

2006 IEEE LEOS Annual Meeting Conference Proceedings

**Montreal, QC, Canada
29 October – 2 November 2006**

Volume 1 of 2



**IEEE Catalog Number: 06CH37736
ISBN: 0-7803-9555-7**

**Copyright © 2006 by The Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republications permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, New Jersey USA 08854. All rights reserved.

IEEE Catalog Number: 06CH37736

ISBN: 0-7803-9555-7

ISSN: 1092-8081

Additional Copies of This Publication Are Available from:

IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854
IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854

Phone: (800) 678-IEEE
(732) 981-1393

Fax: (732) 981-9667

E-mail: customer-service@ieee.org

LEOS ANNUAL 2006 TABLE OF CONTENTS

Sunday, 29 October 2006

CARI	Careers in Research Forum	
CARI1	Working as an Independent Consultant	1
CARI2	A Career in Academia: The Obvious and the Not So Obvious.....	N/A
CARI3	Working in Industry: How I got From Picosecond Spectroscopy to Undersea Cable Telecommunications	N/A
CARP	Careers in Research Forum Poster Session	
CARP1	Research Activities in the McGill University Photonic Systems Group.....	3
CARP2	Research at Boston University Photonics Center	N/A
CARP3	Ultrafast Optics and Photonics as the INRS-EMT	5
CARP4	Optical Systems Research at AT & T	N/A
CARP5	Terahertz Science and Technology at Rice University	N/A
CARP6	Research in Long-Haul Undersea Fiber Optic Transmission Technology at TYCO Telecommunications	N/A
CARP7	The Emerging Communications Technology Institute (ECTI).....	N/A
CARP8	The Institute for Optical Sciences (IOS) at the University of Toronto	7
CARP9	Research In Optical Communications at Queen's University, Canada.....	9
CARP10	Technology and Applications for Flat Electrowetting Optics	N/A

Monday, 30 October 2006

PLE	Plenary Session	
PLE1	Key Technologies for Solid State Lighting.....	11
PLE2	My Voyage to the International Space Station.....	N/A
PLE3	The Search for Gravitational Waves	13
PLE4	Control and Measurement of Attosecond Pulses.....	15
MA	Novel Nonlinear Optics I	
MA1	Coherent Phenomena in High Power Quantum Cascade Lasers	N/A
MA2	Mode Coupling through a Long period Grating of $\chi^{(3)}$	16
MA3	Flexible Slow and Fast Light in Optical Fibers	18
MA4	Slow-Light in a 1300nm GaInNAs Vertical-Cavity Semiconductor Optical Amplifier	20
MB	Optoelectronic Interconnects	
MB1	3D Routing on Optical Boards.....	22
MB2	3-D Optical Wiring with Stacked Waveguide Films and Self-Organized Lightwave Network (SOLNET)	24
MB3	Athermal AWG Devices for WDM-PON Architectures.....	26
MB4	Optical Through-Wafer Interconnects for 3D Hyper-Integration.....	28
MC	Nitrides: Materials and Devices	
MC1	Deep Ultraviolet Light Emitting Diodes	30
MC2	Uniform Emission from Matrix-Addressable Micro-Pixelated InGaN Light-Emitting Diodes.....	32
MC3	InGaN/GaN based LEDs with Electroluminescence in Violet, Blue, and Green tuned by Epitaxial Growth Temperature.....	34
MC4	III-Nitride Wide Bandgap Semiconductors for Optical Communications.....	36
MC5	Observation of Strong Many-Body Effects in Thin InN Films Grown on GaN Buffer Layers	38

MD	Integrated Nanophotonics I	
MD1	Photonic Clocks, Raman Lasers, and Biosensors on Silicon.....	40
MD2	Planar High-Q Microresonators for Chip-Scale Integrated Silicon Photonics	42
MD3	Highly Dispersive Micro-Ring Resonator based on 1D Photonic Crystal – Design and Analysis.....	44
MD4	High-Finesse Micromachined Fabry-Perot Cavities with Silicon/Air DBR Mirrors	46
MD5	The Performance of an Optical Near-Field Generator and Detector Fabricated with Spherical Fused Silica and Silver Paste	48
ME	Semiconductor Laser Physics	
ME1	Carrier Heating from Holes in the Valence Band in a Bulk SOA.....	50
ME2	Quantum Dot Gain-Lever Laser Diode.....	52
ME3	Dynamics of Self-Pulsating Semiconductor Lasers Induced by Injection Current Modulation	54
ME4	Novel Low Time Jitter and Tunable Repetition Rate Short Pulse Generation using Compact Gain Switched Laser Diode Module.....	56
ME5	Exciton Binding Energy and Electron Effective-Mass in Strain Compensated InGaAsN/GaAs Single Quantum Well	58
ME6	Linewidth Enhancement Factor of a 1.3 μ m GaInNAs/GaAs Laser by Optical Gain Analysis	60
MF	Stabilized Frequency Combs and Attosecond Science	
MF1	Timing and Phase Stabilization of Ultrashort Light Pulses.....	62
MF2	Enhancement Resonators for Frequency Combs	64
MF3	Investigation of Impact of Optical Comb Stability on Optical Arbitrary Waveform Generation via Line-by- Line Pulse Shaping	66
MF4	Generation and Applications of Attosecond Pulses	68
MG	Holography	
MG1	Observation of Femtosecond Laser Pulses Propagating in Space and Time.....	70
MG2	Holography in New Shoes: A Digital-Analogue Interface.....	72
MG3	Speckles Removal in Digital Holography using Multiple Wavelengths/Distances from an Object	74
MG4	Phase Retrieval Method from Single Digital Hologram in Three-Dimensional Object Recording	76
MH	Free Space Optical Communications	
MH1	Free-Space Laser Communication Activities in Europe: SILEX and Beyond.....	78
MH2	Results of Ground-to-Space Optical Communications Experiments using a Low Earth Orbit Satellite	80
MH3	Outage Probability for Free-Space Optical Systems over Slow Fading Channels with Pointing Errors	82
MH4	1Gbit/s Handheld File Transfer System with Optical Wireless Interface	84
MI	Nonlinear Wave Mixing	
MI1	Enhanced $X^{(2)}$ Nonlinearities in AlGaAs Microring Resonators	86
MI2	LiInS ₂ and LiInSe ₂ : New Nonlinear Crystals for Continuous-Wave Difference-Frequency Generation in the Mid-Infrared	88
MI3	Cross-Phase Modulation in GaAs/AlAs Superlattice-Core Waveguides Below the Half Band Gap	90
MI4	All Optical Wavelength Conversion via Cross-Phase Modulation in Chalcogenide Glass Rib Waveguides.....	92
MI5	Excitation of Discrete X-waves in Nonlinear Waveguide Arrays	94
MJ	Optoelectronic Packaging	
MJ1	Injection-Molded Low-Cost MUX/DEMUX Module with Concave Micromirror Optical System	96
MJ2	Low-Cost Hybrid Photonic Integrated Circuits using Passive Alignment Techniques.....	98

