure Determination in Nanosecond Compression of Solids up to 600 GPa,” to be published in *Physical Review B*.

D. H. Edgell, J. Katz, R. Raimondi, D. Turnbull, and D. H. Froula, “Scattered-Light Uniformity Imager for Diagnosing Laser Absorption Asymmetries on OMEGA,” to be published in *Review of Scientific Instruments*.

- C. J. Forrest, A. Crilly, A. Schwemmlin, M. Gatu-Johnson, O. M. Mannion, B. Appelbe, R. Betti, V. Yu. Glebov, V. Gopalaswamy, J. P. Knauer, Z. L. Mohamed, P. B. Radha, S. P. Regan, C. Stoeckl, and W. Theobald, "Measurements of Low-Mode Asymmetries in Areal Density of Laser-Direct-Drive Deuterium-Tritium Cryogenic Implosions on OMEGA Using Neutron Spectroscopy," to be published in *Review of Scientific Instruments* (invited).
- H. Geppert-Kleinrath, Y. Kim, K. Meany, M. Rubery, J. Carrera, and E. Mariscal, "Gas Scintillation Mitigation in Gas Cherenkov Detectors for Inertial Confinement Fusion," to be published in *Review of Scientific Instruments* (invited).
- R. Ghosh, X. Liu, and M. Z. Yates, "Flexible Copper Metal Circuits via Desktop Laser Printed Masks," to be published in *Advanced Materials Technologies*.
- M. G. Gorman, S. Elatresh, A. Lazicki, M. M. E. Cormier, S. A. Bonev, D. McGonegle, R. Briggs, A. L. Coleman, S. D. Rothman, L. Peacock, J. V. Bernier, F. Coppari, D. G. Braun, J. R. Rygg, D. E. Fratanduono, R. Hoffmann, G. W. Collins, J. S. Wark, R. F. Smith, J. H. Eggert, and M. I. McMahon, "Experimental Observation of Open Structures in Elemental Magnesium at Terapascal Pressures," to be published in *Nature Physics*.
- D. S. Hodge, A. F. T. Leong, S. Pandolfi, K. Kurzer-Ogul, D. S. Montgomery, H. Aluie, C. Bolme, T. Carver, E. Cunningham, C. B. Curry, M. Dayton, F.-J. Decker, E. Galtier, P. Hart, D. Khaghani, H. J. Lee, K. Li, Y. Liu, K. Ramos, J. Shang, S. Vetter, B. Nagler, R. L. Sandberg, and A. E. Gleason, "Multi-Frame, Ultrafast, X-Ray Microscope for Imaging Shockwave Dynamics," to be published in *Optics Express*.
- N. Kabadi, P. Adrian, C. Stoeckl, A. Sorce, H. W. Sio, M. Bedzyk, T. Evans, S. Ivancic, J. Katz, J. Knauer, J. Percy, D. Weiner, R. Betti, A. Birkel, D. Cao, M. Gatu Johnson, S. P. Regan, R. D. Petrasso, and J. Frenje, "The Phase-2 Particle X-Ray Temporal Diagnostic for Simultaneous Measurement of Multiple X-Ray and Nuclear Emission Histories from OMEGA Implosions," to be published in *Review of Scientific Instruments* (invited).
- A. Krygier, C. E. Wehrenberg, J. V. Bernier, S. Clarke, A. L. Coleman, F. Coppari, T. S. Duffy, M. G. Gorman, M. Hohenberger, D. Kalantar, G. E. Kemp, S. F. Khan, C. Krauland, R. G. Kraus, A. Lazicki, M. J. MacDonald, A. G. MacPhee, E. Marley, M. C. Marshall, M. May, J. M. McNaney, M. Millot, Y. Ping, P. L. Poole, J. R. Rygg, M. Schneider, H. Sio, S. Stoupin, D. Swift, C. Yeaman, T. Zobrist, R. F. Smith, and J. H. Eggert, "X-Ray Source Characterization and Sample Heating on X-Ray Diffraction Experiments at the National Ignition Facility," to be published in *Physics of Plasmas*.
- R. N. Markwick, A. Frank, J. Carroll-Nellenback, E. G. Blackman, P. M. Hartigan, S. V. Lebedev, D. R. Russell, J. W. D. Halliday, and L. G. Suttle, "Morphology of Shocked Lateral Outflows in Colliding Hydrodynamic Flows," to be published in *Physics of Plasmas*.
- S. Pandolfi, T. Carver, D. Hodge, A. F. T. Leong, K. Kurzer-Ogul, P. Hart, E. Galtier, D. Khaghani, E. Cunningham, B. Nagler, H. J. Lee, C. Bolme, K. Ramos, K. Li, Y. Liu, A. Sakdinawat, S. Marchesini, P. M. Kozlowski, C. B. Curry, F.-J. Decker, S. Vetter, J. Shang, H. Aluie, M. Dayton, D. S. Montgomery, R. L. Sandberg, and A. E. Gleason, "Novel Fabrication Tools for Dynamic Compression Targets with Engineered Voids Using Photolithography Methods," to be published in *Review of Scientific Instruments*.
- J. J. Pigeon, S. Ya. Tochitsky, D. Tovey, G. J. Louwrens, I. Ben-Zvi, and C. Joshi, "Interferometric Measurements of the Resonant Nonlinearity of IR-Active Minor Air Constituents," to be published in the *Journal of the Optical Society of America B*.
- L. Savino, V. N. Goncharov, I. V. Igumenshchev, and S. Atzeni, "Studies on Dynamical Shell Formation for Direct-Drive Laser Fusion," to be published in *Il Nuovo Cimento*.
- M. Sharpe, W. T. Shmayda, and J. J. Ruby, "Influence of Heat Treatments on the Near-Surface Tritium Concentration Profiles," to be published in *IEEE Transactions on Plasma Science*.
- C. Stoeckl, D. Cao, L. Ceurvorst, A. Kalb, J. Kwiatkowski, A. Shvydky, and W. Theobald, "Beam-Pointing Verification Using X-Ray Pinhole Cameras on the 60-Beam OMEGA Laser," to be published in *Review of Scientific Instruments*.
- M. P. Valdivia, G. Perez-Callejo, V. Bouffetier, G. W. Collins IV, C. Stoeckl, T. Filkins, C. Mileham, M. Romanofsky, I. A. Begishev, W. Theobald, S. R. Klein, M. K. Schneider, F. N. Beg, A. Casner, and D. Stutman, "Current Advances on Talbot-Lau X-Ray Imaging Diagnostics for High-Energy-Density Experiments," to be published in *Review of Scientific Instruments* (invited).
- K. Weichman, J. P. Palastro, A. P. L. Robinson, R. Bingham, and A. V. Arefiev, "Underdense Relativistically Thermal

