DIRECTED ENERGY PROFESSIONAL SOCIETY

Technical Program

Solid State and Diode Laser Technology Review

and

Ultrashort Pulse Laser Workshop

29 June - 2 July 2009
Newton, Massachusetts

MONDAY

Short Courses

0700 **Registration at Marriott**

0800 **Short Courses Begin**

1. Introduction to Laser Beam Quality
Instructor: *Sean Ross*, Air Force Research Laboratory

2. Transitioning DE Technology to the Warfighter
Instructor: *Bill Decker*, Defense Acquisition University

3. Atmospheric Effects (Limited)
Instructor: *Steve Fiorino*, Air Force Institute of Technology

4. Fiber Lasers (ALL DAY COURSE)
Instructors: *Mike O'Connor,* IPG Photonics
William Torruellas, Johns Hopkins University

1200 **Break for Lunch**

1300 **Afternoon Courses Begin and All Day Course Resumes**

5. Laser Materials
Instructor: *Vida Castillo,* VKSC Consulting

6. Tools for Transitioning Technology
Instructor: *Bill Decker*, Defense Acquisition University

7. Infrared Countermeasures (Limited)
Instructors:
Kenneth Hopkins, Air Force Research Laboratory
Bill Taylor, Air Force Research Laboratory

TUESDAY MORNING

JOINT SESSION

Plenary Session (Open)

Chair: *Iain McKinnie,* Kapteyn-Murnane Laboratories

0700 **Registration and Breakfast at Marriott Speakers Breakfast**

0800 **Welcome**

0815 **Power-Scaling of Cryogenically-Cooled Ultrafast Amplifiers and Applications in Coherent X-Ray Generation**
Henry Kapteyn and Margaret Murnane, Colorado University

0850 **Ultrashort-Pulse Fiber Lasers: Present and Future**
Almantas Galvanauskas, University of Michigan

0925 **Femtosecond Laser Materials Processing**
Erik Mazur, Harvard University

1000 **Break**

Plenary Session (Open)

Chair: *David Mordaunt,* Northrop Grumman

1030 **Pressing System Issues for the Deployment of High Energy Lasers**
Sean Ross, Air Force Research Laboratory

1100 **Technical Issues Concerning HEL Deployment**
Martin Stickley, Booz-Allen Hamilton

1130 **100-kW Coherently Combined Nd:YAG MOPA Laser Array**
Stuart McNaught , Northrop Grumman

1200 **Lunch**

SSDLTR

Beam Control I (Limited/Open)

Chair: *Christopher Corcoran,* Corcoran Engineering

1300 **Incoherent Laser Combiner with Target in the Loop Atmospheric Correction (Limited)**
Allan Wirth, Northrop Grumman/Xinetics

1325 **High Power Enhanced Stroke Deformable Mirror (Limited)**
Mark Ealey, Northrop Grumman/Xinetics

Session is now OPEN

1350 **Power Scaling a Self-Fourier Laser Array Using Different Laser Sources**
Frederic Durville, Corcoran Engineering

1415 **Reference Beam Free Phase Locking of a High Power Fiber Array**
Thomas Shay, Air Force Research Laboratory

1440 **Break**

1510 **Passive Phasing of Five High Power Fiber Amplifiers**
Sami Shakir, Northrop Grumman

1535 **Phase Locking of a Fiber Array on a Remote Object**
Benjamin Pulford, Air Force Research Laboratory

1600 **High-Spectral-Density Beam Combining for Compact Multi-kW Laser Systems**
Oleksiy Andrusyak, University of Central Florida

1730 **Clambake Reception**
Co-Hosted by Lockheed Martin

TUESDAY AFTERNOON

SSDLTR

Diode Lasers I (Limited/Open)

Chair: *Paul Rudy,* Kaai, Inc.

