
Publications and Conference Presentations

Publications

- J. R. Davies, R. Betti, P. M. Nilson, and A. A. Solodov, “Copper K-Shell Emission Cross Sections for Laser–Solid Experiments,” *Phys. Plasmas* **20**, 083118 (2013).
- K. B. Fournier, M. J. May, J. D. Colvin, M. A. Barrios, J. R. Patterson, and S. P. Regan, “Demonstration of a 13-keV Kr K-Shell X-Ray Source at the National Ignition Facility,” *Phys. Rev. E* **88**, 033104 (2013).
- D. H. Froula, T. J. Kessler, I. V. Igumenshchev, R. Betti, V. N. Goncharov, H. Huang, S. X. Hu, E. Hill, J. H. Kelly, D. D. Meyerhofer, A. Shvydky, and J. D. Zuegel, “Mitigation of Cross-Beam Energy Transfer: Implication of Two-State Focal Zooming on OMEGA,” *Phys. Plasmas* **20**, 082704 (2013).
- S. X. Hu, “Boosting Photoabsorption by Attosecond Control of Electron Correlation,” *Phys. Rev. Lett.* **111**, 123003 (2013).
- I. V. Igumenshchev, V. N. Goncharov, W. T. Shmayda, D. R. Harding, T. C. Sangster, and D. D. Meyerhofer, “Effects of Local Defect Growth in Direct-Drive Cryogenic Implosions on OMEGA,” *Phys. Plasmas* **20**, 082703 (2013).
- T. Ma, P. K. Patel, N. Izumi, P. T. Springer, M. H. Key, L. J. Atherton, L. R. Benedetti, D. K. Bradley, D. A. Callahan, P. M. Celliers, C. J. Cerjan, D. S. Clark, E. L. Dewald, S. N. Dixit, T. Döppner, D. H. Edgell, R. Epstein, S. Glenn, G. Grim, S. W. Haan, B. A. Hammel, D. Hicks, W. W. Hsing, O. S. Jones, S. F. Khan, J. D. Kilkenny, J. L. Kline, G. A. Kyrala, O. L. Landen, S. Le Pape, B. J. MacGowan, A. J. Mackinnon, A. G. MacPhee, N. B. Meezan, J. D. Moody, A. Pak, T. Parham, H.-S. Park, J. E. Ralph, S. P. Regan, B. A. Remington, H. F. Robey, J. S. Ross, B. K. Spears, V. Smalyuk, L. J. Suter, R. Tommasini, R. P. Town, S. V. Weber, J. D. Lindl, M. J. Edwards, S. H. Glenzer, and E. I. Moses, “Onset of Hydrodynamic Mix in High-Velocity, Highly Compressed Inertial Confinement Fusion Implosions,” *Phys. Rev. Lett.* **111**, 085004 (2013).
- R. L. McCrory, R. Betti, T. R. Boehly, D. T. Casey, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, J. A. Frenje, D. H. Froula, M. Gatu-Johnson, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, M. Hohenberger, S. X. Hu, I. V. Igumenshchev, T. J. Kessler, J. P. Knauer, C. K. Li, J. A. Marozas, F. J. Marshall, P. W. McKenty, D. D. Meyerhofer, D. T. Michel, J. F. Myatt, P. M. Nilson, S. J. Padalino, R. D. Petrasso, P. B. Radha, S. P. Regan, T. C. Sangster, F. H. Séguin, W. Seka, R. W. Short, A. Shvydky, S. Skupsky, J. M. Soures, C. Stoeckl, W. Theobald, B. Yaakobi, and J. D. Zuegel, “Progress Toward Polar-Drive Ignition for the NIF,” *Nucl. Fusion* **53**, 113021 (2013).
- S. P. Regan, R. Epstein, 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, S. W. Haan, A. Hamza, D. G. Hicks, N. Izumi, O. S. Jones, 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, N. B. Meezan, D. D. Meyerhofer, A. Nikroo, H.-S. Park, J. Ralph, B. A. Remington, T. C. Sangster, V. A. Smalyuk, P. T. Springer, and R. P. J. Town, “Hot-Spot Mix in Ignition-Scale Inertial Confinement Fusion Targets,” *Phys. Rev. Lett.* **111**, 045001 (2013).
- J. E. Schoenly, W. Seka, G. Romanos, and P. Rechmann, “The Efficacy of Selective Calculus Ablation at 400 nm: Comparison to Conventional Calculus Removal Methods,” in *Lasers in Dentistry XIX*, edited by P. Rechmann and D. Fried (SPIE, Bellingham, WA, 2013), Vol. 8566, Paper 85660E.
- R. H. H. Scott, E. L. Clark, F. Pérez, M. J. V. Streeter, J. R. Davies, H.-P. Schlenvoigt, J. J. Santos, S. Hulin, K. L. Lancaster, S. D. Baton, S. J. Rose, and P. A. Norreys, “Measuring Fast Electron Spectra and Laser Absorption in Relativistic Laser-Solid Interactions Using Differential Bremsstrahlung Photon Detectors,” *Rev. Sci. Instrum.* **84**, 083505 (2013).