Plasma Produced by Magnetically Assisted Direct Laser Acceleration,” to be published in *Physical Review Research*.

S. Zhang, V. V. Karasiev, N. Shaffer, D. I. Mihaylov, K. Nichols, R. Paul, R. M. N. Goshadze, M. Ghosh, J. Hinz, R. Epstein,

S. Goedecker, and S. X. Hu, “First-Principles Equation of State of CHON Resin for Inertial Confinement Fusion Applications,” to be published in *Physical Review E*.

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### Conference Presentations

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K. Churnetski, K. M. Woo, W. Theobald, P. B. Radha, R. Betti, V. Gopalaswamy, I. V. Igumenshchev, S. T. Ivancic, M. Michalko, R. C. Shah, C. Stoeckl, C. A. Thomas, and S. P. Regan, “Three-Dimensional Hot-Spot X-Ray Emission Tomography from Cryogenic Deuterium–Tritium Direct-Drive Implosions on OMEGA,” presented at the 9th Plasmas in Super-Intense Laser Fields, Erice, Italy, 1–11 July 2022.

F. García-Rubio, R. Betti, J. Sanz, and H. Aluie, “Magneto-hydrodynamic Instabilities in Ablation Fronts and Coronal Plasmas,” presented at the Plasma Science and Technology Seminar, Princeton, NJ, 5 July 2022.