1300 **Grating-Locked Diode Laser Pump Sources Demonstrate Zero Power Penalty (Limited)**
Steve Patterson, nLight Corporation

Session is now OPEN

1325 **Multi-kW Pump Powers from Conductively-Cooled QCW Laser Diode Stacks**
Eckard Deichsel, JENOPTIK Laserdiode GmbH

1350 **Laser Array Reliability**
Niloy Dutta, LGS Innovation Inc.

1415 **975 nm Surface-Emitting Distributed Feedback (SE-DFB) Laser and Array**
Manoj Kanskar, Alfalight Inc.

1440 **Break**

1510 **Semi-Automated Production of Single Emitter Based High Brightness Diode Lasers**
Stefan Heinemann, Fraunhofer USA

1535 **High-Brightness Pump Modules Based on the Vertical-Cavity Surface-Emitting Laser Technology**
Chuni Ghosh, Princeton Optronics

1600 **High Brightness Fiber Coupled Pump Modules Utilizing Robust Mini-Bar Technology Pump Devices**
Trevor Crum, Spectra Physics

1625 **High Brightness Diode Laser Module Development at nLIGHT Photonics**
Steve Patterson, nLight Photonics

1730 **Clambake Reception**
Co-Hosted by Lockheed Martin

TUESDAY AFTERNOON

USPL

Workshop Session (Limited/Open)
Chair: *Carlton Land,* USMC

1300 **Texas Petawatt Laser (Limited)**
Todd Ditmire, University of Texas

1330 **Mid-IR Fiber-Based High-Peak-Power Short-Pulse Source Development (Limited)**
Deborah Alterman, Lockheed Martin Aculight

1350 **High-Average-Power Ultrashort Pulse Lasers (Limited)**
Daniel Ripin, MIT/Lincoln Laboratories

1410 **High Power Millijoule USP Fiber Laser (Limited)**
David Gaudiosi, Raydiance

1430 **THz Generation in Plasmas Using Multiple Color Laser Pulses (Limited)**
Joe Penano, Naval Research Laboratory

1500 **Break**

Session is now Open
Chair: *Gerald Manke,* Naval Surface Warfare Center

1530 **Lensless Diffractive Imaging and Fourier Transform Holography**
Daisy Raymondson, Kapteyn-Murnane Laboratories

1550 **Electrical Properties of USPL Plasma Channels Formed in Air**
David French, Rose-Hulman Institute of Technology

1610 **A Tunable Passively Mode-locked Tungstate Laser**
Samvel Sarkisyan, Applied Energetics, Inc

1630 **High Power <50fs Ultrafast Laser Systems**
Iain McKinnie, Kapteyn-Murnane Laboratories

1650 **Ultrafast Lasers for Stand-Off Detection**
Martin Richardson, CREOL

1730 **Clambake Reception**
Co-Hosted by Lockheed Martin

WEDNESDAY MORNING

SSDLTR

Solid State Lasers (Limited/OPEN)
Chair: *Sean Ross*, Air Force Research Laboratory

0700 **Registration and Breakfast at Marriott**
Speakers Breakfast
Breakfast Co-Hosted by Textron

0800 **Ytterbium-Based Edge-Pumped Disk Amplifier for an Ultra-Short Pulse Laser (Limited)**
John Vetrovec, Aqwest LLC

0825 **A kW-Class, Near-Diffraction-Limited Cryogenic Yb:YAG Laser System (Limited)**
Darren Rand, Lincoln Laboratory

0850 **Textron J-HPSSL 100 kW ThinZag® Laser Program (Limited)**
Alex Mandl, Textron

0915 **6.5-kW, Yb:YAG Ceramic Thin Disk Laser (Limited)**
Ahmed Lobad, Boeing

0940 **Break**
Poster Session

1010 **Progress on Materials Development Enabling Solid-State Laser Sources (Limited)**
F. Kenneth Hopkins, Air Force Research Laboratory

Session is now OPEN

1035 **Parameters for Describing Quasi-Three-Level Lasers**
Jeffrey White, Army Research Laboratory

