

Technical Program

Advanced High Power Laser Review



1st Annual Free Electron Laser
Conference

23rd Annual Solid State and Diode
Laser Technology Review

8th Annual Ultrashort Pulse Laser
Workshop

15 - 18 June 2010
Broomfield, Colorado

SESSIONS BY CONFERENCE

All Conferences

Tuesday	
Short Courses	1
Wednesday AM	
Plenary Session	2

Free Electron Laser Conference

Wednesday PM	
Joint Session with SSDLTR	3
Thursday AM	
Conference Session 1 (Secret)	5
Thursday PM	
Conference Session 2 (Secret)	9
Friday AM	
Conference Session 3 (Limited)	13

Solid State and Diode Laser Technology Review

Wednesday PM	
Joint Session with FEL	3
Thursday AM	
Fiber Lasers (Limited/Open)	6
Solid State Lasers (Limited/Open)	7
Thursday PM	
Diode Lasers I (Open)	10
Enabling Technologies (Limited/Open)	11
Friday AM	
Beam Control (Open)	14
Diode Lasers II (Limited/Open)	15

Ultrashort Pulse Laser Workshop

Wednesday PM	
Workshop Session 1 (Open/Limited)	4
Thursday AM	
Workshop Session 2 (Open)	8
Thursday PM	
Workshop Session 3 (Open/Limited)	12
Friday AM	
Workshop Session 4 (Secret)	16

TUESDAY

Short Courses

- 0700 Registration at Omni Resort
- 0800 Short Courses Begin
1. Windows, Substrates, and Coatings for HEL Applications - Public Release
Instructor: *William Decker*
 2. Free Electron Lasers - Limited Distribution C
Instructor: *Stephen Milton*
 3. Thin Disk Lasers - Limited Distribution C
Instructor: *Vern Schlie*
- 1200 Break for Lunch
- 1300 Afternoon Courses Begin
4. Beam Quality - Public Release
Instructors: *Sean Ross*
 5. Atmospheric Propagation - Limited Distribution C
Instructor: *Steven Fiorino*
 6. Ultrashort Laser-Induced Filaments - Limited Distribution C
Instructor: *Pat Roach*

WEDNESDAY MORNING

JOINT SESSION

Plenary Session (Open)

Omni Resort, Interlocken B

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort**
- 0800 **Welcome and Call to Order**
- 0815 **Naval Directed Energy**
Ms. Sarwat Chappell, Office of Naval Research
- 0845 **High Energy Lasers for the Marine Corps**
Major Bill Short, U.S. Marine Corp
- 0915 **New Opportunities in High Field THz Science**
Professor Aaron Lindenberg, Materials Science and Engineering / Photon Science Stanford University
- 0945 **Break**
- 1015 **Petawatt Laser Technology and a Look Toward Exawatt Lasers**
Professor Todd Ditmire, Texas Center for High Intensity Laser Science, University of Texas at Austin
- 1045 **ELLA - (Electric Laser on a Large Aircraft) 101 basics**
Dr. Sean Ross, Air Force Research Laboratory
- 1115 **Progress on High Power Electric Lasers**
Mr. Don Seeley, High Energy Laser Joint Technology Office
- 1200 **Lunch**

WEDNESDAY AFTERNOON

JOINT SESSION

FEL and SSDLTR Conferences (Limited)

Session Chair: *Sarwat Chappell, Office of Naval Research*

Omni Resort, Interlocken B

- 1300 **FEL Photocathode Drive Laser Requirements**
Dinh Nguyen, Los Alamos National Laboratory
- 1330 **Seed Laser Technology/Requirements**
Joe Penano, Naval Research Laboratory
- 1400 **Pulsed Fiber Lasers**
Andy Motes, Air Force Research Laboratory / RVSE
- 1430 **Sub-Picosecond Timing and Synchronization**
Stephen Milton, Argonne National Laboratory
- 1500 **Break**
- 1530 **FEL/SSL Metrology of High Power Photon Beam**
Jack Slater, Schafer Corp
- 1600 **Thermal and Harmonic Management of High Power Photon Beams**
Michelle Shinn, Jefferson Laboratory
- 1630 **Thin Disk Lasers**
Vern Schlie, Integral Laser Solutions
- 1730 **Reception at Omni Resort**

WEDNESDAY AFTERNOON

USPLW

USPL Workshop Session 1 (Open/Limited)

Session Chair: *Iain McKinnie*, KMLabs. Inc.