MJ3	High Coupling Efficiency and High Yield Coaxial-Type Laser Module Packages using On-Line Monitoring System.....	100
MJ4	Silicon Micro Machined Hermetic Packaging Technology for Optical Subassemblies.....	102
MJ5	Advances in Multifunctional Fiber Optic Transceiver Packaging.....	104
MK	Nanowires, Dots and Dashes	
MK1	Growth and Characterization of Single Crystal Semiconductor Nanowires.....	106
MK2	Controlled Crystal Structure in Patterned InAs Quantum Dot Formation by Selective Area MOCVD	108
MK3	Integration of Quantum Dot Optoelectronic Devices using Selective-Area MOCVD	110
MK4	Interface Raman Modes to Study Compositional Intermixing in GaAs/AlAs Superlattice	112
MK5	Demonstration of a Novel Mid Infrared Device: The Quantum-Dot Avalanche Photodiode (QDAP).....	114
MK6	High Quality Postgrowth Emission Wavelength Engineering of InAs/InAlGaAs/InP Quantum Dash-in-Well Laser	116
ML	Integrated Nanophotonics II	
ML1	Mechanical Tuning of 2D Photonic Crystal with MEMS Electrostatic Actuator.....	118
ML2	Highly Efficient OADM using Mode Gap with Hexagonal Lattice Air-Hole PC Slab Waveguides.....	120
ML3	Fast All-Optical Pulse Train Modulation by Silicon Photonic Crystal Nanocavities.....	122
ML4	Spectral Properties of Photonic Crystal Double-Heterostructure Resonant Cavities	124
ML5	Focusing Dispersive Photonic Crystal Elements for Chip-Scale Wavelength Demultiplexing	126
MM	Emerging Concepts in Semiconductor Lasers	
MM1	High-Temperature and High-Power Terahertz Quantum Cascade Lasers.....	128
MM2	Silicon-Based Quantum Cascade Lasers using Electronic Intersubband Transitions in the L Valley	130
MM3	Two-Photon Based Semiconductor Entanglement-Sources and Detectors for Quantum Communications	132
MM4	Mid-Infrared Lasers and Molecular Spectroscopy Applications.....	134
MN	Applications of Ultrafast Technologies	
MN1	Ultrafast Nonlinear Interactions in Photonic Nanowires	N/A
MN2	Femtosecond Laser Nano-Surgery for Nerve Regeneration Studies	136
MN3	Terahertz Polaritonics: High-Field THz Coherent Control and Spectroscopy.....	138
MN4	Enhanced Low Frequency Content of THz Sources with Line Source Excitation.....	140
MO	Optical Memory	
MO1	Multilayered Optical Memory for High Density Data Storage in the Next Generation	142
MO2	Coaxial Holographic Data Storage without Recording the Zeroth-order Components	144
MO3	Experimental Evaluation of Three-Dimensional Shift Selectivity in Reflection-type Hologram	146
MO4	Peculiarities of Optical System of Combined Optical Pick-Up Head for Playback/Recording of Information on Discs of CD/DVD/BD Formats	148
MP	All Optical Components for Communications	
MP1	A Novel Model for SOAs in WDM Networks	150
MP2	FROG Characterisation of SOA-based Wavelength Conversion using XPM in Conjunction with Shifted Filtering up to Line Rates of 80 GHz.....	152
MP3	Measurement of the Jitter Transfer Function of a DFB Self-pulsating Laser using Arbitrary Optical Waveform Generation	154
MP4	Impact of Carrier Heating on SOA Dynamics for Wavelength Conversion.....	156

MP5	Amplitude Equalization of 40 Gb/s RZ-DPSK Signals using Saturation of Four-Wave Mixing in a Highly Nonlinear Fiber	158
MP6	Optical Clock Recovery Operation of a Colliding-Pulse Mode-Locked Laser Diode with Integrated Active- Passive Waveguides	160

Tuesday, 31 October 2006

TuA	Biophotonics I: Multimodal Imaging/Spectroscopic Techniques	
TuA1	In Vivo Multimodal Microscopy: Technology meets Biology	N/A
TuA2	Advanced Spectroscopic Coherence Tomography	162
TuA3	Intracavity Spectroscopy of Canine Lymphoma Cells in a Microfluidic Channel.....	164
TuA4	Sparse Solution for Fluorescent Diffuse Optical Tomography Systems: Phantom Results.....	166
TuB	Optoelectronic Design & Manufacturing	
TuB1	Wafer Scale Assembly and Test for the Production of Opto-Electronic Components	168
TuB2	Reliability Test Results for Optical Connectors Assembled with a Non-Smell & Highly Moisture Durable New Optical Adhesive	170
TuB3	PSpice Modeling of Thermal Performance in Laser Diodes Packaging.....	172
TuB4	Contract Manufacturing Trends for Advanced Optical Transceivers.....	174
TuC	Hybrid Materials and Devices	
TuC1	Scalable Wafer Bonding for Active Photonic Devices on Silicon.....	176
TuC2	Electrical and Optical Properties of a IV-VI Semiconductor Structure on Silicon	178
TuC3	GaSb QW-based 'Buffer-Free' Vertical LED Monolithically Embedded within a GaAs Cavity using Interfacial Misfit Arrays	180
TuC4	GaAsSbN/GaAsSb/InP Type-II Quantum Wells for Mid-IR Emission.....	182
TuC5	Hybrid Inorganic/Organic Micro-Structured Light-Emitting Diodes Produced by Self-Aligned Direct Writing	184
TuD	Quantum Nanophotonics	
TuD1	Quantum-Dot Spins and Cavity QED	186
TuD2	Scalable Quantum Computation with Photons and Trapped Ions	187
TuD3	Nanopatterning of InP(001) Surface using e-beam Lithography to Localize InAs Quantum Dots for Single Photon Source Application	189
TuD4	The Effect of Excitons on Raman Excitation Profiles in One-Dimensional Systems.....	191
TuE	Microwave Generation and Transmission	
TuE1	Dispersionless Terahertz Waveguides	193
TuE2	160GHz Two-Tone Lightwave Generation using High Extinction-Ratio Optical Modulation.....	195
TuE3	Transmission Performance of the Optical mm-Wave Signals Generated by Optical Carrier Suppression	197
TuE4	Optical Heterodyning of Narrow-Linewidth Surface Etched Distributed Bragg Reflector Laser Diodes	199
TuE5	Improved Serrrodyne Spur Suppression via Time Division Multiplexing	201
TuF	Ultrafast Fiber Optics	
TuF1	High Peak Power and High Energy Fiber Amplifiers.....	203
TuF2	Novel Fibers using Higher Order Modes: Applications to Femtosecond Pulses	205
TuF3	Soliton Self-Frequency Shift below 1300 nm in Higher-Order-Mode, Solid Silica-based Fiber	207
TuF4	Generation of 400-fs Solitons with 2-MHz Repetition Rate by a Yb-Fiber Laser.....	209

