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## Publications and Conference Presentations

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### Publications

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- R. Betti, K. Anderson, T. R. Boehly, T. J. B. Collins, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, R. L. Keck, J. H. Kelly, J. P. Knauer, S. J. Loucks, J. A. Marozas, F. J. Marshall, A. V. Maximov, D. N. Maywar, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, J. Myatt, P. B. Radha, S. P. Regan, C. Ren, T. C. Sangster, W. Seka, S. Skupsky, A. A. Solodov, V. A. Smalyuk, J. M. Soures, C. Stoeckl, W. Theobald, B. Yaakobi, C. Zhou, J. D. Zuegel, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, "Progress in Hydrodynamics Theory and Experiments for Direct-Drive and Fast Ignition Inertial Confinement Fusion," *Plasma Phys. Control. Fusion* **48**, B153 (2006) (invited).
- R. Betti and J. Sanz, "Bubble Acceleration in the Ablative Rayleigh–Taylor Instability," *Phys. Rev. Lett.* **97**, 205002 (2006).
- R. Betti, A. A. Solodov, J. A. Delettrez, and C. Zhou, "Gain Curves for Direct-Drive Fast-Ignition at Densities Around 300 g/cc," *Phys. Plasmas* **13**, 100703 (2006).
- J. Bromage, C. Dorrer, I. A. Begishev, N. G. Usechak, and J. D. Zuegel, "Highly Sensitive, Single-Shot Characterization for Pulse Widths from 0.4 to 85 ps Using Electro-Optic Shearing Interferometry," *Opt. Lett.* **31**, 3523 (2006).
- I. Carusotto, S. X. Hu, L. A. Collins, and A. Smerzi, "Bogoliubov-Čerenkov Radiation in a Bose-Einstein Condensate Flowing Against an Obstacle," *Phys. Rev. Lett.* **97**, 260403 (2006).
- V. Yu. Glebov, D. D. Meyerhofer, T. C. Sangster, C. Stoeckl, S. Roberts, C. A. Barrera, J. R. Celeste, C. J. Cerjan, L. S. Dauffy, D. C. Eder, R. L. Griffith, S. W. Haan, B. A. Hammel, S. P. Hatchett, N. Izumi, J. R. Kimbrough, J. A. Koch, O. L. Landen, R. A. Lerche, B. J. MacGowan, M. J. Moran, E. W. Ng, T. W. Phillips, P. M. Song, R. Tommasini, B. K. Young, S. E. Caldwell, G. P. Grim, S. C. Evans, J. M. Mack, T. J. Sedillo, M. D. Wilke, D. C. Wilson, C. S. Young, D. Casey, J. A. Frenje, C. K. Li, R. D. Petrasso, F. H. Séguin, J. L. Bourgade, L. Disdier, M. Houry, I. Lantuejoul, O. Landoas, G. A. Chandler, G. W. Cooper, R. J. Leeper, R. E. Olson, C. L. Ruiz, M. A. Sweeney, S. P. Padalino, C. Horsfield, and B. A. Davis, "Development of Nuclear Diagnostics for the National Ignition Facility," *Rev. Sci. Instrum.* **77**, 10E715 (2006) (invited).
- V. Yu. Glebov, C. Stoeckl, T. C. Sangster, C. Mileham, S. Roberts, and R. A. Lerche, "High-Yield Bang Time Detector for the OMEGA Laser," *Rev. Sci. Instrum.* **77**, 10E712 (2006).
- B. Hu, R. Betti, and J. Manickam, "Kinetic Stability of the Internal Kink Mode in ITER," *Phys. Plasmas* **13**, 112505 (2006).
- S. X. Hu, "Quantum Study of Slow Electron Collisions with Rydberg Atoms," *Phys. Rev. A* **74**, 062716 (2006).
- Z. Jiang and J. R. Marciante, "Mode-Area Scaling of Helical-Core, Dual-Clad Fiber Lasers and Amplifiers Using an Improved Bend-Loss Model," *J. Opt. Soc. Am. B* **23**, 2051 (2006).
- J. P. Knauer, F. J. Marshall, B. Yaakobi, D. Anderson, B. A. Schmitt, K. M. Chandler, S. A. Pikuz, T. A. Shelkovenko, M. D. Mitchell, and D. A. Hammer, "Response Model for Kodak Biomax-MS Film to X Rays," *Rev. Sci. Instrum.* **77**, 10F331 (2006).
- T. Z. Kosc, C. J. Coon, G. V. Babcock, K. L. Marshall, A. Trajkovska-Petkoska, and S. D. Jacobs, "Exploring Motion Reversal in Polymer Cholesteric-Liquid-Crystal Devices," in *Liquid Crystals X*, edited by I.-C. Khoo (SPIE, Bellingham, WA, 2006), Vol. 6332, p. 633209.
- T. Z. Kosc, A. A. Kozlov, and A. W. Schmid, "Formation of Periodic Microstructures on Multilayer Dielectric Gratings Prior to Total Ablation," *Opt. Express* **14**, 10,921 (2006).
- N. N. Lepeshkin, S. G. Lukishova, R. W. Boyd, and K. L. Marshall, "Feedback-Free, Single-Beam Pattern Formation by Nanosecond Pulses in Dye-Doped Liquid Crystals," in *Liquid Crystals X*, edited by I.-C. Khoo (SPIE, Bellingham, WA, 2006), Vol. 6332, p. 63320A.