S.-J. Scott and D. R. Harding, "Accelerated Evaporative Drying of RF Foam for ICF Target Fabrication," in *2013 IEEE 25th Symposium on Fusion Engineering (SOFE)* (IEEE, Piscataway, NJ, 2013).

Q. Wang, J. U. Wallace, T. Y.-H. Lee, L. Zeng, J. J. Ou, and S. H. Chen, "Charge Carrier Mobility Through Vacuum-Sublimed

Glassy Films of *s*-Triazine- and Carbazole-Based Bipolar Hybrid and Unipolar Compounds," *Org. Electron.* **14**, 2925 (2013).

B. Yaakobi, A. A. Solodov, J. F. Myatt, J. A. Delettrez, C. Stoeckl, and D. H. Froula, "Measurements of the Divergence of Fast Electrons in Laser-Irradiated Spherical Targets," *Phys. Plasmas* **20**, 092706 (2013).

Forthcoming Publications

C. Dorrer, R. Roides, R. Cuffney, A. V. Okishev, W. A. Bittle, G. Balonek, A. Consentino, E. Hill, and J. D. Zuegel, "Fiber Front End with Multiple Phase Modulations and High-Bandwidth Pulse Shaping for High-Energy Laser-Beam Smoothing," to be published in *IEEE Journal of Selected Topics in Quantum Electronics*.

H. P. H. Liddell, K. Mehrotra, J. C. Lambropoulos, and S. D. Jacobs, "Fracture Mechanics of Delamination Defects in Multilayer Dielectric Coatings," to be published in *Applied Optics*.

M. Storm, B. Eichman, Z. Zhong, W. Theobald, P. Schiebel, C. Mileham, C. Stoeckl, I. A. Begishev, G. Fiksel, R. B. Stephens, R. R. Freeman, and K. U. Akli, "Characterization of a High-Photon-Energy X-Ray Imager," to be published in *Review of Scientific Instruments*.

Conference Presentations

The following presentations were made at the 43rd Anomalous Absorption Conference, Stevenson, WA, 7–12 July 2013:

D. H. Edgell, T. J. B. Collins, V. N. Goncharov, I. V. Igumenshchev, J. A. Marozas, D. T. Michel, J. F. Myatt, P. B. Radha, W. Seka, and D. H. Froula, "Cross-Beam Energy Transfer in Polar-Drive Implosions on OMEGA and the NIF."

R. K. Follett, D. H. Froula, J. Katz, D. T. Michel, S. X. Hu, J. F. Myatt, and R. J. Henchen, "Observation of Two-Plasmon Decay Produced Electron Plasma Waves Using UV Thomson Scattering."

D. H. Froula, T. J. Kessler, I. V. Igumenshchev, V. N. Goncharov, H. Huang, S. X. Hu, E. Hill, J. H. Kelly, D. D. Meyerhofer, A. Shvydkiy, and J. D. Zuegel, "Implications of Two-State Focal Zooming on OMEGA to Mitigate Cross-Beam Energy Transfer."