TuG	Nonlinear Optical Devices and Sensors	
TuG1	Photorefractive Effect in Ion-doped Relaxor Ferroelectric Crystals	211
TuG2	Advanced Laser Architectures for Lidar and Microwave Photonics Applications	213
TuG3	A Reservoir Dynamic Model for Linear Optical Amplifiers	215
TuG4	Intracavity Interferometry for Displacement Measurements in a Three Mirror Linear Mode-Locked Laser	217
TuG5	Methane Detection in Ambient Air by Difference Frequency Generation using a Direct-Bonded Periodically Poled LiNbO ₃ Ridge Waveguide	219
TuH	Regeneration in Optical Networks	
TuH1	OEO versus All-Optical Networks	221
TuH2	All-Optical 3R Regeneration using Higher-Order Four-Wave Mixing in a Highly Nonlinear Fiber with a Clock-Modulated Optical Pump Signal	223
TuH3	Optimization of All-Optical Wavelength Converter based on a Nonlinear Semiconductor Optical Amplifier and Delay Interferometer	225
TuI	Biophotonics II: Ultrahigh-Resolution Bioimaging	
TuI1	Multispectral Fluorescence Imaging for Tumor Detection and Molecular Biology	227
TuI2	16 kHz Scanning Optical Delay Line for Real-Time Video Rate Optical Coherence Tomography	229
TuI3	Comparative Analysis of Bio-Medical Imaging at 3.7 Terahertz with a High Power Quantum Cascade Laser	231
TuI4	Virtual Head Phantom for Evaluation of Near Infrared Topography	233
TuI5	Simultaneous Spatial and Temporal Focusing for Remote Axial Scanning in Wide Field Imaging	235
TuI6	Confocal Nonlinear Optical Microscopy for High Resolution Measurement of Tea-Leaf Cells	237
TuJ	Light Emission	
TuJ1	Silicon LEDs and Lasers	239
TuJ2	Silicon-based Photonic Crystal Nanocavity Light Emitters	240
TuJ3	Controlled Photoluminescence from Ge Quantum Dots in Photonic Crystal Microcavities	242
TuJ4	Si/Ge Semiconductor Saturable Bragg Reflectors for Integrated Mode-Locked Lasers	244
TuK	Negative Index Metamaterials	
TuK1	Optical Negative-Index Metamaterials: From Low to No-Loss and from Linear to Nonlinear Optics	246
TuK2	Toward Artificial Magnetism using Terahertz Split Ring Resonator Metamaterials	248
TuK3	Light Coupling through a Plasmonic Antenna Integrated on an InAs/GaAs Quantum Dot Infrared Photodetector	250
TuK4	Novel Metal-less Optical Left Handed Material by Coupled Semiconductor Quantum Dots	252
TuL	Semiconductor Nanostructures and Nanoplasmonics	
TuL1	Quantum Optics with Semiconductor Nanostructures	254
TuL2	Tuning Metallic Photonic Crystals with Patterned Gold Nanoparticles for Plasmonic Sensing	256
TuL3	Origin of Shape Dependence in Nano-Aperture Transmission	258
TuL4	Plasmonic Coaxial Nano-Cavities and Waveguides	260
TuL5	W-shaped Plasmon Waveguide for Silicon based Plasmonic Modulator	262
TuM	Radio over Fiber	
TuM1	Investigation of Intermodulation Distortion Reduction Technique for Multi-Channel Fiber-Radio Transmission in Heterogeneous Access Networks	264

TuM2	Switched Analogue Radio over Fibre Networks using Semiconductor Optical Amplifiers	266
TuM3	Characteristics of 60-GHz Analog Optical Transmitter Modules for Radio-over-Fiber Applications.....	268
TuM4	Millimetre-Wave Photonic Techniques for Broadband Communication and Sensor Applications	270
TuN	Ultrashort Pulse Sources	
TuN1	Femtosecond Optical Pulse Generation using Line-by-Line Shaping on a Phase-Modulated CW Laser.....	272
TuN2	Optical Pulse Shaping Technique based on a Simple Interferometry Setup.....	274
TuN3	Comparison of the Gain Recovery Times in Low Dimensional Semiconductor Amplifiers at 1.55 μm	276
TuN4	Pulse Generation and Compression via Ground and Excited State from a Grating Coupled Quantum Dot External Cavity Mode Locked Laser	278
TuN5	Pulse-Amplitude Equalized Rational Harmonic Mode-Locking by Negative Impulse Modulation	280
TuN6	Generating Amplitude Equalized Repetition Rate Multiplexed Pulses Directly from a Phase Modulated Fiber Laser	282
TuO	Nonlinear Microscopy and Spectroscopy	
TuO1	Label-Free and Low-Invasive Observations of Living Cells with Stimulated Parametric Emission Microscopy	284
TuO2	Optofluidic Intracavity Spectroscopic Characterization of Standard Microparticles	286
TuO3	Acceptance Angle Improvement in the Holographic Spectrometer for Diffuse Source Spectroscopy	288
TuO4	A Tandem Fabry-Perot Volume Hologram Spectrometer with High Resolution.....	290
TuO5	Ultra-Compact, High Efficiency, Quartz-Enhanced Photoacoustic Spectroscopy based Trace Gas Sensor Platform	292
TuP	Fiber to the Home	
TuP1	Technologies and Applications of FTTx.....	294
TuP2	Arbitrary Optical Waveform Generation for Advanced Optical Modulation Formats and FTTx.....	296
TuP3	Effects of Inverse-RZ and Manchester Code a Wavelength Re-used WDM-PON	298
TuQ	Biophotonics III: Novel Nanobiosensing Methods	
TuQ1	All-Optical Nanoscale pH Meter: A Plasmonic Nanodevice with Quantifiable Output.....	300
TuQ2	Novel Quantum Dot based Approach for Biosensing.....	302
TuQ3	Evanescence Field Response to Small Features on a Planar Waveguide Biosensor.....	304
TuQ4	Hyperspectral Fourier Transform Spectrometer for Spectral Self-Interference Measurements of Biological Material on Surfaces	306
TuQ5	Adsorption and Self-Assembly of Alkanethiols on GaAs (001) Surface	308
TuR	Waveguide Devices	
TuR1	Porous Silicon Waveguide Biosensors	310
TuR2	Planar Concave Grating Demultiplexer on a Nanophotonic Silicon-on-Insulator Platform.....	312
TuR3	Waveguide Birefringence in Asymmetric Silicon-on-Insulator Nanowires.....	314
TuR4	Tailoring the Response of Silicon Photonics Devices.....	316
TuS	Novel Materials, Processing and Devices	
TuS1	Fabrication and Optical Characterization of $\text{Ge}_{33}\text{As}_{12}\text{Se}_{55}$ (AMTIR-1) Thin Film Waveguides	318
TuS2	Raman Characterization of $\text{KGd}(\text{WO}_4)_2$ Waveguides Formed by Swift Heavy-Ion Irradiation	320

TuS3	Growth and Processing Techniques for Fabricating Ultra Broadband High-Power Low-Cross-Talk Semiconductor Optical Amplifiers.....	322
TuS4	Highly Sensitive Assessment of Dry Etch Damage by Measuring Microdisk Resonator Q.....	324
TuS5	1 x 2 and 1 x 3 Multimode Interference Couplers Fabricated by Hot Embossing and DUV-induced Modification of Polymers.....	326
TuT Micro Optics and Display		
TuT1	Diode Lasers for Displays.....	328
TuT2	Self-Assembled 3-D Polymer Micro/Nano Wire and Its Applications.....	330
TuT3	Compact Electro-Optic Modulator on Silicon-on-Insulator Substrates using Cavities with Ultra-Small Modal Volumes.....	332
TuT4	Analysis of Self-Organized Lightwave Network (SOLNET) for Nano Optical IC's by FDTD.....	334
TuU Microwave Photonic Devices		
TuU1	Low Noise High Power Solid State Laser for 1550 nm Wavelength Band.....	336
TuU2	Characterization of Third Order Distortion in InGaAsP Optical Phase Modulator Monolithically Integrated with Balanced UTC Photodetector.....	338
TuU3	Electrooptic Modulator with Polarization Reversal and Its Application.....	340
TuU4	High Power Electroabsorption Waveguide Device.....	342
TuV RF over Fiber Systems		
TuV1	Super Broadband Optical Wireless over Optical Fiber Network Architecture.....	344
TuV2	Techniques for Radio over Fiber Networks.....	346
TuV3	A Bi-Directional Radio-over-Fiber System with All-Optical Up-Converted DPSK for Downstream and Re- Modulated OOK for Upstream.....	348
TuW Signal Processing and Optical Sensors		
TuW1	Recognition Property of Quantum Character Recognition Algorithm.....	350
TuW2	Design and Prototyping of Parallel Exponential Modulo Function based on 2-D Spatial Coding and Digital Optical Computing.....	352
TuW3	Low Power, High Sensitivity Temperature Sensor using Fiber Bragg Gratings and VCSEL.....	354
TuW4	A Highly Sensitive Index Sensor based on Attenuated Total Reflection Inside a Cavity.....	356
TuW5	Implementation of Buried Detector Arrays for Waveguide Sensors.....	358
TuW6	A Fiber Index Sensor for Measurements of Oils and Liquids.....	360
TuX Fiber Gratings and Applications		
TuX1	Micrometer-Scale Measurement of the Local Bragg Wavelength of Fiber Bragg Gratings.....	362
TuX2	Analysis of Birefringence and Eigen-Axes Orientation Resulting from the Interplay between Initial and Form Birefringence in UV-Illuminated Fiber.....	364
TuX3	Novel Single Mode Fiber Lens Coupler for Laser-Diodes Based on Long Period Gratings in a Hybrid Graded-Index Multimode Fiber.....	366
TuX4	Spun Fiber Bragg Grating Sensors with Strong Resistance to Transverse Pressure.....	368
TuX5	All-Optical Temporal Differentiator based on a Single Phase-Shifted Fiber Bragg Grating.....	370
TuX6	Tunable GVD Compensators With Fixed Bandwidth and Center Wavelength based on Enhanced Thermal Chirping of FBGs.....	372
TuY Nano-biophotonics		
TuY1	Femtosecond Laser Nanosurgery and Study of Nerve Regeneration and Degeneration.....	374
TuY2	Rigorous Modal Method for the Analysis of Lamellar Metallic Gratings for Surface Plasmon Resonance Sensing.....	376
TuY3	Enhanced SPR Sensitivity using Sinusoidal Gratings.....	378
TuY4	Optical Nanoprobes for Biosensing and Therapy.....	380