F. J. Marshall, J. P. Knauer, D. Anderson, and B. L. Schmitt, "Absolute Calibration of Kodak Biomax-MS Film Response to X Rays in the 1.5- to 8-keV Energy Range," *Rev. Sci. Instrum.* **77**, 10F308 (2006).

K. L. Marshall, A. G. Noto, G. Painter, and N. Tabiryan, "Computational Chemistry Methods for Predicting the Chiroptical Properties of Liquid Crystal Systems. II. Application to Chiral Azobenzenes," in *Liquid Crystals X*, edited by I.-C. Khoo (SPIE, Bellingham, WA, 2006), Vol. 6332, p. 63320C.

P. W. McKenty, M. D. Wittman, and D. R. Harding, "Effect of Experimentally Observed Hydrogenic Fractionation in Inertial Confinement Fusion Ignition Target Performance," *J. Appl. Phys.* **100**, 073302 (2006).

A. V. Okishev and J. D. Zuegel, "Intracavity-Pumped Raman Laser Action in a Mid-IR, Continuous-Wave (cw) MgO:PPLN Optical Parametric Oscillator," *Opt. Express* **14**, 12,169 (2006).

G. P. Pepe, M. Amanti, C. De Lisio, R. Latempa, N. Marrocco, L. Parlato, G. Peluso, A. Barone, R. Sobolewski, and T. Taneda, "Ultrafast Photoresponse of Superconductor/Ferromagnet Nb/NiCu Heterostructures," *Phys. Stat. Sol. C* **3**, 2968 (2006).

T. C. Sangster and J. M. Soures, "Validation of Direct-Drive Ignition Target Design on OMEGA," *American Nuclear Society, Fusion Energy Division Newsletter* (June 2006), p. 10.

M. B. Schneider, D. E. Hinkel, O. L. Landen, D. H. Froula, R. F. Heeter, A. B. Langdon, M. J. May, J. McDonald, J. S. Ross, M. S. Singh, L. J. Suter, K. Widmann, B. K. Young, H. A. Baldis, C. Constantin, R. Bahr, V. Yu. Glebov, W. Seka, and C. Stoeckl, "Plasma Filling in Reduced-Scale Hohlräume Irradiated with Multiple Beam Cones," *Phys. Plasmas* **13**, 112701 (2006).

V. A. Smalyuk, S. B. Dumanis, J. A. Delettrez, V. Yu. Glebov, D. D. Meyerhofer, S. P. Regan, T. C. Sangster, and C. Stoeckl, "Hot-Core Assembly in Cryogenic D<sub>2</sub> Direct-Drive Spherical Implosions," *Phys. Plasmas* **13**, 104502 (2006).

C. Stoeckl, V. Yu. Glebov, P. A. Jaanimagi, J. P. Knauer, D. D. Meyerhofer, T. C. Sangster, M. Storm, S. Sublett, W. Theobald, M. H. Key, A. J. MacKinnon, P. Patel, D. Neely, and P. A. Norreys, "Operation of Target Diagnostics in a Petawatt Laser Environment," *Rev. Sci. Instrum.* **77**, 10F506 (2006) (invited).

W. Theobald, J. E. Miller, T. R. Boehly, E. Vianello, D. D. Meyerhofer, T. C. Sangster, J. H. Eggert, and P. M. Celliers, "X-Ray Preheating of Window Materials in Direct-Drive Shock-Wave Timing Experiments," *Phys. Plasmas* **13**, 122702 (2006).

A. Trajkovska, C. Kim, K. L. Marshall, T. H. Mourey, and S. H. Chen, "Photoalignment of a Nematic Liquid Crystal Fluid and Glassy-Nematic Oligofluorenes on Coumarin-Containing Polymer Films," *Macromolecules* **39**, 6983 (2006).

### Forthcoming Publications

B. Ashe, K. L. Marshall, C. Giacomini, A. L. Rigatti, T. J. Kessler, A. W. Schmid, J. B. Oliver, J. Keck, and A. Kozlov, "Evaluation of Cleaning Methods for Multilayer Diffraction Gratings," to be published in the Proceedings of SPIE.

V. Bagnoud, J. D. Zuegel, N. Forget, and C. Le Blanc, "High-Dynamic-Range Temporal Measurements of Short Pulses Amplified by OPCPA," to be published in *Optics Express*.

P. Brijesh, T. J. Kessler, J. D. Zuegel, and D. D. Meyerhofer, "Demonstration of a Horseshoe-Shaped Longitudinal Focal Profile," to be published in the *Journal of the Optical Society of America B*.

T. J. B. Collins, J. A. Marozas, R. Betti, D. R. Harding, P. W. McKenty, P. B. Radha, S. Skupsky, V. N. Goncharov, J. P. Knauer, and R. L. McCrory, "One-Megajoule, Wetted-Foam

Target Design Performance for the NIF," to be published in *Physics of Plasmas* (invited).

C. Dorrer, "High-Speed Characterization for Optical Telecommunication Signals," to be published in the Proceedings of SPIE (invited).

C. Dorrer and J. D. Zuegel, "Design and Analysis of Binary Shapers Using the Error-Diffusion Algorithm," to be published in the *Journal of the Optical Society of America B*.

D. H. Edgell, R. S. Craxton, L. M. Elasky, D. R. Harding, S. J. Verbridge, M. D. Wittman, and W. Seka, "Three-Dimensional Characterization of Cryogenic Targets Using Systems Identification Techniques with Multiple Shadowgraph Views," to be published in *Fusion Science and Technology*.