W. T. Shmayda, “Fusion-Related Tritium Research and Development at the Laboratory for Laser Energetics,” presented at the 20th Tritium Users Group, Culham, UK, 5–6 July 2022.

C. Deeney, “The Laboratory for Laser Energetics: An Overview,” presented at the Jill Hruby Visit, Rochester, NY, 6 July 2022.

The following presentations were made at the 22nd Biennial Conference of the APS Topical Group on Shock Comprehension of Condensed Matter, Anaheim, CA, 10–15 July 2022:

M. K. Ginnane, D. N. Polsin, X. Gong, M. C. Marshall, T. R. Boehly, J. R. Rygg, G. W. Collins, A. Lazicki, R. Kraus, J. H. Eggert, D. E. Fratanduono, J.-P. Davis, C. A. McCoy, C. Seagle, and S. Root, “X-Ray Diffraction of Shocked Platinum.”

X. Gong, M. C. Marshall, M. K. Ginnane, R. Boni, J. R. Rygg, and G. W. Collins, “Extending Optical Pyrometry for Temperature Measurements Below 5000 K.”

E. Smith, D. T. Bishel, D. A. Chin, J. R. Rygg, G. W. Collins, and J. J. Ruby, “Shock-Wave Properties in High-Energy-Density Environments.”

S. Zhang, S. X. Hu, M. C. Marshall, J. R. Rygg, A. Shvydky, D. Haberberger, V. N. Goncharov, T. R. Boehly, G. W. Collins, D. E. Fratanduono, and A. E. Lazicki, “Molecular-Dynamics Simulations and Laser-Drive Shock-Release Experiments on Polystyrene Under Inertial Confinement Fusion Conditions.”

S. Zhang, R. Paul, M. Ghosh, T.-A. Suer, M. Millot, M. A. Morales, F. Malone, R. Jeanloz, E. Zurek, S. X. Hu, J. R. Rygg, and G. W. Collins, “Equations of State and Phase Transformations in Rocky Materials to TPa Pressures.”

T. R. Joshi, R. B. Spielman, E. N. Hahn, M. Bailly-Grandvaux, T. Cordova, R. E. Turner, J. E. Garay, and F. N. Beg, “Investigation of Laser Ablation as a Function of Pulse Length in Silicon at  $10^{15}$  W/cm<sup>2</sup> Intensities,” presented at the Association of Nepali Physicists in America, virtual, 15–17 July 2022.

The following presentations were made at the Research at High Pressure, Holderness, NH, 17–22 July 2022:

D. A. Chin, P. M. Nilson, D. T. Bishel, B. J. Henderson, R. Paul, D. N. Polsin, M. Signor, S. X. Hu, M. K. Ginnane, X. Gong, E. A. Smith, A. Coleman, F. Coppari, Y. Ping, J. J. Ruby, D. Trail, A. Amouretti, M. Harmand, R. Torchio, J. R. Rygg, and G. W. Collins, “X-Ray Absorption Fine Structure Spectroscopy of Iron Compounds at High-Energy-Density Conditions.”

H. Pantell, G. W. Collins, and J. R. Rygg, “The Rosenfeld Viscosity and Phase Changes in Silicates.”

Z. K. Sprowal, L. E. Hansen, M. F. Huff, D. N. Polsin, D. G. Hicks, T. R. Boehly, J. R. Rygg, and G. W. Collins, “Accessing High-Density States in D<sub>2</sub> Using Double Shock.”

T.-A. Suer, X. Gong, M. C. Marshall, S. Zhang, M. K. Ginnane, M. Huff, A. LaPierre, D. A. Chin, J. R. Rygg, and G. W. Collins, “A New Phase of Aluminum Oxide Observed at ~450 GPa.”

T. J. B. Collins and P. Tzeferacos, “Computational Modeling at the University of Rochester’s Laboratory for Laser Energetics and Flash Center: Advanced Simulation Tools for High-Energy-Density Physics,” presented at Materials Science in Extreme Environments, virtual, 2 August 2022.