TuZ	Nonlinear Effects	
TuZ1	Energy Harvesting in Silicon Photonic Devices	382
TuZ2	Helium Implantation into Silicon: Nonlinear and Linear Optoelectronic Applications	384
TuZ3	Two-Photon Photovoltaic Effect in Silicon Wavelength Converters	386
TuAA	Fibre Lasers & Amplifiers	
TuAA1	Generation and Full Characterization of High-Repetition Rate Odd-Symmetry Hermite-Gaussian Pulses.....	388
TuAA2	Highly Efficient Dual Wavelength Pumping Scheme for Thulium-doped Fiber Amplifier.....	390
TuAA3	Tuning Device Based in a Rare-Earth-Doped Fiber Laser using Multimode-Interference Effect	392
TuAA4	Femtosecond Soliton Mode-Locked Laser based on Ytterbium-doped Photonic Bandgap Fiber.....	394
TuAA5	Tunable Er ³⁺ -doped Fiber Amplifiers Covering S- and C+L Bands (1490 ~ 1610 nm) using Discrete All- Fiber ASE Suppressing Filters.....	396
TuAA6	Multiwavelength Generation in a Brillouin Semiconductor Fiber Laser	398
TuBB	High Speed Modulation	
TuBB1	High-Bandwidth VCSEL Devices	400
TuBB2	40 Gb/s Directly Modulated Lasers	402
TuBB3	Integration of Tapered Undercut-Etching-Active-Region Waveguide and Vertical Mode Expanders for Traveling-Wave Electroabsorption Modulator	404
TuBB4	Integrated InP Mach-Zehnder Analog Modulator.....	406
TuCC	Microwave Photonic Techniques and Applications	
TuCC1	Photonic Mixing in RF Modulated Optical Links	408
TuCC2	Electrical Equalization of Multi-Path Interferences using Subcarrier Multiplexing with Single Frequency Light Source.....	410
TuCC3	Photonic Beamformer with True Time Delay and Phase Control for Large Antenna Arrays	412
TuCC4	Fiber-Mounted Electro-Optic Probe with Highly Stable Sensitivity.....	414
TuDD	Enabling Technologies for Optical Networks	
TuDD1	Solution-Processed Telecom-Wavelength Active Optoelectronics: Monolithic Integration of Detectors and Sources using Colloidal Quantum Dots	416
TuDD2	Slow and Fast Light in Semiconductors.....	418
TuDD3	622/1244 Mb/s Burst-Mode CDR for GPONs.....	420
TuDD4	Novel Encoder and Correlator for Optical Code Division Multiple Access Networks.....	422
TuEE	Flexible Displays	
TuEE1	Highly Bendable Liquid Crystal Displays with Plastic Substrates for Mobile Applications	424
TuEE2	Flexible Organic Light-Emitting Diode Displays.....	426
TuEE3	Flexible Displays	428
TuEE4	Transparent Plastic Microplasma Flexible Light Sources	430

Wednesday, 01 November 2006

WA	Backplane Technologies	
WA1	Study of Organic Thin-film Transistor on Silicon Nitride Gate Dielectrics for Integration in Display Circuits and Arrays	432
WA2	Enabling Materials for Printed Electronics.....	434

WA3	An Enhanced and Simplified Optical Feedback Pixel Circuit for AMOLED Displays.....	436
WA4	P-OLED Microdisplays.....	438
WA5	Reducing Charge Injection in Active-Matrix a-Si TFT Pixels.....	440
WB	VCSELS I	
WB1	Nano-Aperture VCSELS.....	442
WB2	1.57 μm InAlGaAs/InP VCSELS with Al ₂ O ₃ Embedded Apertures	444
WB3	In-Phase Evanescent Coupled Implant Defined Vertical Cavity Laser Arrays	446
WB4	2-Dimensional Integrated VCSEL and PIN Photodetector Arrays for Bidirectional Optical Links.....	448
WB5	Threshold Current Reduction in a Vertical-Cavity Surface-Emitting Laser via Electron Spin Injection	450
WC	Special Symposium on Ultra-Wideband Signal Generation	
WC1	Photonically Implemented RF-UWB Waveform Generation and Filtering	452
WC2	Optical Generation and Distribution of UWB Signals	454
WC3	Integrated Lithium-Niobate Optical Modulators for Ultra-Wideband Signal Generation in Millimetre- and Micro-Wave Bands	456
WD	Group IV Devices	
WD1	Optical Receivers in CMOS using Ge-on-SOI Photodiodes	458
WD2	Strain Enhanced High Efficiency Germanium Photodetectors in the Near Infrared for Integration with Silicon	460
WD3	Distributed-Grating Wavelength Demultiplexer in SOI	462
WD4	Coupling Characteristics of Three-Guide Tapered Coupler for Interferometric Optical Isolator with Si Guiding Layer	464
WE	High Power Lasers	
WE1	High Energy High Repetition Rate Ultrashort Pulse Fiber Lasers	466
WE2	High Power Laser Diodes and Applications to Direct Diode HELs	468
WE3	Effect of Heat Spreader Location on Lasing Property of End-Pumped Vertical-External-Cavity Surface- Emitting Lasers (VECSELS).....	470
WE4	Theory of Intracavity Optical Second Harmonic Generation in Vertical-External-Cavity Surface-Emitting Lasers (VECSELS)	472
WF	Nanoplasmonics and Terahertz Applications	
WF1	Prediction of Coherent Optical Photons from Shock Waves in Crystals.....	474
WF2	Highly Efficient Surface-Plasmon Antenna and its Application to Si Nano-Photodiode	476
WF3	Beam-Steering at Optical Frequencies using Metal-Grating Antennas	478
WF4	Dynamic Metamaterials at Terahertz Frequencies	480
WG	Burst and Packet Switching	
WG1	Optical Burst Switched Networks	N/A
WG2	All-Optical Packet Compression by using the Active Vertical Coupler based Optical Crosspoint Switch Matrix.....	482
WG3	All-Optical Label Stacking Capacity for Packet Switching using Spectral Amplitude Code Labels	484
WG4	How to Build a Petabit-per-Second Optical Router	486
WH	Modulation Formats	
WH1	Performance Limits of FEC and Modulation Formats in Optical Fiber Communications	488
WH2	32.1 Gbit/s InverseRZ-ASK-DQPSK Modulation with Low Implementation Penalty.....	490
WH3	Increasing Dispersion Tolerance for Quaternary Optical ASK-DPSK by Chirp-Free Modulation.....	492
WH4	Dispersion Tolerance of 40 Gbaud Multilevel Modulation Formats with up to 3 Bits per Symbol.....	494
WH5	Experimental Investigation of Asymmetrical Filtered 43 Gb/s RZ-DQPSK.....	496

