
Publications and Conference Presentations

Publications

- J. Bromage, C. Dorrer, M. Millecchia, J. Bunkenburg, R. Jungquist, and J. D. Zuegel, "A Front End for Ultra-Intense OPCPA," in *Light at Extreme Intensities 2011, AIP Conf. Proc. 1462*, edited by K. Osvay, P. Dombi, J. A. Fulop, and K. Varju (American Institute of Physics, New York, 2012), pp. 74–77.
- D. T. Casey, J. A. Frenje, M. Gatu Johnson, M. J.-E. Manuel, N. Sinenian, A. B. Zylstra, F. H. Séguin, C. K. Li, R. D. Petrasso, V. Yu Glebov, P. B. Radha, D. D. Meyerhofer, T. C. Sangster, D. P. McNabb, P. A. Amendt, R. N. Boyd, S. P. Hatchett, S. Quaglioni, J. R. Rygg, I. J. Thompson, A. D. Bacher, H. W. Herrmann, and Y. H. Kim, "Measurements of the $T(t,2n)^4\text{He}$ Neutron Spectrum at Low Reactant Energies from Inertial Confinement Implosions," *Phys. Rev. Lett.* **109**, 025003 (2012).
- M. Chini, B. Zhao, H. Wang, Y. Cheng, S. X. Hu, and Z. Chang, "Subcycle ac Stark Shift of Helium Excited States Probed with Isolated Attosecond Pulses," *Phys. Rev. Lett.* **109**, 073601 (2012).
- J. M. N. Djiokap, S. X. Hu, W.-C. Jiang, L.-Y. Peng, and A. F. Starace, "Enhanced Asymmetry in Few-Cycle Attosecond Pulse Ionization of He in the Vicinity of Autoionizing Resonances," *New J. Phys.* **14**, 095010 (2012).
- W. R. Donaldson, C. Zhao, L. Ji, R. G. Roides, K. Miller, and B. Beeman, "A Single-Shot, Multiwavelength Electro-Optic Data-Acquisition System for ICF Applications," *Rev. Sci. Instrum.* **83**, 10D726 (2012).
- D. H. Edgell, D. K. Bradley, E. J. Bond, S. Burns, D. A. Callahan, J. Celeste, M. J. Eckart, V. Yu. Glebov, D. S. Hey, G. Lacaille, J. D. Kilkenny, J. Kimbrough, A. J. Mackinnon, J. Magoon, J. Parker, T. C. Sangster, M. J. Shoup III, C. Stoeckl, T. Thomas, and A. MacPhee, "South Pole Bang-Time Diagnostic on the National Ignition Facility," *Rev. Sci. Instrum.* **83**, 10E119 (2012).
- G. Fiksel, F. J. Marshall, C. Mileham, and C. Stoeckl, "Note: Spatial Resolution of Fuji BAS-TR and BAS-SR Imaging Plates," *Rev. Sci. Instrum.* **83**, 086103 (2012).
- C. J. Forrest, V. Yu. Glebov, V. N. Goncharov, A. Pruyne, J. P. Knauer, P. B. Radha, M. Romanofsky, T. C. Sangster, M. J. Shoup III, C. Stoeckl, D. T. Casey, M. Gatu-Johnson, and S. Gardner, "High-Resolution Spectroscopy Used to Measure ICF Neutron Spectra on OMEGA," *Rev. Sci. Instrum.* **83**, 10D919 (2012).
- D. H. Froula, R. Boni, M. Bedzyk, R. Brown, R. S. Craxton, T. Duffy, F. Ehrne, S. Ivancic, R. Jungquist, N. Kugland, J. Puth, R. G. Roides, M. C. Rushford, W. Seka, M. J. Shoup III, W. Theobald, and D. Weiner, "Optical Diagnostic Suite (Schlieren, Interferometry, and Grid-Image Refractometry) on OMEGA EP Using a 10-ps, 263-nm Probe Beam," *Rev. Sci. Instrum.* **83**, 10E523 (2012).
- L. Gao, P. M. Nilson, I. V. Igumenshchev, S. X. Hu, J. R. Davies, C. Stoeckl, M. G. Haines, D. H. Froula, R. Betti, and D. D. Meyerhofer, "Magnetic-Field Generation by Rayleigh–Taylor Instability in Laser-Driven Planar Plastic Targets," *Phys. Rev. Lett.* **109**, 115001 (2012).
- V. Yu. Glebov, C. Forrest, J. P. Knauer, A. Pruyne, M. Romanofsky, T. C. Sangster, M. J. Shoup III, C. Stoeckl, J. A. Caggiano, M. L. Carman, T. J. Clancy, R. Hatarik, J. McNaney, and N. P. Zautseva, "Testing a New NIF Neutron Time-of-Flight Detector with a Bibenzyl Scintillator on OMEGA," *Rev. Sci. Instrum.* **83**, 10D309 (2012).
- R. Q. Gram, A. She, R. S. Craxton, and D. R. Harding, "Thermal Conductivity of Solid Deuterium by the 3ω Method," *J. Appl. Phys.* **112**, 033504 (2012).
- J. D. Hager, V. A. Smalyuk, S. X. Hu, J. P. Knauer, D. D. Meyerhofer, and T. C. Sangster, "Study of Rayleigh–Taylor