Omni Resort, Interlocken C

Session is Open

- 1330 **Propagation of Ultra-Intense Bessel and Airy Laser Beams in Gaseous and Liquid Media**
Pavel Polynkin, University of Arizona
- 1400 **Directivity and Frequency Control of an Underwater Laser Acoustic Source Using Ultrashort and Nanosecond Pulses**
Ted Jones, Naval Research Laboratory
- 1430 **Dual Wavelength Laser Damage Testing of Dichroic Pump Optics for High Energy Lasers**
Mark Kimmel, Sandia National Laboratory
- 1500 **Probing Ultrafast Magnetization Dynamics with Element-Specificity Using Coherent EUV High-Harmonics**
Chan La-o-vorakiat, University of Colorado
- 1530 **Break**

Session is now Limited

- 1600 **Physical Processes in Semiconductor Materials Irradiated by Ultrashort Pulsed Lasers (Limited)**
William (Pete) Latham, Air Force Research Laboratory/RDLAS
- 1630 **Advanced Short Pulse Filamentation and Interaction Investigations for Standoff Sensing (Limited)**
Martin Richardson, Townes Laser Institute, CREOL
- 1730 **Reception at Omni Resort**

THURSDAY MORNING

FEL

FEL Conference Session 1 (Secret)

Session Chair: *Roy Whitney*, Jefferson Laboratory
Offsite Location

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort
Buses to Offsite Location**
- 0800 **MW Class Amplifier and Oscillator FELs**
- 0850 **Efficient Compact MW Class FEL**
- 0940 **Break**
- 1010 **MW Class FEL Start to End Modeling**
- 1100 **MW Class FEL Real-Time Performance
Optimization Simulations**
- 1150 **Buses to Omni Resort**
- 1200 **Lunch**

THURSDAY MORNING

SSDLTR

Fiber Lasers (Limited/Open)

Session Chair: *Vern Schlie*, Integral Laser Solutions
Omni Resort, Interlocken B

0630 Breakfast / Speakers Breakfast

0700 Registration at the Omni Resort

Session is Limited

0800 Phase Coherence, Phase Noise and Phase Control in a High-Power Yb Fiber Amplifier (Limited)
Charles Yu, MIT Lincoln Lab

0825 Semi-Guiding High Aspect Ratio Core (SHARC) Fiber Laser (Limited)
David Rockwell, Raytheon Space & Airborne Systems

Session is now Open

0850 kW-Class, Narrow-Linewidth Counter Pumped Fiber Amplifiers
John Edgecumbe, Nufern

0915 Power and Efficiency Scaling of Resonantly Cladding-Pumped Er-doped LMA Fiber Laser
Jun Zhang, US Army Research Lab.

0940 Break

1010 Effect of Co-Seeding of Broadband 1040-nm Radiation with Narrowband 1064-nm Radiation on SBS Threshold
Leanne Henry, Air Force Research Laboratory

1035 All-Fiber Isolator in Undoped Silica Fiber
Chunte Lu, AFRL, Directed Energy Directorate

1100 High Efficiency Coherent Combining of a 1.4-kW fiber laser
Gregory Goodno, Northrop Grumman Aerospace Systems

1125 Advanced Thulium:Fiber Laser Development
Martin Richardson, Townes Laser Institute, CREOL

1200 Lunch

THURSDAY MORNING

SSDLTR

Solid State Lasers (Limited/Open)

Session Chair: *Dave Mordaunt*, Northrop Grumman
Omni Resort, Interlocken D

Session is Limited

0630 Breakfast / Speakers Breakfast

0700 Registration at the Omni Resort

0800 Cryogenically Cooled Solid-State Lasers: Recent Developments and Future Prospects (Limited)
John Hybl, MIT Lincoln Laboratory

0825 Textron's J-HPSSL 100 kW ThinZag® Laser Program (Limited)
Alexander Mandl, Textron Defense Systems

0850 Yb:YAG Disk Amplifier for Pulsed Operation at High-Average Power (Limited)
John Vetrovec, Aqwest LLC

Session is now Open

0915 Thin Disk Laser Performance with Various Cooling Configurations
Tyler Carson, Air Force Research Laboratory/DED

0940 Break

1010 Silicon Carbide Face Cooled Thin Disk Laser
G. Alex Newburgh, Army Research Laboratory

1035 Heat-Fraction-Limited CW Yb:YAG Cryogenic Solid-State Laser With 100 % Photon-Photon Efficiency
Joe Singley, Snake Creek Lasers, LLC

1100 Cryogenic Er:YAG Lasers: Aspects of Diode Pumping
Nikolay Ter-Gabrielyan, Army Research Laboratory

1125 Cryo-Cooled Er:YAG Laser Resonantly Pumped by a Fiber Coupled Ultra-Spectrally-Narrowed Diode Source
Viktor Fromzel, US Army Research Laboratory

1200 Lunch

THURSDAY MORNING

USPLW

USPL Workshop Session 2 (Open)