G. N. Gol'tsman, O. Minaeva, A. Korneev, M. Tarkhov, I. Rubstova, A. Divochiy, I. Milostnaya, G. Chulkova, N. Kaurova, B. Voronov, D. Pan, J. Kitaygorsky, A. Cross, A. Pearlman, I. Komissarov, W. Słysz, M. Węgrzecki, P. Grabiec, and R. Sobolewski, "Middle-Infrared to Visible-Light Ultrafast Superconducting Single-Photon Detectors," to be published in *IEEE Transactions on Applied Superconductivity*.

V. N. Goncharov, "Ablative Richtmyer–Meshkov Instability: Theory and Experimental Results," to be published in the *Proceedings of the Scottish Universities Summer Schools in Physics*.

V. N. Goncharov, "Direct-Drive Inertial Fusion: Basic Concepts and Ignition Target Designing," to be published in the *Proceedings of the Scottish Universities Summer Schools in Physics*.

W. Guan and J. R. Marciante, "Dual-Frequency Operation in a Short-Cavity Ytterbium-Doped Laser," to be published in *IEEE Photonics Technology Letters*.

M. Haurylau, S. P. Anderson, K. L. Marshall, and P. M. Fauchet, "Electrically Tunable Silicon 2-D Photonic Bandgap Structures," to be published in *IEEE Journal of Quantum Electronics*.

S. X. Hu, "Producing Ultracold and Trappable Antihydrogen Atoms," to be published in *Physical Review Letters*.

S. D. Jacobs, "Manipulating Mechanics and Chemistry in Precision Optics Finishing," to be published in *Science and Technology of Advanced Materials*.

M. Khafizov, X. Li, R. Sobolewski, Y. Cui, and X. X. Xi, "Mechanisms of Light Detection by Superconducting Current-Biased MgB<sub>2</sub> Microbridges," to be published in *IEEE Transactions on Applied Superconductivity*.

J. Kitaygorsky, I. Komissarov, A. Jukna, D. Pan, O. Minaeva, N. Kaurova, A. Divochiy, A. Korneev, M. Tarkhov, B. Voronov, I. Milostnaya, G. Gol'tsman, and R. Sobolewski, "Dark Counts in Nanostructured NbN Superconducting Single-Photon Detectors and Bridges," to be published in *IEEE Transactions on Applied Superconductivity*.

T. Z. Kosc, K. L. Marshall, A. Trajkovska-Petkoska, K. Hasman, C. J. Coon, G. V. Babcock, R. Howe, M. Leitch, and S. D. Jacobs, "Development of Polymer Cholesteric Liquid Crystal Flake Technology for Electro-Optic Devices and Particle Displays," to be published in the *Proceedings of SPIE* (invited).

B. E. Kruschwitz, J. H. Kelly, M. J. Shoup III, L. J. Waxer, E. C. Cost, E. T. Green, Z. M. Hoyt, J. Taniguchi, and T. W. Walker, "High-Contrast Plasma-Electrode Pockels Cell (PEPC)," to be published in *Applied Optics*.

X. Li, M. Khafizov, Š. Chromik, M. Valerianova, V. Štrbík, P. Odier, and R. Sobolewski, "Ultrafast Photoresponse Dynamics of Current-Biased Hg-Ba-Ca-Cu-O Superconducting Microbridges," to be published in *IEEE Transactions on Applied Superconductivity*.

S. G. Lukishova, A. W. Schmid, R. Knox, P. Freivald, L. Bissell, R. W. Boyd, C. R. Stroud, Jr., and K. L. Marshall, "Room-Temperature Source of Single Photons of Definite Polarization," to be published in the *Journal of Modern Optics*.

J. A. Marozas, "Fourier Transform-Based Continuous Phase-Plate Design Technique: A High-Pass Phase-Plate Design as an Application for OMEGA and the NIF," to be published in the *Journal of the Optical Society of America*.

J. E. Miller, T. R. Boehly, D. D. Meyerhofer, P. M. Celliers, J. H. Eggert, D. G. Hicks, C. M. Sorce, J. A. Oertel, and P. Emmel, "A Streaked Optical Pyrometer System for Laser-Driven Shock-Wave Experiments on OMEGA," to be published in *Review of Scientific Instruments*.

J. Myatt, W. Theobald, J. A. Delettrez, C. Stoeckl, M. Storm, T. C. Sangster, A. V. Maximov, and R. W. Short, "High-Intensity Laser Interactions with Solid Targets and Implications for Fast-Ignition Experiments on OMEGA EP," to be published in *Physics of Plasmas* (invited).

S. Papernov and A. W. Schmid, "Using Gold Nanoparticles as Artificial Defects in Thin Films: What Have We Learned About Laser-Induced Damage Driven by Localized Absorbers?" to be published in the *Proceedings of SPIE*.

S. P. Regan, R. Epstein, V. N. Goncharov, I. V. Igumenshchev, D. Li, P. B. Radha, H. Sawada, T. R. Boehly, J. A. Delettrez, O. V. Gotchev, J. P. Knauer, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, T. C. Sangster, S. Skupsky, V. A. Smalyuk, B. Yaakobi, and R. Mancini, "Laser-Energy Coupling, Mass Ablation Rate, and Shock Heating in Direct-Drive Inertial Confinement Fusion," to be published in *Physics of Plasmas* (invited).