The following presentations were made at the J. Stiles Visit, Rochester, NY, 3 August 2022:

R. B. Spielman, P. Tzeferacos, S. G. Demos, S. P. Regan, and C. Deeney, “Pulsed Laser Lethality.”

J. D. Zuegel, “The Laboratory for Laser Energetics: An Overview.”

P. M. Nilson, F. J. Marshall, T. J. B. Collins, R. Epstein, D. T. Bishel, D. A. Chin, J. Kendrick, D. Guy, M. Krieger, W. J. Armstrong, D. Haberberger, S. M. Fess, D. Wasilewski, T. Cracium, M. J. Bonino, J. Katz, S. T. Ivancic, C. Stoeckl, V. N. Goncharov, D. H. Froula, J. J. Ruby, and R. Peters, “Flow Visualization at Ultrahigh Pressure,” presented at the University of Michigan Talk, Ann Arbor, MI, 5 August 2022.

G. Bruhaug, J. L. Shaw, H. Rinderknecht, M. S. Wei, J. R. Rygg, G. W. Collins, M. Freeman, F. Merrill, L. P. Neukirch, C. Wilde, C. A. Walsh, and E. Tubman, “Laser-Plasma-Acceleration-Driven Electron Radiography on the OMEGA EP Laser,” presented at the North American Particle Accelerator Conference, Albuquerque, NM, 7–12 August 2022.

The following presentations were made at the LaserNetUS User Group Meeting, Fort Collins, CO, 16–18 August 2022:

A. E. Raymond, S.-W. Bahk, I. A. Begishev, S. Bucht, C. Dorrer, C. Feng, C. Jeon, C. Mileham, R. G. Roides, M. Spilatro, B. Webb, and J. Bromage, “Status of the MTW-OPAL Laser System, a Prototype All-OPCPA System for Ultra-Intense Science.”

H. G. Rinderknecht, G. Bruhaug, K. Weichman, M. VanDusen-Gross, J. P. Palastro, M. S. Wei, A. Arefiev, T. Wang, T. Toncian, A. Laso Garcia, D. Doria, K. Spohr, H. J. Quevedo, T. Ditmire, J. Williams, A. Haid, and D. Stutman, “Initial Experimental Results from Relativistically Transparent Magnetic Filament Experiments.”

P. Tzeferacos, “*FLASH*—An Open Computational Tool for Laser-Driven High-Energy-Density Physics.”

M. VanDusen-Gross, K. Weichman, D. R. Harding, A. Arefiev, A. G. MacPhee, A. Haid, and H. G. Rinderknecht, “Designing and Testing Optical Concentrator Targets for High-Intensity Lasers.”

K. L. Marshall, J. U. Wallace, N. Urban, K. R. P. Kafka, and S. G. Demos, “The Impact of  $\pi$ -Electron Delocalization on the Chiroptical Properties, Mesophase Stability, and Laser-Damage Resistance of Chiral Dopants and Liquid Crystal Host Mixtures in High-Peak-Power Laser Applications,” presented at Liquid Crystals XXVI, San Diego, CA, 21–25 August 2022 (invited).

D. Chakraborty, B. N. Mills, J. Cheng, S. A. Gerber, and R. Sobolewski, “Maximum A-Posteriori Probability THz Parameter Extraction for Pancreatic Ductal Adenocarcinoma,” presented at the 47th International Conference on Infrared, Millimeter and Terahertz Waves, Delft, Netherlands, 28 August–2 September 2022.

The following presentations were made at the 13th International Laser Operations Workshop, Livermore, CA, 30 August–1 September 2022:

M. Barczys, D. Canning, M. J. Guardalben, B. E. Kruschwitz, T. McKean, J. O’Sullivan, N. Savidis, and L. J. Waxer, “OMEGA EP Updates from 2021–2022.”

D. Canning, “Omega Facility Update.”

A. Consentino, G. Pien, S. Householder, M. Labuzeta, D. Canning, J. Puth, and S. F. B. Morse, “LLE’s Experience with Mix of Remote and In-Person PI.”