WI	Organic Light Emitting Diodes	
WI1	High Efficiency White-Light-Emitting Organic Devices Coupled with Lateral Color Conversion Layer	498
WI2	Electromagnetic Modeling of OLEDs and its Applications to High-cd/A OLEDs	500
WI3	Increasing Light Extraction of a Substrate Emitting OLED using a 2D Surface Grating	502
WI4	Red Phosphorescent Material Doped in the Hole- and Electron-Transport Layer of Organic Light-Emitting Device	504
WI5	White Organic Light-Emitting Devices with Selectively-Doped Emitting Layer	506
WJ	VCSELs II	
WJ1	High-Speed InGaAs VCSELs	508
WJ2	2-bit Optical Buffering using Polarization Bistable VCSELs	510
WJ3	Enhancement of the Optical Pumping Efficiency in Vertical External Cavity Surface Emitting Laser	512
WJ4	Tunable Vertical External Cavity Surface Emitting Laser Operating at 2- μ m	514
WJ5	Comparison of Buried and Implanted Tunnel Junction as Current Confinement Schemes for the Realisation of Single-Transverse-Mode Large Diameter (50 μ m) 1.55 μ m InP-based Electrically-Pumped VCSELs	516
WK	Special Symposium on Ultra-Wideband over Fiber	
WK1	Technologies for UWB-over-Fiber.....	518
WK2	Analysis of Laser Induced Distortions in Ultra Wide Band MB-OFDM over Fiber.....	520
WK3	Transmission of Ultra Wideband Signals through Radio-over-Fiber Systems	522
WK4	Experimental Investigation on Radio-on-Fiber Transmission of Full Ultra-Wideband Signal with a Novel Bandpass Filter	524
WL	Interconnect and Switching	
WL1	Polymeric Arrayed Waveguide Grating using Imprint Method Based on a Flexible PDMS Stamp	526
WL2	New Geometrical Shaped EO Deflectors	528
WL3	Polymeric Ring Resonator Enabling Electrically Variable Extinction Ratio	530
WL4	An Integrated 1x3 InP Photonic Switch	532
WL5	Molengineered Material Solutions for Today's Opportunities in Photonic-Microelectronic Integration	534
WM	Intense Lasers & Applications	
WM1	High Intensity Science at the 200TW/50W ALLS Facility	536
WM2	GeV Electron Beams from a Laser-Plasma Accelerator	538
WM3	Development of High-Intensity Few-Cycle Optical Parametric Chirped-Pulse Amplifiers Pumped by an Yb:YLF Chirped-Pulse Amplification Laser	540
WM4	Microwave Interferometric Measurements of the Electron Density Generated by a Sub-Picosecond 100 GW KrF Laser Pulses in Air.....	542
WN	Applications of Nanoparticles	
WN1	Light Emission from Silicon-based Nano-Materials	544
WN2	Photonic Crystal Microcavity with Colloidal PbSe Quantum Dots	545
WN3	CdSe/ZnS Core-Shell Nanocrystal based Scintillators for Enhanced Detection in UV.....	547
WN4	Size Effect in Optical Activation of TiO ₂ Nanoparticles in Photocatalytic Process.....	549
WN5	Large Enhancement of Second Order Non-Linear Effects in Ionic Self-Assembled Multilayer Films	551
WO	Optical Label Switching	
WO1	High Bit-Rate All-Optical Packet Switching	553
WO2	40 Gbit/s NRZ Packet-Length Insensitive Header Extraction for Optical Label Switching Networks	555

WO3	Optically Generated Quaternary Packets: Transmission over the KyaTera Network.....	557
WO4	Contention Resolution by means of Packet Envelope Detection Circuit with a Slow Saturable Absorber- based Vertical Cavity Semiconductor Gate	559
WP	Optical Transmitters & Receivers	
WP1	Coherent Detection: Born Again?	561
WP2	Fiber Bragg Grating Balanced DPSK Demodulation.....	563
WP3	All Optical Pulsewidth-Tunable CSRZ Signal Generation using LiNbO3 Modulator and Time Delay Interferometer.....	565
WP4	A Compact 43Gb/s Clock Recovery Module using a Dielectric Resonator Filter.....	567
WP5	40GHz Up-Conversion in Radio-over-Fiber System using a 10GHz Modulator and Birefringent Fiber Loop.....	569
WQ	High Speed Communication Technologies	
WQ1	Advances in Photonic Integrated Circuits (PIC) and Their Associated Impact on Fiber Optic Transmission Systems	571
WQ2	A 17 Gb/s, 200-meter Multimode Optical Fiber Link using CMOS Analog ICs and Silicon Carrier Packaging	573
WQ3	Embedded Laser Ablated Micro-Mirrors for Intra- and Out-of-Plane Coupling in Multilayer Optical Interconnections.....	575
WQ4	Vertical Light Coupling in Optical Interconnect Systems.....	577
WQ5	Optical Interconnects for Board-Level Signal Distribution at 10 Gb/s using Hybrid Integration	579
WQ6	In-plane Optical Interconnection with High Coupling Efficiency between Optical Chips and Waveguides	581
WR	High Power and Reliability Semiconductor Lasers	
WR1	High Power Diode Lasers.....	583
WR2	Novel High-Brightness Laser Diodes at 830 nm.....	585
WR3	Reliability of High-Power 1060-nm DBR Lasers	587
WR4	Highly Reliable Operation of 660 nm Laser Diodes for POF Data Links	589
WR5	14 dB Gain, 1.3 μ m Diode Laser Amplifier with Reshaping Capability using Main-Mode Suppression and Injection Technique	591
WS	Biophotonics IV: Progress in Biophotonic Therapeutic Technologies	
WS1	Photonic and Biophotonic Technologies: Impact on and Challenges in Photodynamic Therapy	593
WS2	Angiogenesis Enhancement by Laser-induced Stress Waves-assisted Gene Transfer of Hepatocyte Growth Factor in Grafted Skins	595
WS3	Improved Transfection Efficiency by the use of Lipofectamine-Modified Plasmid DNA in Laser-Induced Stress Wave-Assisted Gene Transfer: In Vitro Study	597
WS4	Tunable Mid-Infrared, High-Energy Femtosecond Laser Source for Glyco-Protein Structure Analysis.....	599
WS5	Experimental Prediction of Wavelength Dependence of Optical Path Length for Optical Intrinsic Signal Analysis	601
WT	Optofluidics	
WT1	Optofluidics	N/A
WT2	Optically Tweezed Silica Micro-Cantilevers	603
WT3	Integrated Fluidic Photonics for Multi-Parameter In-Plane Detection in Microfluidic Flow Cytometry.....	605
WT4	Dynamic Optoelectronic Tweezers for Particle and Cell Manipulation	N/A
WU	Silicon Photonics	
WU1	Ultrafast Pulse Propagation on Si Chips.....	607
WU2	Silicon Waveguides Based Ultra-Wide-band Filter for Raman Amplification.....	609
WU3	Multiple-Wavelength Dynamic Gain Transient Compensation based on Silicon Platform.....	611