T. C. Sangster, R. Betti, R. S. Craxton, J. A. Delettrez, D. H. Edgell, L. M. Elasky, V. Yu. Glebov, V. N. Goncharov, D. R.

Harding, D. Jacobs-Perkins, R. Janezic, R. L. Keck, J. P. Knauer, S. J. Loucks, L. D. Lund, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, P. B. Radha, S. P. Regan, W. Seka, W. T. Shmayda, S. Skupsky, V. A. Smalyuk, J. M. Soures, C. Stoeckl, B. Yaakobi, J. A. Frenje, C. K. Li, R. D. Petrasso, F. H. Séguin, J. D. Moody, J. A. Atherton, B. D. MacGowan, J. D. Kilkenny, T. P. Bernat, and D. S. Montgomery, "Cryogenic DT and D<sub>2</sub> Targets for Inertial Confinement Fusion," to be published in *Physics of Plasmas* (invited tutorial).

S. N. Shafrir, J. C. Lambropoulos, and S. D. Jacobs, "A Magnetorheological Polishing-Based Approach for Studying Precision Microground Surfaces of Tungsten Carbides," to be published in *Precision Engineering*.

S. N. Shafrir, J. C. Lambropoulos, and S. D. Jacobs, "Technical Note: Toward Magnetorheological Finishing of Magnetic Materials," to be published in the *Journal of Manufacturing Science and Engineering*.

W. Słysz, M. Węgrzecki, J. Bar, P. Grabciec, M. Górská, V. Zwiller, C. Latta, P. Böhi, A. J. Pearlman, A. S. Cross, D. Pan, J. Kitaygorsky, I. Komissarov, A. Verevkin, I. Milostnaya, A. Korneev, O. Minayeva, G. Chulkova, K. Smirnov, B. Voronov, G. N. Gol'tsman, and R. Sobolewski, "Fiber-Coupled, Single-Photon Detector Based on NbN Superconducting Nanostructures for Quantum Communications," to be published in the *Journal of Modern Optics*.

V. A. Smalyuk, R. Betti, J. A. Delettrez, V. Yu. Glebov, V. N. Goncharov, D. Y. Li, D. D. Meyerhofer, S. P. Regan, S. Roberts, T. C. Sangster, C. Stoeckl, W. Seka, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, "Experimental Studies of Direct-Drive, Low-Intensity, Low-Adiabatic Spherical Implosions on OMEGA," to be published in *Physics of Plasmas*.

S. Sublett, J. P. Knauer, I. V. Igumenshchev, A. Frank, and D. D. Meyerhofer, "Double-Pulse Laser-Driven Jets on OMEGA," to be published in *Astrophysics and Space Science*.

S. Wu, D. Wang, P. Geiser, J. Jun, J. Karpinski, and R. Sobolewski, "Time-Resolved Intervalley Transitions in GaN Single Crystals," to be published in the *Journal of Applied Physics*.

L. Zheng, A. W. Schmid, and J. C. Lambropoulos, "Surface Effects on Young's Modulus and Hardness of Fused Silica by Nanoindentation Study," to be published in the *Journal of Material Science*.

C. D. Zhou, W. Theobald, R. Betti, P. B. Radha, V. A. Smalyuk, D. Shvarts, V. Yu. Glebov, C. Stoeckl, K. S. Anderson, D. D. Meyerhofer, T. C. Sangster, C. K. Li, R. D. Petrasso, J. A. Frenje, and F. H. Séguin, "High- $\rho R$  Implosions for Fast-Ignition Fuel Assembly," to be published in *Physical Review Letters*.

### Conference Presentations

The following presentations were made at the 17th Target Fabrication Meeting, San Diego, CA, 1–5 October 2006:

D. H. Edgell, R. S. Craxton, L. M. Elasky, D. R. Harding, S. J. Verbridge, M. D. Wittman, and W. Seka, "Three-Dimensional Characterization of Cryogenic Targets Using Systems Identification Techniques with Multiple Shadowgraph Views."

L. M. Elasky, S. J. Verbridge, A. Weaver, D. H. Edgell, and D. R. Harding, "Developments in Layering OMEGA D<sub>2</sub> Cryogenic Targets."

L. M. Elasky, A. Weaver, S. J. Verbridge, R. Janezic, and W. T. Shmayda, "Tritium Migration in MCTC's During DT Introduction."

R. Q. Gram and D. R. Harding, "Thermal Conductivity of Condensed D<sub>2</sub> and D<sub>2</sub> in RF Foam Using the 3- $\omega$  Method."

D. R. Harding, L. M. Elasky, S. J. Verbridge, A. Weaver, and D. H. Edgell, "Forming Cryogenic DT Ice Layers for OMEGA."

R. Janezic, "Operational Challenges in Filling and Transferring Cryogenic DT Targets."

R. Janezic, "Performance of the Tritium Removal Systems at LLE."

A. K. Knight, D. R. Harding, "Evaluating the Dependence of the Roughness of Polyimide Capsules and Processing Conditions."

L. D. Lund, D. Jacobs-Perkins, D. H. Edgell, R. Orsagh, J. Ulreich, and R. Early, "Cryogenic Target Positioning and Stability on OMEGA."

S. Scarantino, M. Bobeica, and D. R. Harding, "Performance of the Cryogenic Test Facility Used to Simulate the Effect

of Injecting an Inertial Fusion Energy Target into a Hot Target Chamber.”