1100 **Resonantly Diode-Pumped $Er^3+:Y_2O_3$ Ceramic Laser**
Mark Dubinskii, Army Research Laboratory

1200 **Lunch**

Agenda Subject to Change
Visit www.deps.org for Daily Updates

WEDNESDAY MORNING

SSDLTR

Fiber Lasers I (Limited/Open)

Chair: *Tom Shay*, Air Force Research Laboratory

0700 **Registration and Breakfast at Marriott**
Speakers Breakfast
Breakfast Co-Hosted by Textron

0800 **Comparison of Direct Amplification and Chirped Pulse Amplification in High-Peak-Power Fiber Amplifiers (Limited)**
Deborah Alterman, Lockheed Martin Aculight

0825 **400-W, High Efficiency Coherent Combination of Fiber Lasers (Limited)**
Peter Thielen, Northrop Grumman Aerospace Systems

Sesion is now OPEN

0850 **Mode Locking of an Array of Fiber Lasers**
Sami Shakir, Northrop Grumman

0915 **Patterned Disorder in a Fiber Laser Array Improves Coherence**
Will Ray, Georgia Tech

0940 **Break**
Poster Session

1010 **Stimulated Brillouin Scattering Reduction in Chilled Amplifiers**
Tim Newell, Air Force Research Laboratory

1035 **Modal Measurement of a Large-Area Photonic Crystal-Fiber Amplifier Using Spatially Resolved Spectral Interferometry**
Jake Bromage, University of Rochester

1100 **Pump Fluctuation-Induced Modulation Instability of Fiber Amplifiers and Passively Phased Ring-Geometry Laser Arrays**
Erik Bochove, Air Force Research Laboratory

1125 **Narrow-Linewidth Kilowatt-Class CW Diffraction Limited Fiber Lasers and Amplifiers**
Oleg Shkurikhin, IPG Photonics

1200 **Lunch**

WEDNESDAY MORNING

USPL

Workshop Session (Limited/Open)

Chair: *David Kiel,* PMS 405

0700 **Registration and Breakfast at Marriott**
Speakers Breakfast
Breakfast Co-Hosted by Textron

0800 **Introduction**

0810 **Physical Processes in Semiconductor Materials Irradiated by UPLs (Limited)**
Pete Latham, Air Force Research Laboratory

0840 **Terahertz Radiation in Ionized Air Plasma (Limited)**
Matthew Bohn, Air Force Institue of Technology

0900 **Wavelength Dependent Activation of Nociceptors by Femtosecond Laser (FSL) Bursts (Limited)**
Brian Cooper, University of Florida

0920 **Measurements of EM Spectrum Generated by USP Laser Material Interactions (Limited)**
Jeff Thomas, EOC Penn State

0940 **Electromagnetic Wave Attachment to Femto -Second Laser Plasma Filaments (Limited)**
Clint Friedman, ARDEC

1010 **Break**
Poster Session

Session is now Open

Chair: *J. Thomas Schriempf,* NAVSEA

1040 **Effects of Laser Beam Astigmatism on the Induced Birefringence in USPL-Formed Plasma in Air**
Blake Lam, Rose-Hulman Institute of Technology

1100 **Standoff Detection Single-Beam CARS and Other Applications Enabled by MIIPS**
Marcos Dantus, BioPhotonic Solutions

1120 **Self-Phase-Locked Divide-by-2 Femtosecond Optical Parametric Oscillator**
Samuel Wong, Q-Peak

1140 **Laser Produced Air Plasmas for Directed Energy Applications**
Daniel Gordon, Naval Research Laboratory

1200 **Lunch**

WEDNESDAY LUNCH

SSDLTR

Poster Session (Open)

Chair: *Roy Hamil,* Air Force Research Laboratory

0940 **Poster Session**

Novel Pump-Limited High Power Photonic Crystal Fiber with 260 W Output
Craig Robin, Air Force Research Laboratory

High Power Narrow-Band Semiconductor Laser Pumping System
Divliansky Ivan, University of Central Florida