D. Haberberger, D. H. Edgell, S. X. Hu, S. Ivancic, B. Yaakobi, R. Boni, and D. H. Froula, "Measurement of Long-Scale-Length Plasma Density Profiles for Two-Plasmon Decay Studies."

S. X. Hu, D. H. Edgell, D. H. Froula, V. N. Goncharov, D. T. Michel, J. F. Myatt, S. Skupsky, and B. Yaakobi, "Understand-

ing the Creation of NIF-Scale Plasmas on OMEGA EP for Laser-Plasma Instability Studies."

J. A. Marozas, T. J. B. Collins, P. B. Radha, D. H. Edgell, D. H. Froula, M. Hohenberger, F. J. Marshall, D. T. Michel, and W. Seka, "Comparison of the 2-D *DRACO* Cross-Beam Energy Transfer (CBET) Simulations with OMEGA and NIF Experiments."

A. V. Maximov, J. F. Myatt, R. W. Short, I. V. Igumenshchev, and W. Seka, "Nonlinear Interaction Between Multiple Incoherent Laser Beams in the Plasmas of Direct-Drive ICF."

D. T. Michel, V. N. Goncharov, I. V. Igumenshchev, P. B. Radha, S. X. Hu, W. Seka, and D. H. Froula, "Comparison of Implosion Velocities for Be, C, and CH Ablators Measured in Direct-Drive Implosions."

W. Seka, J. F. Myatt, R. W. Short, D. H. Froula, J. Katz, V. N. Goncharov, and I. V. Igumenshchev, "Time-Resolved Electron Temperature Measurements Near $n_c/4$ Reveal Temperature Islands on Imploding Targets."

W. Seka, J. F. Myatt, J. Zhang, R. W. Short, D. H. Froula, D. T. Michel, A. V. Maximov, V. N. Goncharov, I. V. Igumenshchev, D. F. DuBois, D. A. Russell, and H. X. Vu, “The Nonlinear Behavior of the Two-Plasmon–Decay Instability.”

R. W. Short, J. F. Myatt, and J. Zhang, “The Effects of Beam Geometry and Polarization on Two-Plasmon Decay Driven by Multiple Laser Beams.”

A. A. Solodov, B. Yaakobi, J. F. Myatt, J. A. Delettrez, F. J. Marshall, C. Stoeckl, and D. H. Froula, “Measurements of the Divergence of Fast Electrons in Laser-Irradiated Spherical Targets.”

J. Zhang, J. F. Myatt, A. V. Maximov, R. W. Short, D. F. DuBois, D. A. Russell, and H. X. Vu, “Linear Growth and Nonlinear Saturation of Two-Plasmon Decay Driven by Multiple Laser Beams.”

The following presentations were made at the High-Energy-Density Physics Summer School, Columbus, OH, 15–19 July 2013:

D. D. Meyerhofer, “Diagnostics for High-Energy-Density Physics.”

P. B. Radha, “Hydrodynamic Simulations of HED Plasmas.”

J. D. Zuegel, J. Bromage, S.-W. Bahk, I. A. Begishev, J. Bunkenburg, T. Conley, C. Dorrer, H. Huang, R. K. Jungquist, C. Kellogg, T. J. Kessler, E. Kowaluk, J. R. Marciante, S. F. B. Morse, A. V. Okishev, J. B. Oliver, T. Petersen, C. Stoeckl, D. Haberberger, P. M. Nilson, G. Fiksel, J. F. Myatt, and D. D. Meyerhofer, “Technology Development and Prospects for Exawatt-Class OPCPA Pumped by OMEGA EP,” 3rd IZEST Meeting, Livermore, CA, 17–18 July 2013.

D. H. Froula, “Direct-Drive Inertial Confinement Fusion: Where We Started (60 kJ), Where We Stand Today (1.5 MJ), and Where We Will be in 50 Years (100 kJ),” Intense Laser and Beam Plasma Interactions Workshop, Los Angeles, CA, 19–20 July 2013.