W. T. Shmayda, M. J. Bonino, D. R. Harding, P. S. Ebey, and D. C. Wilson, “Hydrogen Isotope Exchange in Plastic Targets.”

D. Turner, M. J. Bonino, J. Ulreich, and R. Orsagh, “Measuring and Optimizing the Dynamics of Spherical Cryogenic Targets on OMEGA.”

M. D. Wittman and D. R. Harding, “Isotopic Fractionation During Solidification and Sublimation of Hydrogen-Isotope Mixtures.”

The following presentations were made at Frontiers in Optics 2006/Laser Science XXII, Rochester, NY, 8–12 October 2006:

W. Guan and J. R. Marciante, “Gain Apodization in Highly Doped Fiber DFB Lasers.”

W. Guan and J. R. Marciante, “Single-Frequency, 2-cm, Yb-Doped Silica Fiber Laser.”

Z. Jiang and J. R. Marciante, “Loss Measurements for Optimization of Large-Mode-Area, Helical-Core Fibers.”

A. V. Okishev and J. D. Zuegel, “Highly Stable, Long-Pulse, Diode-Pumped Nd:YLF Regenerative Amplifier.”

L. Sun and J. R. Marciante, “Filamentation Analysis in Large-Area-Mode Fiber Lasers.”

J. D. Zuegel, J. H. Kelly, L. J. Waxer, V. Bagnoud, I. A. Begishev, J. Bromage, C. Dorrer, B. E. Kruschwitz, T. J. Kessler, S. J. Loucks, D. N. Maywar, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, J. B. Oliver, A. L. Rigatti, A. W. Schmid, C. Stoeckl, S. Dalton, L. Folsbee, M. J. Guardalben, R. Jungquist, J. Puth, M. J. Shoup III, and D. Weiner, “New and Improved Technologies for the OMEGA EP High-Energy Petawatt Laser” (invited).

D. D. Meyerhofer, “Research Using Chirped-Pulse-Amplification Lasers at the University of Rochester,” OSA Annual Meeting and APS Laser Science Meeting, Rochester, NY, 8–12 October 2006 (invited).

The following presentations were made at Optical Fabrication and Testing, Rochester, NY, 9–11 October 2006:

J. E. DeGroot, A. E. Marino, A. L. Bishop, and S. D. Jacobs, “Using Mechanics and Polishing Particle Properties to Model Material Removal for Magnetorheological Finishing (MRF) of Optical Glasses.”

J. E. DeGroot, J. P. Wilson, T. M. Pfunter, and S. D. Jacobs, “Adding Chemistry and Glass Composition Data into a Mechanical Material Removal Model for Magnetorheological Finishing (MRF).”

S. N. Shafrir, J. C. Lambropoulos, and S. D. Jacobs, “A Magnetorheological Polishing-Based Approach for Studying Magnetic/Nonmagnetic WC Hard Metals,” ASPE 21st Annual Meeting, Monterey, CA, 15–20 October 2006.

T. C. Sangster, R. L. McCrory, V. N. Goncharov, D. R. Harding, S. J. Loucks, P. W. McKenty, D. D. Meyerhofer, S. Skupsky, B. A. Hammel, J. D. Lindl, E. Moses, J. Atherton, G. B. Logan, S. Yu, J. D. Kilkenny, A. Nikroo, H. Wilken, K. Matzen, R. Leeper, R. Olsen, J. Porter, C. Barnes, J. C. Fernandez, D. Wilson, J. D. Sethian, and S. Obenschain, “Overview of Inertial Fusion Research in the United States,” 21st IAEA Fusion Energy Conference, Chendu, China, 16–21 October 2006.

S. D. Jacobs, “Manipulating Mechanics and Chemistry in Precision Optics Finishing,” International 21st Century COE Symposium on Atomistic Fabrication Technology, Osaka, Japan, 19–20 October 2006.

W. Guan and J. R. Marciante, “Dual-Frequency Ytterbium-Doped Fiber Laser,” LEOS 2006, Montreal, Quebec, Canada, 29 October–2 November 2006.

The following presentations were made at the 48th Annual Meeting of the APS Division of Plasma Physics, Philadelphia, PA, 30 October–3 November 2006:

K. S. Anderson, R. Betti, P. W. McKenty, P. B. Radha, and M. M. Marinak, “2-D Simulations of OMEGA Fast-Ignition Cone Targets.”

R. Betti, K. S. Anderson, C. Zhou, L. J. Perkins, M. Tabak, P. Bedrossian, and K. N. LaFortune, "Shock Ignition of Thermo-nuclear Fuel with High Areal Density."

T. R. Boehly, V. N. Goncharov, D. D. Meyerhofer, J. E. Miller, T. C. Sangster, V. A. Smalyuk, P. M. Celliers, G. W. Collins, D. Munro, and R. E. Olson, "Direct- and Indirect-Drive Shock-Timing Experiments on the OMEGA Laser."

D. T. Casey, J. A. Frenje, C. K. Li, J. R. Rygg, F. H. Séguin, R. D. Petrasso, V. Yu. Glebov, B. Owens, D. D. Meyerhofer, T. C. Sangster, P. Song, S. W. Haan, S. P. Hatchett, R. A. Lerche, M. J. Moran, D. C. Wilson, R. Leeper, and R. E. Olson, "Diagnosing Cryogenic DT Implosions Using the Magnetic Recoil Spectrometer (MRS)."