Session Chair: *Gerald Manke*, Naval Surface Warfare Center

Omni Resort, Interlocken C

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort**
- 0900 **Observation of Non-Fourier Thermal Transport at Nano-Interfaces**
Qing Li, University of Colorado
- 0930 **Modeling of Ultrashort Laser Material Interaction via Combined Molecular Dynamics and Monte Carlo Method**
Yung Shin, Purdue University
- 1000 **Break**
- 1030 **Development of a 1 J Diode-Pumped Yb: YAG Chirped Pulse Amplification Laser System to Pump Soft X-ray Lasers**
Brendan Regan, Colorado State University
- 1100 **Modular, Robust, High-Power, Ultrafast Laser Amplifier Systems**
Iain McKinnie, KMLabs Inc.
- 1130 **Reliable Diode Pumped Lasers for Ultrafast Pump Sources**
Wade Collins, Northrop Grumman
- 1200 **Lunch**

THURSDAY AFTERNOON

FEL

FEL Conference Session 2 (Secret)

Session Chair: *Roy Whitney*, Jefferson Laboratory
Offsite Location

- 1300 **Buses to Offsite Location**
- 1310 **Atmospheric Propagation of MW Class FEL Beams**
- 1400 **Materials Interaction with MW Class FEL Beams**
- 1450 **Break**
- 1510 **Summary Discussion**
All

THURSDAY AFTERNOON

SSLDTR

Diode Lasers I (Open)

Session Chair: *Jay Brasseur*, DE Solutions
Omni Resort, Interlocken B

- 1300 **Diode Laser Stacks in the 100-J Range**
Eckard Deichsel, JENOPTIK Laserdiode GmbH
- 1330 **High Power VCSEL Pump Sources for Nd:YAG Lasers**
Daniel Klemer, Aerius Photonics, LLC
- 1400 **High-Brightness, Fiber-Coupled Diode Lasers for Fiber Laser Pumping Enabled by Tailored Diode Laser Bars**
S. David Roh, Coherent, Inc.
- 1430 **Break**
- 1500 **Light Sources for High Brightness Applications**
Rajiv Pathak, Coherent, Inc.
- 1530 **Advances in QCW and CW Laser Diode Arrays**
David Schleuning, Coherent Inc
- 1600 **Wavelength-Stabilized Pump Sources from 20 to 2000 W**
Kirk Price, nLIGHT Corporation

THURSDAY AFTERNOON

SSDLTR

Enabling Technologies I (Limited/Open)

Session Chair: *Greg Quarles*, B.E.Meyers & Co.
Omni Resort, Interlocken D

Session is Limited

- 1300 **Development of Active Heat Sink for High-Power Laser Diodes (Limited)**
John Vetrovec, Aqwest LLC
- 1330 **Cryogenically Cooled Diode Lasers (Limited)**
Matthew Bohn, Directed Energy Solutions

Session is now Open

- 1400 **Analysis of the Power Quality Impact of Multiple Directed Energy Loads on an Electric Ship Power System**
Angelo Gattozzi, University of Texas, Austin
- 1430 **Loop Heat Pipe Technology for Laser Cooling**
Dmitry Khrustalev, ATK Space
- 1500 **Break**
- 1530 **IBS Anti-Reflection Coatings for High-Power Fiber Laser Endcaps**
Chris Wood, Precision Photonics Corporation
- 1600 **Novel Technique for Laser Gain Media to Heat Sink Integration for Improved Thermal Management**
Ove Lyngnes, Precision Photonics Corp
- 1630 **Investigation of Interface Heat Transfer in Adhesive Free Bond Laser Composites**
Xiaodong Mu, Onyx Optics Inc.

THURSDAY AFTERNOON

USPLW

USPL Workshop Session 3 (Open/Limited)

Session Chair: *Martin Richardson*, Townes Laser Institute, CREOL

Omni Resort, Interlocken C

Session is Open

- 1330 **Bright, Coherent, Attosecond Soft X-Ray Harmonics Spanning the Water Window from a Tabletop Source**
Paul Arpin, University of Colorado
- 1400 **Large Area High Efficiency Multilayer Dielectric Gratings for High Energy Laser Pulse Compression at 800 nm**
Carmen Menoni, Colorado State University
- 1430 **Stretching and Compression of Ultrashort Pulses Using Chirped Volume Bragg Gratings in Single- and Multi-Pass Configurations**
Dylan Moses, CREOL
- 1500 **Break**

Session is now Limited

- 1530 **Ultrafast Fiber Lasers to Reach the Millijoule Level (Limited)**
Michael Mielke, Raydiance
- 1600 **All-Fiber Based Mode-Locked 2-micron Fiber Laser Incorporating Carbon Nanotubes (Limited)**
Arturo Chavez-Pirson, NP Photonics, Corp.