Growth in Directly Driven Cryogenic Deuterium Targets,” *Phys. Plasmas* **19**, 072707 (2012).

S. X. Hu, V. N. Goncharov, and S. Skupsky, “Burning Plasmas with Ultrashort Soft-X-Ray Flashing,” *Phys. Plasmas* **19**, 072703 (2012).

J. Katz, R. Boni, M. J. Shoup III, R. Follett, and D. H. Froula, “A Reflective Optical Transport System for Ultraviolet Thomson Scattering from Electron Plasma Waves on OMEGA,” *Rev. Sci. Instrum.* **83**, 10E349 (2012).

B. E. Kruschwitz, S.-W. Bahk, J. Bromage, M. D. Moore, and D. Irwin, “Accurate Target-Plane Focal-Spot Characterization in High-Energy Laser Systems Using Phase Retrieval,” *Opt. Express* **20**, 20,874 (2012).

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F. J. Marshall, “Compact Kirkpatrick–Baez Microscope Mirrors for Imaging Laser–Plasma X-Ray Emission,” *Rev. Sci. Instrum.* **83**, 10E518 (2012).

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M. Mikulics, J. Zhang, J. Serafini, R. Adam, D. Grützmacher, and R. Sobolewski, “Subpicosecond Electron-Hole Recombination Time and Terahertz-Bandwidth Photoresponse in Freestanding GaAs Epitaxial Mesoscopic Structures,” *Appl. Phys. Lett.* **101**, 031111 (2012).

M. Millicchia, S. P. Regan, R. E. Bahr, M. Romanofsky, and C. Sorce, “Streaked X-Ray Spectrometer Having a Discrete Selection of Bragg Geometries for Omega,” *Rev. Sci. Instrum.* **83**, 10E107 (2012).

J. B. Oliver, P. Kupinski, A. L. Rigatti, A. W. Schmid, J. C. Lambropoulos, S. Papernov, A. Kozlov, S. Smith, and R. D. Hand, “Stress Compensation in Hafnia/Silica Optical Coatings by Inclusion of Alumina Layers,” *Opt. Express* **20**, 16,596 (2012).

P. B. Radha, J. A. Marozas, F. J. Marshall, A. Shvydky, T. J. B. Collins, V. N. Goncharov, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, T. C. Sangster, and S. Skupsky, “OMEGA Polar-Drive Target Design,” *Phys. Plasmas* **19**, 082704 (2012).

S. P. Regan, R. Epstein, B. A. Hammel, L. J. Suter, J. Ralph, H. Scott, M. A. Barrios, D. K. Bradley, D. A. Callahan, G. W. Collins, S. N. 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, A. J. MacKinnon, R. C. Mancini, F. J. Marshall, R. L. McCrory, N. B. Meezan, D. D. Meyerhofer, A. Nikroo, K. J. Peterson, T. C. Sangster, P. Springer, and R. P. J. Town, “Diagnosing Implosions at the National Ignition Facility with X-Ray Spectroscopy,” in *The 17th International Conference on Atomic Processes in Plasmas (ICAPiP)*, *AIP Conf. Proc.* **1438**, edited by K. Aggarwal, and F. Shearer (American Institute of Physics, New York, 2012), pp. 49–54.

H. G. Rinderknecht, M. Gatu Johnson, A. B. Zylstra, N. Sinenian, M. J. Rosenberg, J. A. Frenje, C. J. Waugh, C. K. Li, F. H. Séguin, R. D. Petrasso, J. R. Rygg, J. R. Kimbrough, A. MacPhee, G. W. Collins, D. Hicks, A. Mackinnon, P. Bell, R. Bionta, T. Clancy, R. Zacharias, T. Döppner, H. S. Park, S. LePape, O. Landen, N. Meezan, E. I. Moses, V. U. Glebov, C. Stoeckl, T. C. Sangster, R. Olson, J. Kline, and J. Kilkenny, “A Novel Particle Time of Flight Diagnostic for Measurements of Shock- and Compression-Bang Times in D³He and DT Implosions at the NIF,” *Rev. Sci. Instrum.* **83**, 10D902 (2012).