WU4	All-Optical Signal Processing using Nonlinear Effects in Silicon Photonic Wire Waveguides	613
WV	Nanophotonic Emitters	
WV1	Symmetry Control of Wavelength-Scale Light Emitters	615
WV2	Electrically Injected Photonic Crystal Light Emitters with Spatially Localized Gain	617
WV3	Electrically Injected Quantum Dot Photonic Crystal Microcavity Light-Emitting Arrays with Air-bridge Nano-Contacts	619
WV4	High Speed Dynamics of Photonic Crystal Nanocavity Laser	621
WW	Packet Switching	
WW1	Implementation Challenges in the OSMOSIS Optical HPC Switch	623
WW2	An Enhanced Buffered Switching Node for a Data Vortex Interconnection Network.....	625
WW3	Signal Integrity of RZ Data in Micron-Scale Silicon Ring Resonators	627
WW4	Waveband Deaggregator Cascading Effect in Multi-Granularity Optical Cross-Connect Nodes	629
WW5	Bistable Switching Node for Optical Packet Switched Networks	631
WX	Transmission over Multimode and Microstructure Fibers	
WX1	Optical Transmission with Mircostructured Fibers	633
WX2	Modal Bandwidth Enhancement of Plastic Optical Fibers by W-Shaped Index Profile and Low-Dispersion Fluorinated Polymer	635
WX3	40 Gbps Short Reach Links using Plastic Optical Fiber.....	637
WX4	MIMO Processing of Multi-Mode Fiber Links	639
WX5	Data Parallelization by Optical MIMO Transmission over Multi-Mode Fiber with Inter-Modal Coupling.....	641
WX6	Raman Amplification in Multi Mode Fiber: A Method to Reduce Inter-Symbol Interference via Mode Selective Gain	643
WY	Silicon Photonics	
WY1	A 4 Channel WDM Silicon Photonics Transceiver Integrated with Electronics in a Volume CMOS Process	N/A
WY2	Devices utilizing Free-Space Optics on a Chip.....	645
WY3	WDM Silicon Modulators based on Micro-Ring Resonators	647
WY4	Tunable Transmission Resonant Filter and Modulator with Vertical Gratings	649
WY5	Perfect 4-way Plasmon Splitting in Cross Gap Waveguides Intersection	651
WZ	Grating Feedback Semiconductor Lasers	
WZ1	Spectral Narrowing and Locking of Vertical External-Cavity Surface-Emitting Lasers using a Volume Bragg Grating.....	653
WZ2	Monolithically Integrated Four-Channel DFB Laser Array by MOVPE Selective Area Growth for 1.5 μm CWDM Systems	655
WZ3	4.6 nm Mode-Hop-Free Tunable DFB Laser with High Coupling Coefficient Gratings.....	657
WZ4	A Spectrum-Narrowed, Wavelength and Temperature Stabilized Broad Area Laser using a Subwavelength Resonant Grating Filter Feedback	659
WZ5	Novel Modulation Capability of a Long Hybrid Semiconductor Fiber-Grating Laser with an Intra-Cavity Saturable Absorber.....	661
WZ6	Low Sensitivity to Optical Feedback and Optical Injection of Discrete Mode Lasers	663
WAA	Biophotonics V: Advanced Low-Level Laser Therapy and Biosensors	
WAA1	Progress in Low-Level Laser Therapy	665
WAA2	Compact Photonic Crystal Spectrometers for Lab-on-a-Chip Biosensing Applications	667
WAA3	Monolayer Detection using Etched-Core Fiber Bragg Grating Sensors	669
WAA4	A Plasmon-Controlled Fluorescence Biochip.....	671
WAA5	Laser Patterning of Biotinylated Nanobeads Immobilized on (001) GaAs Surface.....	673

WAA6	Imaging Differential Phase Surface Plasmon Resonance Biosensors	675
WBB	Integrated Photonics	
WBB1	Opportunities and Challenges in Silicon Photonics	677
WBB2	Magneto-Optic Contact for Application in an Amplifying Waveguide Optical Isolator	679
WBB3	Performance Optimization of a Reconfigurable Waveguide Digital Optical Switch on InGaAsP/InP.....	681
WBB4	HBT Lasers	N/A
WCC	Continuum Generation	
WCC1	Fibers for Continuum Generation and Frequency Metrology	683
WCC2	Long-Term and Short-Term Spectral Stability Characterization of Supercontinuum Laser Sources.....	685
WCC3	SOA-based Multi-Wavelength Comb Laser with 25GHz Spacing	687
WCC4	Supercontinuum Generation in a Microstructured Optical Fiber by Picosecond Self Q-switched Mode- Locked Nd:GdVO ₄ Laser	689
WDD	Near Field Optics	
WDD1	Multiple Probe Interactions in Near-Field Imaging	691
WDD2	Imaging Sub-Micron Scale Light Confinement in Silicon Waveguides with Apertureless Transmission- based Near-Field Scanning Optical Microscopy	693
WDD3	Subsurface Imaging with Widefield and Confocal Numerical Aperture Increasing Lens Microscopes.....	695
WDD4	Evanescence Probing of Chalcogenide Photonic Crystal Waveguides and Nanocavities.....	697
WDD5	Coupling to Ultra-Small Nanocavities for Single-Photon Source Applications via Tapered Nanowire Micro- Loops	699
WEE	Optical Access Networks	
WEE1	Optics in Data Communication Networks and Ethernet Applications	N/A
WEE2	Upstream Transmission and Local Area Network Emulation in Passive Optical Networks using a Single Wavelength-Seeded RSOA	701
WEE3	Bi-Directional 120 km Long-Reach PON Link based on Distributed Raman Amplification	703
WEE4	85 km Long Reach PON System using a Reflective SOA-EA Modulator and Distributed Raman Fiber Amplification	705
WEE5	Reduction of Reflections in Interleaved Bi-Directional DWDM Systems using SOA Inline Amplification	707
WFF	Display Systems & 3D Visualization	
WFF1	3-D Imaging and Visualization of Biological Microorganisms	709
WFF2	Real-Time Compensation for Angular-Dependent Color Shift in TN LCDs	711
WFF3	Luminance Enhancement and Blur Effect of Microlens Array Film Attachment on Organic Light-Emitting Device	713
WFF4	High Dynamic Range Display Adopting High Dynamic Range Imaging Technique	715
WFF5	MEMS based Highly-Informative Image Display System for Visual Information Processing	717

Thursday, 02 November 2006

ThA	Special Symposium on Single Photon Geiger Mode Detectors	
ThA1	Recent Advances in Silicon Single Photon Avalanche Diodes and Their Applications.....	719
ThA2	Single Photon Imaging in CMOS.....	721
ThA3	Review of SPM Low Light Level Detectors.....	723
ThB	Microcavity and Microdisk Diode Lasers	
ThB1	High Power Semiconductor Disk Lasers.....	725
ThB2	Chaotic Microcavity Lasers	727