FRIDAY MORNING

FEL

FEL Conference Session 3 (Limited)

Session Chair: *Michelle Shinn*, Jefferson Laboratory
Omni Resort, Interlocken C

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort**
- 0800 **The Optical Klystron as a Path to a High-Power Free-Electron Laser**
Henry Freund, Science Applications International Corporation
- 0845 **RF Gated Thermionic Guns for High Average Power FELs**
Phil Sprangle, Naval Research Laboratory
- 0930 **Break**
- 1000 **System Efficiency Studies of High Power Free Electron Lasers**
Mike Phillips, Advanced Energy Systems
- 1045 **Energy Pulsed Photocathode Drive Laser for Quantum Efficiency Experiments and SRF Gun Testing**
Mark Curtin, Boeing
- 1200 **Conference Adjourns**

FRIDAY MORNING

SSLDTR

Beam Control (Open)

Session Chair: *Josh Rothenberg*, Northrop
Grumman Space Technology
Omni Resort, Interlocken B

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort**
- 0800 **Coherent Laser Combination Using a Self-Fourier Cavity**
Christopher Corcoran, Corcoran Engineering, Inc.
- 0825 **Coherent Beam Combination in Two-Dimensional Waveguides**
Andrew Bratcher, Lockheed Martin CT
- 0850 **Coherent Polarization Beam Combination with Active Phase and Polarization Control**
Radek Uberna, Lockheed Martin CT
- 0915 **Break**
- 0945 **High-Reliability, High-Power Combiners for Fiber Lasers and Amplifiers**
Imtiaz Majid, Nufern
- 1010 **Coherently Combined High-Power Intelligent Semiconductor Emitters (COCHISE)**
Shawn Redmond, MIT Lincoln Lab
- 1035 **Diamond Raman Beam Combining and Cleanup**
Matthew Bohn, Directed Energy Solutions
- 1200 **Conference Adjourns**

FRIDAY MORNING

SSDLTR

Diode Lasers II (Limited/Open)

Session Chair: *John Edgecumbe*, Nufern
Omni Resort, Interlocken D

- 0630 **Breakfast / Speakers Breakfast**
- 0700 **Registration at the Omni Resort**
- Session is Limited**
- 0800 **Reliable Power Scaling of Diode Laser Modules Based on Arrays of Single Emitters (Limited)**
Paul Leisher, nLIGHT Corporation
- 0825 **Single Emitter Based High Brightness Diode Lasers with High Brightness and Narrow Linewidth (Limited)**
Stefan Heinemann, Fraunhofer USA
- Session is now Open**
- 0850 **4kW, 1mm (0.20-NA), Continuous Wave, Single-WaveLength, 9xxnm, Fiber-Coupled, Turn-Key Diode-Laser System**
Rajiv Pandey, DILAS Diode Laser Inc.
- 0915 **Break**
- 0945 **Record Pulsed Power Demonstration from a 2 micron GaSb-Based OPSL Grown Lattice-Mismatched on an AlAs/GaAs Bragg Mirror and Substrate**
Jerome Moloney, University of Arizona
- 1010 **High Power Optically Pumped Semiconductor Laser at 1040 nm**
Jerome Moloney, University of Arizona
- 1200 **Conference Adjourns**

FRIDAY MORNING

USPLW

USPL Workshop Session 4 (Secret)

Session Chair: *Gerald Manke*, Naval Surface Warfare Center

Offsite Location

- 0630 Breakfast / Speakers Breakfast
- 0700 Registration at the Omni Resort
Buses to Offsite Location
- 0800 Welcoming Remarks
- 0815 DARPA's USPL Program
- 0845 Foreign USPL Developments
- 0905 Recent Foreign Developments
- 0925 Directed Energy Range Safety Data Collection
- 0945 Break
- 1000 Intense RF Emission from Filament Interaction
- 1030 EM generation with a USP Laser
- 1050 Recent Results form NRL's Ultra Short Pulsed Laser Program
- 1110 USPL System for Sensor Countermeasures
- 1200 Conference Adjourns

Upcoming Directed Energy Professional Society Events

**Directed Energy Test
and Evaluation Conference**
3-5 August 2010
Albuquerque, NM

**High Power Microwave
Conference**
14-17 September 2010
Shrivenham, United Kingdom

**Annual Directed Energy
Symposium**
15-19 November 2010
Bethesda, MD
Now Accepting Abstracts



Conference Organizers

Free Electron Lasers Conference

Roy Whitney, Jefferson Laboratory

Solid State and Diode Laser Technology Review

Kalin Spariosu, Raytheon

Sean Ross, Air Force Research Laboratory

Ultrashort Pulse Laser Workshop

Gerald Manke, NSWC Crane

Iain McKinnie, Kapteyn-Murnane Laboratories

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