J. E. Schoenly, W. Seka, J. D. B. Featherstone, and P. Rechmann, “Near-UV Laser Treatment of Extrinsic Dental Enamel Stains,” *Lasers Surg. Med.* **44**, 339 (2012).

C. Stoeckl, J. A. Delettrez, R. Epstein, G. Fiksel, D. Guy, M. Hohenberger, R. K. Jungquist, C. Mileham, P. M. Nilson, T. C. Sangster, M. J. Shoup III, and W. Theobald, “Soft X-Ray Backlighting of Direct-Drive Implosions Using a Spherical Crystal Imager on OMEGA,” *Rev. Sci. Instrum.* **83**, 10E501 (2012).

Forthcoming Publications

N. L. Kugland, D. D. Ryutov, P.-Y. Chang, R. P. Drake, G. Fiksel, D. H. Froula, S. H. Glenzer, G. Gregori, M. Grosskopf, M. Koenig, Y. Kuramitsu, C. Kuranz, M. C. Levy, E. Liang, J. Meinecke, F. Miniati, T. Morita, A. Pelka, C. Plechaty, R. Presura, A. Ravasio, B. A. Remington, B. Reville, J. S. Ross, Y. Sakawa, A. Spitkovsky, H. Takabe, and H.-S. Park, "Self-Organized Electromagnetic Field Structures in Laser-Produced Counter-Streaming Plasmas," to be published in *Nature Physics*.

T. Y.-H. Lee, Q. Wang, L. Zeng, J. J. Ou, J. U. Wallace, L. J. Rothberg, and S. H. Chen, "Charge Transport Through Vacuum-Sublimed Glassy Films of *s*-Triazine- and Carbazole-Based Bipolar and Unipolar Compounds," to be published in *Chemistry of Materials*.

K. Mehrotra, H. P. Howard, S. D. Jacobs, and J. C. Lambropoulos, "Mechanical Characterization of 'Blister' Defects on Optical Oxide Multilayers Using Nanoindentation," to be published in the *Materials Research Society Proceedings*.

K. Mehrotra, H. P. Howard, S. D. Jacobs, and J. C. Lambropoulos, "Nanoindentation Probing of High-Aspect-Ratio Pillar Structures on Optical Multilayer Dielectric Diffraction Gratings," to be published in the *Material Research Society Proceedings*.

D. T. Michel, A. V. Maximov, B. Yaakobi, S. X. Hu, J. F. Myatt, A. A. Solodov, R. W. Short, and D. H. Froula, "Experimental Validation of the Two-Plasmon-Decay Common-Wave Process," to be published in *Physical Review Letters*.

S. Papernov, "Defect-Induced Damage," to be published in *Laser-Induced Damage in Optical Materials*.

S. P. Regan, K. Falk, G. Gregori, P. B. Radha, S. X. Hu, T. R. Boehly, B. J. B. Crowley, S. H. Glenzer, O. L. Landen, D. O. Gericke, T. Doeppner, D. D. Meyerhofer, C. D. Murphy, T. C. Sangster, and J. Vorberger, "Inelastic X-Ray Scattering from Shocked Liquid Deuterium," to be published in *Physical Review Letters*.

W. Theobald, R. Nora, M. Lafon, A. Casner, X. Ribeyre, K. S. Anderson, R. Betti, J. A. Delettrez, J. A. Frenje, V. Yu. Glebov, O. V. Gotchev, M. Hohenberger, S. X. Hu, F. J. Marshall, D. D. Meyerhofer, T. C. Sangster, G. Schurtz, W. Seka, V. A. Smalyuk, C. Stoeckl, and B. Yaakobi, "Spherical Shock-Ignition Experiments with the 40 + 20-Beam Configuration on OMEGA," to be published in *Physics of Plasmas*.

H. X. Vu, D. F. DuBois, J. F. Myatt, and D. A. Russell, "Suprathermal Electron Production and Heat Flux Scaling with Laser Fluence from the Two-Plasmon-Decay Instability," to be published in *Physics of Plasmas*.

H. X. Vu, D. A. Russell, D. F. DuBois, and J. F. Myatt, "Hot-Electron Generation by Cavitating Langmuir Turbulence in the Nonlinear Stage of the Two-Plasmon-Decay Instability," to be published in *Physics of Plasmas*.