ThB3	Morphological Dependence of Emission Patterns from Oval-Billiard Microcavity Laser Diodes	729
ThB4	Room Temperature InGaSb Quantum Well Microcylinder Lasers at 2 μm Grown Monolithically on a Silicon Substrate	731
ThC	Periodically-Poled Devices and Applications	
ThC1	Guided-Wave Nonlinear Devices for Classical and Quantum Optical Signal Processing	N/A
ThC2	Guided-Wave Singly-Resonant CW PPLN RPE Fiber-Loop Ring OPO	733
ThC3	Widely Tunable 3.4-μm-Band Wavelength Converter using Apodized $X^{(2)}$ Grating	735
ThC4	Ultrasensitive Nonlinear Measurements of Femtosecond Optical Pulses at 1.5 μm by Aperiodically Poled Lithium Niobate Waveguides	737
ThD	Solid State Laser Systems	
ThD1	Review of MPS Solid State Laser Systems	N/A
ThD2	Cryogenically Cooled Ytterbium Doped Sesquioxide Ceramic Lasers	739
ThD3	Generation of Sub-Nanosecond Shaped 5-50mJ Pulses from a Compact Regenerative Yb^{3+}:YAG MOPA	741
ThD4	Growth and Mid-Infrared Laser Performance of Er^{3+}:KPb_2Cl_5	743
ThD5	Coherent Beam Combining of Multiple Solid-State Lasers with Simplified Active Stabilization	745
ThE	Trends in Optical Interconnects and Processing	
ThE1	All-Optical and Optoelectronic Serial-to-Parallel Conversion of High-Speed, Asynchronous Optical Packets	747
ThE2	Trapping Light on Chip – Breaking the Delay-Bandwidth Product	N/A
ThE3	The Convergence of Informatics and Lightwave Communications	749
ThF	Advanced Planar Lightwave Circuits	
ThF1	Advanced Ring Resonator based PLCs	751
ThF2	Ultra-fast Binary Code Pulse Train Generation using Planar Lightwave Circuits	753
ThF3	Ultra-Fast Photonic Signal Processing using 2D Ring Resonator Arrays Designed with the Direct Temporal Domain Approach	755
ThF4	Low-Crosstalk LiNbO_3 Optical Switch with Embedded Sub Mach-Zehnder Structures	757
ThF5	Compact Single-Chip AWG Multiplexer with Variable Attenuator Integrated Micro-Mirror and Stacked PD-Array	759
ThG	Photonic Crystal Waveguides & Resonators	
ThG1	Photonic Band Gap Materials: Engineering the Fundamental Properties of Light	761
ThG2	Photonic Band Tuning in 2D Photonic Crystals by Atomic Layer Deposition	763
ThG3	Novel Hetero-Structures Formed by Refractive Index Variations in Chalcogenide-based Photonic Crystal Slabs	765
ThG4	Topology Optimization for Photonic Crystal Waveguide with Wide and Flat Bandwidths in Ultra-Fast All- Optical Switch (PC-SMZ)	767
ThG5	All-Optical Bistability in Photonic Crystal Resonators based on InGaAsP Quantum-Wells	769
ThH	Optical Transmission	
ThH1	Using Testbeds for Optically-Transparent Mesh Network Experimentation	771
ThH2	Application of the Nonlinear Transfer Function to Dispersion Map Evaluation in DPSK Transmission Systems	773
ThH3	CSRZ-ASK and DPSK 40 Gb/s All-Raman WDM Transmission based on UltraWaveTM Fiber	775
ThH4	Equalisation of Fibre Bragg Gratings' Group Delay Ripple by means of Maximum Likelihood Sequence Estimation	777
ThH5	Low-Cost Polarization Scrambling using a Single Re-Entrant Polarization Controller	779

ThI	Photon Counting and Linear Mode APDs	
ThI1	InGaAs/InP MOS Single Photon Detector	781
ThI2	Afterpulsing Effects in 1.5 μm Single Photon Avalanche Photodetectors	783
ThI3	InP-based MIR Avalanche Photodiodes: Current Status and Future Prospects.....	785
ThI4	Excess Noise and Avalanche Multiplication in InAlAs	787
ThI5	A Comparison of the Lower Limit of Multiplication Noise in InP and InAlAs Based APDs for Telecommunications Receiver Applications	789
ThJ	Mode Locked Semiconductor Lasers	
ThJ1	Recent Advances in Stabilized Ultrafast Modelocked Semiconductor Diode Lasers for High Speed Information Based Applications	791
ThJ2	Ultralow Jitter Semiconductor based Actively Mode-Locked Laser	792
ThJ3	High Power 1.5- μm InGaAsP/InP Colliding-Pulse Mode-Locked Slab-Coupled Optical Waveguide Laser	794
ThJ4	High Power All-Quantum-Dot based External Cavity Mode Locked Laser.....	796
ThJ5	Temperature Dependence of Pulse Duration in a Mode-Locked Quantum-Dot Laser: Experiment and Theory	798
ThK	Multi-Photon and Quantum Processes	
ThK1	Multiphoton Interaction of Light with Dielectrics	800
ThK2	On-Demand Photon-Number State Generation via Cavity Parametric Down Conversion.....	802
ThK3	Nonlinear Refraction in ZnS Crystal Associated with Three-Photon Absorption.....	804
ThK4	Triggerable Continuum Source for Single-Shot Ultra-Fast Applications.....	806
ThL	THz and Fiber Lasers	
ThL1	Solid-State-Laser-Pumped THz Parametric Generation and Detection and Applications.....	808
ThL2	Advances in High Power Fiber Lasers and Amplifiers	N/A
ThL3	Dual-Frequency Ytterbium-Doped Fiber Laser	809
ThM	Heterogeneous Integration	
ThM1	Optical Interconnection in CMOS IC with Optical Waveguide and Heterogeneous Integrated Opto- Devices	811
ThM2	Experimental Validation of a Multi-Scale Free-Space Intra-Chip Optical Interconnection Fabric Concept.....	813
ThM3	Coupling Structure for Intrachip Optical Global Communication: Design and Simulation	815
ThM4	Resonant Grating Based Fabry-Perot Cavity in AlGaAs/GaAs	817
ThM5	A New Form of Flat Optics Enabled by Electrowetting Micropisms	819
ThM6	Reprogrammable Optical Phase Array (ROPA) used as a 1x6 Space Switch	821
ThM7	A 2.5-Gbps De-Skew Chip for Very Short Reach (VSR) Interconnects	823
ThN	Photonic Crystal Waveguides and Fibers	
ThN1	Advanced Design and Optimization Techniques for Photonic Crystal Devices	825
ThN2	Low Loss Photonic Crystal Waveguide by Elliptical Unit Cell Structure.....	827
ThN3	Gaussian Filtering with Tapered Liquid Crystal Photonic Bandgap Fibers	829
ThN4	Observation of Photoluminescence of Semiconductor Nanocrystal Quantum Dots in the Core of Photonic Bandgap Fiber	831
ThN5	Realization of Large Hollow-Core Photonic Band-Gap Fibers with Suppressed Higher-Order Modes.....	833
ThO	Photonic Crystal Devices and Techniques	
ThO1	1-D Photonic Crystal as an Anti-Reflection Layer for First Band Photonic Crystals.....	835
ThO2	Theoretical and Experimental Investigation of Efficient Photonic Crystal Cavity-Waveguide Couplers	837
ThO3	Stratified Photonic Crystal Demultiplexer.....	839