M. Heimbueger, W. R. Donaldson, S. Sampat, and L. J. Waxer, “New Temporal Diagnostic Scheme Based on Semiconductor Technology.”

E. M. Hill, C. Dorrer, J. D. Zuegel, S. Herman, A. Bolognesi, N. Ekanayake, K. Gibney, and M. Spilatro, “Overview of the Fourth-Generation Laser for Ultrabroadband eXperiments (FLUX) at the Laboratory for Laser Energetics.”

S. T. Ivancic, R. B. Brannon, T. Filkins, J. Katz, A. Sorce, D. Mastrosimone, N. Pelepchan, M. Michalko, J. Tellinghuisen, B. Stanley, and J. Frelier, “Experimental Diagnostic Development and Integration at OMEGA.”

M. Labuzeta, S. F. B. Morse, J. Puth, D. Canning, A. Consentino, and S. Householder, “The Role of Availability and Effectiveness Performance Metrics in the Omega Sustainment Plan.”

C. Mileham, S.-W. Bahk, I. A. Begishev, S. Bucht, R. Cuffney, C. Dorrer, C. Feng, T. Filkins, C. Jeon, R. Roides, J. L. Shaw, M. Spilatro, C. Stoeckl, B. Webb, J. D. Zuegel, and J. Bromage, “An Overview of the Multi-Terawatt Facility Operational Paradigm.”

S. Sampat, B. Ehrich, M. Heimbueger, S.-W. Bahk, J. Kwiatkowski, L. J. Waxer, B. E. Kruschwitz, and S. F. B. Morse, “Current Status of On-Target Uniformity Improvements on the OMEGA 60 Laser.”

A. Sorce, G. Bogan, E. Power, R. Raimondi, D. Guy, M. Romanofsky, S. Ali, and P. M. Celliers, “OMEGA High-Resolution Velocimeter Laser Replacement Project: Considerations and Design Challenges for Integration at OMEGA.”

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S. Zhang, “Isentropes and Equations of State of Solid Hydrogen—Perspectives from Theory and Calculations,” presented at the Center for Matter at Atomic Pressures Seminar, virtual, 2 September 2022.

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The following presentations were made at the Laser-Induced Damage in Optical Materials 2022, Rochester, NY, 18–21 September 2022:

Z. S. Davidson, J. Wallace, Y. Sargol, N. Urban, S. G. Demos, K. L. Marshall, and S. Elhadj, “Laser Damage to Liquid Crystal Alignment Materials in Ordinary and Extraordinary Modes.”

B. N. Hoffman, N. Savidis, S. Abbey, A. Kalb, A. L. Rigatti, and S. G. Demos, “Characterization of Particulate Contamination Inside the OMEGA EP Grating Compressor Chamber.”

H. Huang, T. Z. Kosc, T. J. Kessler, and S. G. Demos, “Modeling of Transverse Stimulated Raman Scattering in KDP/DKDP Polarization Control Plates.”

K. R. P. Kafka, “Cumulative Damage Probability Algorithm: Advantages and Limitations.”

J. B. Oliver, A. A. Kozlov, J. Spaulding, C. Smith, S. MacNally, D. Coates, K. R. P. Kafka, A. L. Rigatti, and S. G. Demos, “Striated Composite Layers for High-Fluence Applications.”

Y. Sargolzaeiaval, J. U. Wallace, N. D. Urban, S. G. Demos, K. L. Marshall, and S. Elhadj, “Optimized Liquid Crystals for High-Power Laser Beam Manipulation: An Evaluation and Feasibility Study.”

N. D. Urban, K. R. P. Kafka, J.-M. Jang, K. L. Marshall, S. G. Demos, R. Emms, and D. Walker, “Laser-Damage Performance of Fused Silica and Potassium Dihydrogen Phosphate Surfaces Finished by Fluid Jet Polishing.”