T. J. B. Collins, J. A. Marozas, R. Betti, D. R. Harding, P. W. McKenty, P. B. Radha, S. Skupsky, V. N. Goncharov, J. P. Knauer, and R. L. McCrory, "One-Megajoule, Wetted-Foam Target Design Performance for the NIF" (invited).

J. A. Delettrez, J. Myatt, C. Stoeckl, and D. D. Meyerhofer, "Hydrodynamic Simulations of Integrated Fast-Ignition Experiments Planned for the OMEGA/OMEGA EP Laser Systems."

D. H. Edgell, R. S. Craxton, L. M. Elasky, D. R. Harding, L. S. Iwan, R. L. Keck, L. D. Lund, S. J. Verbridge, A. Weaver, M. D. Wittman, and W. Seka, "Layering and Characterization of Cryogenic-DT Targets for OMEGA."

R. Epstein, H. Sawada, V. N. Goncharov, D. Li, P. B. Radha, and S. P. Regan, "K-Shell Absorption Spectroscopy at Low Temperatures in Preheat Conditions."

J. A. Frenje, D. T. Casey, C. K. Li, J. R. Rygg, F. H. Séguin, R. D. Petrasso, P. B. Radha, V. Yu. Glebov, D. D. Meyerhofer, and T. C. Sangster, "Diagnosing Cryogenic D<sub>2</sub> and DT Implosions on OMEGA Using Charged-Particle Spectroscopy."

M. Ghilea, D. D. Meyerhofer, T. C. Sangster, D. J. Lonobile, A. Dillenbeck, R. A. Lerche, and L. Disdier, "Developmental Status of a Liquid-Freon Bubble Chamber for Neutron Imaging."

V. Yu. Glebov, T. C. Sangster, P. B. Radha, W. T. Shmayda, M. J. Bonino, D. R. Harding, D. C. Wilson, P. S. Ebey, A. Nobile, Jr., R. A. Lerche, and T. W. Phillips, "Measurement of the Neutron Energy Spectrum in T-T Inertial Confinement Fusion."

V. N. Goncharov, V. A. Smalyuk, W. Seka, T. R. Boehly, R. L. McCrory, I. A. Igumenshchev, J. A. Delettrez, W. Manheimer, and D. Colombant, "Thermal Transport Modeling in ICF Direct-Drive Experiments."

O. V. Gotchev, M. D. Barbero, N. W. Jang, J. P. Knauer, and R. Betti, "A Compact, TIM-Based, Pulsed-Power System for Magnetized Target Experiments on OMEGA."

S. Hu, V. N. Goncharov, V. A. Smalyuk, J. P. Knauer, and T. C. Sangster, "Analysis of the Compressibility Experiments Performed on the OMEGA Laser System."

I. V. Igumenshchev, V. N. Goncharov, V. A. Smalyuk, W. Seka, D. H. Edgell, T. R. Boehly, and J. A. Delettrez, "Effects of Resonant Absorption in Direct-Drive Experiments on OMEGA."

N. W. Jang, R. Betti, J. P. Knauer, O. V. Gotchev, and D. D. Meyerhofer, "Theory and Simulation of Laser-Driven Magnetic-Field Compression."

J. P. Knauer, P. W. McKenty, K. S. Anderson, T. J. B. Collins, and V. N. Goncharov, "Direct-Drive, Foam-Target ICF Implosions."

C. K. Li, F. H. Séguin, J. A. Frenje, J. R. Rygg, R. D. Petrasso, R. P. J. Town, P. A. Amendt, S. P. Hatchett, D. G. Hicks, O. L. Landen, V. A. Smalyuk, T. C. Sangster, and J. P. Knauer, "Measuring *E* and *B* Fields in Laser-Produced Plasmas Through Monoenergetic Proton Radiography."

D. Li, I. V. Igumenshchev, and V. N. Goncharov, "Effects of the Ion Viscosity on the Shock Yield and Hot-Spot Formation in ICF Targets."

G. Li, C. Ren, V. N. Goncharov, and W. B. Mori, "The Channeling Effect in the Underdense Plasma."

J. A. Marozas, P. W. McKenty, P. B. Radha, and S. Skupsky, "Imprint Simulations of 1.5-MJ NIF Implosions Using a Refractive 3-D Laser Ray Trace with an Analytical SSD Model."

F. J. Marshall, R. S. Craxton, M. J. Bonino, R. Epstein, V. Yu. Glebov, D. Jacobs-Perkins, J. P. Knauer, J. A. Marozas, P. W. McKenty, S. G. Noyes, P. B. Radha, W. Seka, S. Skupsky, and V. A. Smalyuk, "Optimized Polar-Direct-Drive Experiments on OMEGA."