ThO4	Pseudo-Interference and Its Application in Determining Averaged Phase Refractive Index of Photonic Crystals	841
ThO5	Planar Focusing Lens Grating for Vertical Coupling on 2D Photonic Crystal Slab Waveguide.....	843
ThO6	Finite-Size Resonant Sub-Wavelength Grating High Reflectivity Mirror.....	845
ThO7	Fabry-Perot Cavity Design in AlGaAs/GaAs using a Photonic Crystal Slab for a Resonant Cavity Detector	847
ThP	Signal Processing in Photonic Networks	
ThP1	Slow Gap Solitons in an Optical Fibre Bragg Grating.....	849
ThP2	Simultaneous Label Erasure and Rewriting using a Single Reflective Semiconductor Optical Amplifier for DPSK/ASK Optical Label Switching.....	851
ThP3	Simultaneous Data Demodulation and All-Optical Clock Extraction from Pure DPSK Packets.....	853
ThP4	Statistical Analysis of Multi-Channel Fibre Optical Parametric in Agile Photonic Networks.....	855
ThP5	Simultaneous 160 Gb/s Add-Drop Multiplexing in a Non-Linear Optical Loop Mirror	857
ThQ	APDs and Si-based Detectors	
ThQ1	A Physics-based Model to Predict Bit Error Rate of an Optical Telecommunication System Incorporating an Avalanche Photodiode that Includes the Effects of Dead Space and Finite Carrier Velocity	859
ThQ2	SiC Avalanche Photodiodes	861
ThQ3	Ge/Si Heterojunction Photodiodes by Wafer Bonding.....	863
ThQ4	Geometry Dependence of Leaky-Mode, Waveguide-Coupled, Polysilicon Photodetectors.....	865
ThR	Quantum Dot Lasers	
ThR1	1.3 μ m Emitting, Self Assembled Quantum Dot Lasers	867
ThR2	High Performance 1.5 μ m Metamorphic InAs Quantum Dot Lasers on GaAs	868
ThR3	Ultra Low Threshold at Room Temperature on 1.55 μ m InAs/InP(311)B Laser with an Active Zone based on a Single Quantum Dot Layer	870
ThR4	1.3-mm Quantum Dot Monolithic Multi-Section Passively Mode-Locked Lasers	872
ThR5	Harmonic Mode-Locking of a Quantum-Dot Laser Diode.....	874
ThS	Solitary Phenomena	
ThS1	Nonlinear Surface Waves at the Interface of Discrete and Continuous Media.....	876
ThS2	Propagation, Stability and Interactions of Novel Three-Wave Parametric Solitons	878
ThS3	Spatio-Temporal Effects in Nonlinear Discrete Media	880
ThT	Laser Parameters and Materials Processing	
ThT1	Various Ambiguities in Re-Constructing Laser Pulse Parameters.....	881
ThT2	Fourth Harmonic CW Mode-Locking of a Diode Pumped Nd:YVO ₄ Laser	883
ThT3	Femtosecond Laser Waveguide Writing: Contrasting Interactions at MHz and kHz Repetition Rates	885
ThT4	Interconnection Microvia Drilling using Solid State UV Laser	887
ThU	X-Ray Imaging	
ThU1	Ultrafast Time-Resolved X-ray Diffraction of Coherent Phonons in Semiconductors	889
ThU2	Dynamic Imaging System for Measuring L-shell Absorption Structures of Aluminum in Femtosecond Laser Ablation Plume.....	891
ThU3	Submicron Digital In-Line Holographic Microscopy at 32nm with High-Order Harmonics.....	893
ThU4	Nanometer-Scale Resolution Microscopy with Compact Extreme Ultraviolet Lasers	895

ThV	Novel Waveguides I	
ThV1	Towards the Monolithically Integrated Optical Isolator on a Semiconductor Laser Chip.....	897
ThV2	Wideband Operation of Magneto-Optical Isolator with Phase Adjusted Mach-Zehnder Interferometer	899
ThV3	Parallel-Coupled Nonreciprocal Microring Resonators for Miniaturized Optical Isolators with Wider Bandwidth	901
ThV4	Ge/SiGe Quantum-Confined Stark Modulators on Silicon.....	903
ThW	QKD & OCDMA	
ThW1	QKD Networking from an Operator's Point of View	N/A
ThW2	Novel Building Block for Multiple Encoding and Decoding in Spectral Amplitude Encoded OCDMA.....	905
ThW3	Simulation of Real SAC-OCDMA under Both S-ALOHA and R^2T Random Access Protocols	907
ThW4	Experimental Demonstration of Multi-Channel Coherent Detection for Spectral Phase-Encoded OCDMA Systems	909
ThW5	A Comparison of Optical Sources for Spectral Amplitude Coding OCDMA.....	911
ThX	High-Speed Data Transmission	
ThX1	Single Channel Transmission Beyond 1 Tbit/s.....	913
ThX2	160-Gb/s All-Optical OTDM Demultiplexing and Pulse Reshaping by using Cascaded Wavelength Conversion in PPLN Waveguides	915
ThX3	Performance of Pulse Source Consisting of an Externally Injected Gain-Switched Laser Followed by a Nonlinearly/Linearly Chirped Grating in an 80 Gb/s OTDM System	917
ThY	Imaging & Photoreceivers	
ThY1	Quantum Well and Quantum Dot based Detector Arrays for Infrared Imagin.....	919
ThY2	High-Speed Photo-Response Properties of Organic Photo-Detectors utilizing Copper-phthalocyanine as an Imaging Devices	921
ThY3	A Large Aperture and Field-of-View Telescope with 1-mm InGaAs/InAlAs Avalanche Photodiodes	923
ThY4	InP-based Narrow Band Photodetector Modules for 40 to 100 GHz Linear High Power Applications.....	925
ThY5	A CMOS Imaging Diversity Receiver Chip with Flip-Chip Integrated Detector Array for Optical Wireless Links	927
ThZ	Novel Cavity Design	
ThZ1	Recent Development on Silicon Raman Lasers and Amplifiers	929
ThZ2	Lowest Order Ring Mode Lasing in Confocal Quasi-Stadium Laser Diodes.....	931
ThZ3	Intrinsic Parameter and Modal Characteristics of Asymmetric Cladding Ridge Waveguide Lasers for Photonic Integrated Circuits	933
ThZ4	High-Efficiency Oxide-Confined Ridge Waveguide Laser with Nearly Symmetric Output Beam	935
ThZ5	Native Oxidation of Aluminum-Containing III-V Compound Layers for Increased Current and Optical Confinement in Semiconductor Lasers	937
ThAA	Novel Nonlinear Optics II	
ThAA1	Bandgap Engineering and Spatial Confinement of Optical Phonon in ZnO Quantum Dots	939
ThAA2	Nonlinear Propagation Effects in Integrated Chalcogenide Waveguide Gratings	N/A
ThAA3	Fiber Parametric Devices	941
ThBB	Integrated Optics	
ThBB1	Characterization of Hybrid Integrated All-Optical Flip-Flop	943
ThBB2	Optoelectronic Integration for Planar Lightwave Systems in Chip Scale Sensing, Optical Interconnect, and Signal Processing	945
ThBB3	Rapid Liquid Variable-Focus Lens with 2-ms Response	947

ThCC	Coherent X-Ray	
ThCC1	Molecules in the Strong Attosecond XUV Field.....	949
ThCC2	Generation and Pulsewidth Characterization of High Repetition Rate Soft X-ray Lasers Operating at 13.2 nm and 13.9 nm.....	951
ThCC3	Nano-Scale Ablation with a Compact Extreme Ultraviolet Laser.....	953
ThCC4	Ablation Harmonics as a New Source for Intense Coherent Soft X-ray Radiation.....	955
ThDD	Novel Waveguides II	
ThDD1	High Contrast Surface Waveguide Technology for Biochemical Sensing and Telecom Applications.....	957
ThDD2	Electrooptic Multimode Interference Device based on Nonlinear Organic Materials.....	959
ThDD3	(Pb, La)(Zr, Ti)O ₃ Thin Film Arrayed Waveguide Grating.....	961
ThDD4	86-Gbit/s Differential Quadrature Phase-Shift-Keying Modulator using Hybrid Assembly Technique with Planar Lightwave Circuit and LiNbO ₃ Devices.....	963
ThEE	Backbone Networks	
ThEE1	Backbone Network Trends and Expectations: Assessing Evolving Needs & Costs.....	965
ThEE2	40 Gb/s Transmission over a Reconfigurable 10 Gb/s WDM System Scaling beyond 1000 km of G.652 Fiber.....	966
ThEE3	Adjacent Channel Interference due to Wavelength Drift of a Tunable Laser in Base-Band and Subcarrier Multiplexed System.....	968
ThEE4	Low-Cost In-Band Optical Signal-to-Noise Ratio Monitoring using an Optical Interferometer.....	970