J. Bromage, R. G. Roides, S.-W. Bahk, J. B. Oliver, C. Mileham, C. Dorrer, and J. D. Zuegel, “Noncollinear Optical Parametric Amplifiers for Ultra-Intense Lasers,” Nonlinear Optics 2013, Kamuela, HI, 21–26 July 2013.

The following presentations were made at Optics and Photonics, San Diego, CA, 25–29 August 2013:

M. Hohenberger, N. E. Palmer, G. LaCaille, E. L. Dewald, L. Divol, E. J. Bond, T. Döppner, J. J. Lee, J. D. Salmonson, C. A. Thomas, D. K. Bradley, C. Stoeckl, and T. C. Sangster, “Measuring the Hot-Electron Population Using Time-Resolved, Hard X-Ray Detectors on the NIF.”

K. L. Marshall, D. Saulnier, H. Xianyu, S. Serak, N. Tabiryan, and C. Dorrer, “Liquid Crystal Near-IR Beam Shapers Employing Photoaddressable Alignment Layers for High-Peak-Power Applications.”

D. Saulnier, B. Taylor, K. L. Marshall, T. J. Kessler, and S. D. Jacobs, “Liquid Crystal Chiroptical Polarization Rotators for the Near UV Region: Theory, Materials, and Device Applications.”

The following presentations were made at the University of Alberta ICF Committee, Rochester, NY, 28 August 2013:

K. S. Anderson, R. Betti, P. W. McKenty, T. J. B. Collins, M. Hohenberger, W. Theobald, T. R. Boehly, R. S. Craxton, J. A. Delettrez, D. H. Edgell, S. X. Hu, M. Lafon, J. A. Marozas, D. D. Meyerhofer, R. Nora, T. C. Sangster, W. Seka, S. Skupsky, C. Stoeckl, A. Shvydky, B. Yaakobi, R. Yan, X. Ribeyre, G. Schurtz, A. Casner, L. J. Perkins, M. R. Terry, and D. E. Fratanduono, “Shock-Ignition OMEGA Experiments and Target Design for the NIF.”

D. H. Froula, “Experimental Plasma Physics Program.”

D. R. Harding, T. B. Jones, D. D. Meyerhofer, S. H. Chen, R. Q. Gram, M. Bobeica, Z. Bei, M. Moynihan, W. Wang, W. T. Shmayda, S.-J. Scott, A. Nikroo, J. Hund, R. Paguio, G. Randall, J. Fooks, D. Goodin, R. Garrell, and A. Tucker-Schwartz, “Mass Production of Targets for Inertial Fusion Energy.”

J. F. Myatt, R. W. Short, A. V. Maximov, A. A. Solodov, J. Zhang, C. Ren, R. Yan, I. V. Igumenshchev, S. X. Hu, V. N. Goncharov, W. Seka, D. H. Edgell, D. H. Froula, B. Yaakobi, D. T. Michel, D. F. DuBois, D. A. Russell, and H. X. Vu, “The Theoretical Plasma Physics Program at LLE.”

T. C. Sangster, “The Polar-Drive–Ignition Campaign Plan Through FY15.”

P. B. Radha, “Overview of Direct-Drive–Implosion Physics: Results from OMEGA and the NIF,” 8th International Conference on Inertial Fusion Sciences and Applications, Nara, Japan, 8–13 September 2013.

S. Papernov, A. A. Kozlov, J. B. Oliver, and B. Marozas, “Near-Ultraviolet Absorption Annealing Effects in HfO₂ Thin Films Subjected to Continuous-Wave Laser Irradiation at 355 nm,” Laser Damage 2013, Boulder, CO, 22–25 September 2013.

J. Katz, N. Fillion, R. J. Henchen, C. Sorce, D. H. Froula, and J. S. Ross, “A Reflective Image Rotating Periscope of Spatially Resolved Thomson-Scattering Experiments on OMEGA,” 16th International Symposium on Laser Aided Plasma Diagnostics, Madison, WI, 22–26 September 2013.