Conference Presentations

The following presentations were made at the European Physical Society 2012 Conference, Stockholm, Sweden, 2–6 July 2012:

D. H. Froula, D. T. Michel, R. S. Craxton, D. H. Edgell, R. Follett, V. Yu. Glebov, V. N. Goncharov, S. X. Hu, I. V. Igumenshchev, F. J. Marshall, J. F. Myatt, P. B. Radha, T. C. Sangster, W. Seka, R. W. Short, A. A. Solodov, C. Stoeckl, and B. Yaakobi, "Direct-Drive Laser-Plasma Interaction Experiments."

M. LaFon, X. Ribeyre, G. Schurtz, A. Casner, W. Theobald, R. Nora, M. Hohenberger, K. S. Anderson, R. Betti, C. Stoeckl,

and D. D. Meyerhofer, "Hydrodynamic Modeling for Shock-Ignition Implosions and Simulations for Experiments on OMEGA."

The following presentations were made at the Optics and Photonics 2012, San Diego, CA, 12–16 August 2012:

B. Beeman, A. G. MacPhee, J. R. Kimbrough, G. A. Lacaille, M. A. Barrios, J. Emig, J. R. Hunter, E. K. Miller, and W. R. Donaldson, "Mach-Zehnder Modulator Performance Using the Comet Laser Facility and Implications for Use on NIF"

K. L. Marshall, C. Dorrer, M. Vargas, A. Gnolek, M. Statt, and S.-H. Chen, "Photoaligned Liquid Crystal Devices for High-Peak-Power Laser Applications."

C. Mileham, C. Stoeckl, W. Theobald, G. Fiksel, D. Guy, R. K. Jungquist, P. M. Nilson, T. C. Sangster, and M. J. Shoup III, "Crystal Imager Development at the Laboratory for Laser Energetics."

K. L. Marshall, A. Schulz, J. Lee, M. Rutan, E. Jones, G. Mitchell, C. Smith, and A. L. Rigatti, "Chemically Modified Organosilane Optical Coatings and Their Applications in High-Peak-Power Lasers," presented at the 244th American Chemical Society Fall 2012 National Meeting, Philadelphia, PA, 19–23 August 2012.

The following presentations were made at the International Committee on Ultra-High Intensity Lasers, Mamaia, Romania, 16–21 September 2012:

S.-W. Bahk, I. A. Begishev, and J. D. Zuegel, "An Anamorphically Imaged, Programmable Beam-Shaping System for High-Power Lasers."

J. Bromage, J. B. Oliver, C. Dorrer, and J. D. Zuegel, "Optical Coatings for Ultra-Intense OPCPA Systems."

C. Dorrer, "Characterization of Highly Dispersive Components Using Direct Instantaneous Frequency Measurements."

C. Dorrer, K. L. Marshall, S. H. Horn, M. Vargas, M. Statt, C. Caggiano, S. K.-H. Wei, J. B. Oliver, P. Leung, K. Wegman, J. Boulé, and Z. Zhao, "High-Damage-Threshold Beam Shaping Using Optically Patterned Liquid Crystal Devices."

H. P. Howard, A. F. Aiello, J. G. Dressler, N. R. Edwards, T. J. Kessler, A. A. Kozlov, S. LaDelia, J. B. Oliver, S. Papernov, A. L. Rigatti, A. W. Schmid, C. C. Smith, B. N. Taylor, and S. D. Jacobs, "An Improved Cleaning Method to Enhance the Damage Threshold of MLD Gratings."

J. Qiao, P. A. Jaanimagi, R. Boni, J. Bromage, and E. Hill, "Uniform Illumination and Space-Charge–Broadening Calibration for Accurate Short-Pulse Measurement Using a High-Speed Streak Camera."

J. Qiao, A. Kalb, Z. De Santis, and J. Papa, "Design and Analysis of a Meter-Scale Deformable Multilayer-Dielectric-Grating–Based Compressor for Kilojoule, Petawatt Laser Systems."

J. D. Zuegel, I. A. Begishev, J. Bromage, S.-W. Bahk, C. Dorrer, R. B. Brannon, and D. D. Meyerhofer, "Design and Status of an Energy Upgrade to the Multi-Terawatt Laser at the University of Rochester's Laboratory for Laser Energetics."

S. Papernov, E. Shin, T. Murray, A. W. Schmid, and J. B. Oliver, "355-nm Absorption in HfO₂ and SiO₂ Monolayers with Embedded Hf Nanoclusters Studied Using Photothermal Heterodyne Imaging," presented at Laser Damage, Boulder, CO, 23–26 September 2012.