Commercial High-Efficiency 885-nm Diode Lasers
Bryan Gelnett, nLight Corporation

Advances in the Pearl Architecture at nLIGHT Photonics
Steve Patterson, nLight Photonics

Progress of On-Chip Wavelength Stabilization of Laser Diodes for Seeding and Pumping of High Power Solid State and Fiber Lasers
Laurent Vaissié, QPC Lasers

1300 **Poster Session Adjourns**

WEDNESDAY AFTERNOON

SSDLTR

Fiber Lasers II (Open)

Chair: *Tom Shay,* Air Force Research Laboratory

1300 **Power Scaling of Resonantly Cladding-Pumped Yb-Free Er-Doped LMA Fiber Lasers and Amplifiers**
Mark Dubinskii, Army Research Laboratory

1325 **Recent Progress in Scaling of High Power Fiber Lasers at IPG Photonics**
Alex Yusim, IPG Photonics

1350 **High Power, Coherently Combinable Tm Fiber Lasers**
Gregory Goodno, Northrop Grumman Aerospace Systems

1415 **KWatt Level Fiber Amplifiers for Beam Combining**
Victor Khitrov, Nufern

1440 **Fiber-Coupled Module Producing 100 W Out of a 100 μm Fiber with NA = 0.12 as a Building Block for kW Level Direct Diode Applications**
John Hostetler, TRUMPF Photonics

1505 **Break**

Diode Lasers II (Open)

Chair: *Paul Rudy*, Kaai, Inc.

1535 **High-Power QCW Diode Arrays for Use in Military Applications**
Ryan Feeler, Northrop Grumman Cutting Edge Optronics

1600 **Grating Stabilized High Brightness Fiber Coupled Pump Modules**
Trevor Crum, Spectra Physics

1625 **Analysis of Laser Action and Thermal Management in Er-Doped GaN Semiconductor Structures**
William Hageman, University of Central Florida

WEDNESDAY AFTERNOON

USPL

Keynote Session (Open)

Chair: *Pete Latham*, Air Force Research Laboratory

1300 **High Power Ultrafast Laser Systems for EUV and X-Ray Sources**
Franz Kaertner, MIT

1330 **Femtosecond Technology for Arbitrary Optical Waveforms**
Erich Ippen, MIT

1400 **High Intensity THz Pulse Generation, THz Field Control, and THz Spectroscopy and Nonlinear Optics**
Keith Nelson, MIT

1430 **Ultrafast Laser Science at the Townes Institute**
Martin Richardson, University of Central Florida

1500 **Break**

Workshop Session (Limited/Open)

Chair: *Juliet Gopinath,* MIT/Lincoln Laboratories

1530 **Wide BW Chirped Bragg Gratings in PTR Glass for High Energy fs Pulse Stretching/Compression (Limited)**
Vadim Smirnov, OptiGrate Corp.

1550 **Sectional Chirped Volume Bragg Gratings for Ultrashort Pulse Stretching and Compression (Limited)**
Oleksiy Andrusyak, University of Central Florida

Session is now Open

1610 **Short Pulse High Power Fiber Lasers with Tunable Pulse Width**
Pratheepan Madasamy, Lockheed Martin Aculight

1630 **High Power and High Energy Femtosecond Fiber Laser at High Repetition Rate**
Liu Jain, Polaronyx

1650 **The Progress in Near and Mid-IR Ultrafast Laser Systems at Q-Peak**
Evgueni Slobodtchikov, Q-Peak

1710 **Laser-Induced Photo-Ionization of Transparent Materials by High-Power Femtosecond Pulses**
Vitaly Gruzdev, University of Missouri

THURSDAY MORNING

SSDLTR

Beam Control II (Limited/Open)

Chair: *Christopher Corcoran*, Corcoran Engineering

0700 **Registration and Breakfast at Marriott Speakers Breakfast**

0800 **Atmospheric Compensation Concepts for Passively Phased Ring Fiber Array Laser (Limited)**
Allan Wirth, Northrop Grumman/Xinetics

Session is now Open

0825 **All-Fiber Passive Coherent Arrays Combing Four High Power Fiber Lasers**
Baishi Wang, Vytran

0850 **Optimization and Power Scaling of Two-Dimensional Re-Imaging Assisted Phased Array**
Radek Uberna, Lockheed Martin Coherent Technologies

0915 **Break**

0945 **High-Brightness, Fiber-Coupled Lasers Enabled by Beam Combination of Diode Laser Bars**
Daniel Grasso, Coherent, Inc.