A. V. Maximov, J. Myatt, and R. W. Short, "Laser-Plasma Coupling Near Critical Density in Direct-Drive ICF Plasmas."

- P. W. McKenty, J. A. Marozas, V. N. Goncharov, K. S. Anderson, R. Betti, D. D. Meyerhofer, P. B. Radha, T. C. Sangster, S. Skupsky, and R. L. McCrory, “Numerical Investigation of Proposed OMEGA Cryogenic Implosions Using Adiabatic-Shaping Techniques.”
- D. D. Meyerhofer, T. C. Sangster, K. S. Anderson, R. Betti, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, R. L. Keck, J. D. Kilkenny, J. P. Knauer, S. J. Loucks, L. D. Lund, F. J. Marshall, R. L. McCrory, P. W. McKenty, P. B. Radha, S. P. Regan, W. Seka, V. A. Smalyuk, J. M. Soures, C. Stoeckl, S. Skupsky, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, “Studies of Adiabatic Shaping in Direct-Drive, Cryogenic-Target Implosions on OMEGA.”
- J. E. Miller, T. R. Boehly, A. Melchior, and D. D. Meyerhofer, “Thermal and Kinetic Equation-of-State Experiments Using Decaying Shock Waves.”
- J. Myatt, A. V. Maximov, and R. W. Short, “Positron–Electron, Pair-Plasma Production on OMEGA EP.”
- J. Myatt, W. Theobald, J. A. Delettrez, C. Stoeckl, M. Storm, T. C. Sangster, A. V. Maximov, and R. W. Short, “High-Intensity Laser Interactions with Solid Targets and Implications for Fast-Ignition Experiments on OMEGA EP” (invited).
- P. Nilson, “Magnetic Reconnection and Plasma Dynamics in Two Beam Laser–Solid Interactions.”
- R. D. Petrasso, C. K. Li, F. H. Séguin, J. A. Frenje, J. R. Rygg, M. Manuel, V. A. Smalyuk, R. Betti, R. S. Craxton, J. P. Knauer, F. J. Marshall, D. D. Meyerhofer, J. Myatt, P. B. Radha, T. C. Sangster, W. Theobald, R. P. J. Town, P. A. Amendt, P. M. Celliers, S. P. Hatchett, D. G. Hicks, O. L. Landen, J. Cobble, N. M. Hoffman, and J. D. Kilkenny, “Monoenergetic Particle Backlighter for Radiography and Measuring  $E$  and  $B$  Fields and Plasma Areal Density.”
- P. B. Radha, V. Yu. Glebov, V. N. Goncharov, D. D. Meyerhofer, T. C. Sangster, S. Skupsky, J. A. Frenje, and R. D. Petrasso, “Inferring Areal Density in OMEGA DT-Cryogenic Implosions.”
- S. P. Regan, R. Epstein, V. N. Goncharov, I. V. Igumenshchev, D. Li, P. B. Radha, H. Sawada, T. R. Boehly, J. A. Delettrez, O. V. Gotchev, J. P. Knauer, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, T. C. Sangster, S. Skupsky, V. A. Smalyuk, B. Yaakobi, and R. Mancini, “Laser-Energy Coupling, Mass Ablation Rate, and Shock Heating in Direct-Drive Inertial Confinement Fusion” (invited).
- S. P. Regan, D. D. Meyerhofer, T. C. Sangster, R. Epstein, L. J. Suter, O. S. Jones, N. B. Meezan, M. D. Rosen, S. Dixit, C. Sorce, O. L. Landen, J. Schein, and E. L. Dewald, “Hohlraum Energetics with Elliptical Phase Plates on OMEGA.”
- J. R. Rygg, J. A. Frenje, C. K. Li, F. H. Séguin, R. D. Petrasso, and V. N. Goncharov, “Time-Dependent Nuclear Measurements of Fuel–Shell Mix in ICF Implosions.”
- T. C. Sangster, R. Betti, R. S. Craxton, J. A. Delettrez, D. H. Edgell, L. M. Elasky, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, D. Jacobs-Perkins, R. Janezic, R. L. Keck, J. P. Knauer, S. J. Loucks, L. D. Lund, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, P. B. Radha, S. P. Regan, W. Seka, W. T. Shmayda, S. Skupsky, V. A. Smalyuk, J. M. Soures, C. Stoeckl, B. Yaakobi, J. A. Frenje, C. K. Li, R. D. Petrasso, F. H. Séguin, J. D. Moody, J. A. Atherton, B. D. MacGowan, J. D. Kilkenny, T. P. Bernat, and D. S. Montgomery, “Cryogenic DT and D<sub>2</sub> Targets for Inertial Confinement Fusion” (invited tutorial).
- T. C. Sangster, R. S. Craxton, J. A. Delettrez, D. H. Edgell, R. Epstein, V. Yu. Glebov, V. N. Goncharov, D. R. Harding, R. L. Keck, J. D. Kilkenny, J. P. Knauer, S. J. Loucks, L. D. Lund, J. A. Marozas, F. J. Marshall, R. L. McCrory, P. W. McKenty, D. D. Meyerhofer, P. B. Radha, S. P. Regan, W. Seka, V. A. Smalyuk, J. M. Soures, C. Stoeckl, S. Skupsky, J. A. Frenje, C. K. Li, R. D. Petrasso, and F. H. Séguin, “Implosion Performance of Fully  $\beta$ -Layered Cryogenic-DT Targets on OMEGA” (invited).
- J. Sanz and R. Betti, “Bubble Acceleration in the Ablative Rayleigh–Taylor Instability.”
- H. Sawada, S. P. Regan, R. Epstein, D. Li, V. N. Goncharov, P. B. Radha, D. D. Meyerhofer, T. R. Boehly, V. A. Smalyuk, T. C. Sangster, B. Yaakobi, and R. Mancini, “Investigation of Direct-Drive Shock Heating Using X-Ray Absorption Spectroscopy.”
- F. H. Séguin, C. K. Li, J. A. Frenje, J. R. Rygg, R. D. Petrasso, V. A. Smalyuk, R. S. Craxton, J. P. Knauer, F. J. Marshall, T. C. Sangster, S. Skupsky, A. Greenwood, and J. D. Kilkenny, “Using Target Shimming to Compensate for Asymmetric Drive in ICF Implosions.”