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The following presentations were made at The International Committee on Ultrahigh-Intensity Lasers, Jeju, South Korea, 18–23 September 2022:

S.-W. Bahk, I. A. Begishev, R. Roides, C. Mileham, R. Cuffney, C. Feng, B. Webb, C. Jeon, M. Spilatro, S. Bucht, C. Dorrer, and J. Bromage, “Experimental Verification of Pump Wavefront Transfer in an Optical Parametric Amplifier.”

S.-W. Bahk, S. Sampat, M. Heimbueger, J. Kwiatkowski, K. A. Bauer, and L. J. Waxer, “Single-Shot Wavefront Characterization of High-Energy Focal Spots in the OMEGA Target Chamber Using a Phase Diversity Grating.”

J. Bromage, S.-W. Bahk, M. Bedzyk, I. A. Begishev, S. Bucht, C. Dorrer, C. Feng, B. N. Hoffman, C. Jeon, C. Mileham, J. B. Oliver, A. Raymond, R. G. Roides, E. M. Schiesser, K. Shaughnessy, M. J. Shoup III, M. Spilatro, B. Webb, D. Weiner, and J. D. Zuegel, “Commissioning and Performance of MTW-OPAL, an All-OPCPA System.”

W. T. Shmayda, H. Mutha, E. Dombrowski, and K. Ryan, “SPARC Tokamak Tritium Processing Systems,” presented at the 32nd Symposium on Fusion Technology, Dubrovnik, Croatia, 18–23 September 2022.

The following presentations were made at the 36th European Conference on Laser Interaction with Matter, Frascati, Italy, 19–23 September 2022:

R. Betti, V. Gopalaswamy, J. P. Knauer, D. Patel, A. Lees, K. M. Woo, C. A. Thomas, D. Cao, O. M. Mannion, R. C. Shah, C. J. Forrest, Z. L. Mohamed, C. Stoeckl, V. Yu. Glebov, S. P. Regan, D. H. Edgell, M. J. Rosenberg, I. V. Igumenshchev, P. B. Radha, K. S. Anderson, J. R. Davies, T. J. B. Collins, V. N. Goncharov, K. Churnetski, W. Theobald, A. A. Solodov, D. Turnbull, D. H. Froula, E. M. Campbell, R. T. Janezic, D. R. Harding, M. J. Bonino, S. Sampat, K. A. Bauer, S. F. B. Morse, M. Gatu Johnson, R. D. Petrasso, C. K. Li, and J. A. Frenje, “High-Performance Implosions on OMEGA and Prospects for Direct-Drive Ignition with Multimégajoule Lasers.”

C. Dorrer, “The Fourth-Generation Laser for Ultrabroadband eXperiments (FLUX).”

D. Turnbull, C. Dorrer, D. H. Edgell, R. K. Follett, V. N. Goncharov, A. M. Hansen, A. L. Milder, K. L. Nguyen, J. P. Palastro, R. C. Shah, J. D. Zuegel, D. H. Froula, A. Colaïtis, and P. Michel, “Broadband Lasers will be a Game Changer for Inertial Confinement Fusion—Foundation for this Belief, Plans for Further Validation” (invited).

D. Haberberger, “Overview of Plasma Experiments and Diagnostics on Laser Facilities,” presented at the HRMT-62 Collaboration Meeting at the European Council for Nuclear Research, Geneva, Switzerland, 26–27 September 2022.

The following presentations were made at the 8th Target Fabrication Workshop, Oxford, UK, 26–28 September 2022:

M. J. Bonino, D. R. Harding, A. Behlok, T. Cracium, S. Fess, S. Karim, I. Knudson, K. Lintz, N. Redden, D. Wasilewski, M. D. Wittman, J. Fooks, and K. Knolker, “Target Fabrication Capabilities at LLE.”

D. R. Harding, S. M. Fess, M. J. Bonino, Y. Lu, and P. Fang, “3-D Printing Foam Targets.”

D. R. Harding, J. D. Zuegel, T. B. Jones, R. Gram, M. Bobeica, Z. Bei, and W. Wang, “Technologies for Mass Producing IFE Targets and Determining Their Survival in an IFE Chamber.”