1010 **Simulation of a 37-Element, Truncated-Gaussian, Tiled-Aperture, Coherent Fiber Laser Array**
Sami Shakir, Northrop Grumman

1130 **Conference Adjourns**

1300 **Tour of MIT Laboratories (To 1500)**

Agenda Subject to Change
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THURSDAY MORNING

SSDLTR

Enabling Technologies I (Open)

Chair: *Vida Castillo*, VKSC Consulting

0700 **Registration and Breakfast at Marriott Speakers Breakfast**

0800 **Novel Technique for Producing Over-Sized Laser Gain Media in High Fluence Applications**
Nick Traggis, Precision Photonics Corporation

0825 **Measurement of Upconversion/Cross Relaxation Constants Over a Range of Er:YAG Concentrations from Cryogenic to Room Temperature**
G. Alex Newburgh, Army Research Laboratory

0850 **Fracture Strength and Toughness of Lasing Media and Composites**
Huai-Chuan Lee, Onyx Optics

0915 **Ion-Beam Sputtered High-Laser-Damage Coatings on YAG for CW Applications**
Nick Traggis, Precision Photonics Corporation

0940 **Break**

Enabling Technologies II (Open)

Chair: *Andrey Voevodin*, Air Force Research Laboratory

1010 **Comparison of Thermally Induced Effects in Laser Media in the Temperature Range of 77 – 770K**
Michael Tilleman, Elbit Systems of America

1035 **Active Heat Sink for High-Power Laser Diodes**
John Vetrovec, Aqwest LLC

1100 **Thermal Energy Storage Techniques for High Energy Lasers**
Jennifer Lindauer, Rini Technologies

1130 **Conference Adjourns**

1300 **Tour of MIT Laboratories (To 1500)**

THURSDAY MORNING

USPL

Workshop Session (Secret)

Chair: *Pete Latham,* Air Force Research Laboratory

0700 **Registration and Breakfast at Marriott Speakers Breakfast**

0715 **Buses to Offsite Location**

0830 **Introduction**

0840 **DARPA's USPL Program - Bridging the Gap Between Applications and Reality**

0910 **Navy Perspective and Overview of Potential USP Laser Weapons**

0930 **High Energy Ultra Short Pulsed Laser Testing for IRCM Applications**

0950 **Recent Foreign Developments in USPL Technology and Applications**

1010 **Break**

Chair: *Gerald Manke,* Naval Surface Warfare Center

1040 **Progress on USP Laser Guided Discharges**

1100 **Coherent Anti-Stokes Raman Spectroscopy for Remote Sensing Applications**

1120 **Two Photon Absorbing Materials for Femtosecond Lasers**

1140 **Workshop Adjourns**

1300 **Tour of MIT Laboratories (To 1500)**

Conference Organizers

Solid State and Diode Laser Technology Review

Chair
Dave Mordaunt, Northrop Grumman

Co-Chair
Kalin Spariosu, Raytheon

Technical Chair
Sean Ross, Air Force Research Laboratory

Ultrashort Pulse Laser Workshop

Chair
Iain McKinnie, Kapteyn-Murnane Laboratories

Event Coordinator
Cynnamon Spain, DEPS

Registration and Short Courses
Donna Storment, DEPS

Directed Energy Professional Society
7770 Jefferson Street NE, Suite 440
Albuquerque, NM 87109
Tel: 505-998-4910
Fax: 505-998-4917

www.deps.org