W. Seka, V. N. Goncharov, J. A. Delettrez, D. H. Edgell, I. V. Igumenshchev, R. W. Short, A. V. Maximov, J. Myatt, and R. S. Craxton, "Time-Dependent Absorption Measurements in Direct-Drive Spherical Implosions."

R. W. Short and J. Myatt, "Instabilities of Relativistic Electron Beams in Plasmas: Spatial Growth and Absolute Instability."

S. Skupsky, "Nonlocal Ion-Heat Transport in ICF Implosions."

A. A. Solodov, R. Betti, J. A. Delettrez, and C. Zhou, "Gain Curves for Fast-Ignition Inertial Confinement Fusion."

J. M. Soures, T. R. Boehly, V. N. Goncharov, S. Hu, D. D. Meyerhofer, J. E. Miller, T. C. Sangster, W. Seka, and V. A. Smalyuk, "Spherical Shock-Breakout Measurements on OMEGA."

C. Stoeckl, J. Bromage, J. H. Kelly, T. J. Kessler, B. E. Kruschwitz, S. J. Loucks, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, A. L. Rigatti, T. C. Sangster, W. Theobald, L. J. Waxer, and J. D. Zuegel, "Status of the OMEGA EP High-Energy Petawatt Laser Facility."

M. Storm, J. Myatt, and C. Stoeckl, "Characterization of Fast-Electron Beam Propagation Through Solid-Density Matter by Optical-Transition Radiation."

S. Sublett, J. P. Knauer, D. D. Meyerhofer, I. V. Igumenshchev, T. J. B. Collins, and A. Frank, "Influence of Episodic Mass Ejection on Hydrodynamic Jet Evolution."

W. Theobald, C. Stoeckl, C. Zhou, R. Betti, S. Roberts, V. A. Smalyuk, V. Yu. Glebov, J. A. Delettrez, T. C. Sangster, D. D. Meyerhofer, C. K. Li, and R. D. Petrasso, "High-Areal-Density Fuel-Assembly Experiments for the Fast-Ignitor Concept."

C. Zhou and R. Betti, "Fast-Ignition Fuel-Assembly Scaling Laws: Theory and Experiments."

The following presentations were made at the 9th International Fast Ignition Workshop, Cambridge, MA, 3–5 November 2006:

K. S. Anderson, R. Betti, P. W. McKenty, P. B. Radha, and M. M. Marinak, "2-D Simulations of OMEGA Fast-Ignition Cone Targets."

J. A. Delettrez, J. Myatt, C. Stoeckl, D. D. Meyerhofer, and M. G. Haines, "Hydrodynamic Simulations of Integrated Fast-Ignition Experiments Planned for the OMEGA/OMEGA EP Laser Systems."

D. D. Meyerhofer, R. Betti, V. N. Goncharov, D. H. Edgell, D. R. Harding, J. H. Kelly, T. J. Kessler, S. J. Loucks, L. D. Lund, R. L. McCrory, S. F. B. Morse, T. C. Sangster, W. Seka, C. Stoeckl, W. Theobald, L. J. Waxer, and J. D. Zuegel, "Preparations for Integrated Cryogenic Fast-Ignition Experiments on OMEGA/OMEGA EP" (invited).

J. Myatt, A. V. Maximov, and R. W. Short, "Laboratory Demonstration of  $e^+e^-$  Pair-Plasma Production on OMEGA EP."

J. Myatt, W. Theobald, J. A. Delettrez, C. Stoeckl, M. Storm, T. C. Sangster, A. V. Maximov, and R. W. Short, "High-Intensity Laser Interactions with Solid Targets and Implications for Fast-Ignition Experiments on OMEGA EP" (invited).

P. Nilson, "Optical Probing of Underdense Laser-Plasma Interactions Using the Vulcan Petawatt Laser."

A. A. Solodov, R. Betti, J. A. Delettrez, and C. Zhou, "Gain Curves for Fast-Ignition Inertial Confinement Fusion."

C. Stoeckl, S.-W. Bahk, J. Bromage, V. Yu. Glebov, O. V. Gotchev, P. A. Jaanimagi, D. D. Meyerhofer, P. Nilson, T. C. Sangster, M. Storm, S. Sublett, W. Theobald, and J. D. Zuegel, "Diagnostics for Fast-Ignitor Experiments on OMEGA/OMEGA EP."

W. Theobald, C. Stoeckl, K. S. Anderson, R. Betti, T. R. Boehly, J. A. Delettrez, R. Epstein, V. Yu. Glebov, J. H. Kelly, T. J. Kessler, B. E. Kruschwitz, S. J. Loucks, R. L. McCrory, D. N. Maywar, D. D. Meyerhofer, J. E. Miller, S. F. B. Morse, J. Myatt, P. B. Radha, A. L. Rigatti, T. C. Sangster, V. A. Smalyuk, L. J. Waxer, B. Yaakobi, J. C. Zhou, J. D. Zuegel, R. D. Petrasso, C. K. Li, C. A. Back, G. Hund, R. B. Stephens, S. P. Hatchett, M. H. Key, A. J. MacKinnon, H.-S. Park, P. K. Patel, K. L. Lancaster, and P. A. Norreys, "Fast-Ignition Research at the Laboratory for Laser Energetics."

C. Zhou and R. Betti, "Fast-Ignition Fuel-Assembly Scaling Laws."