

2017 IEEE Photonics Society Summer Topical Meeting Series (SUM 2017)

**San Juan, Puerto Rico, USA
10-12 July 2017**



**IEEE Catalog Number: CFP17SUM-POD
ISBN: 978-1-5090-6572-1**

**Copyright © 2017 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 republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP17SUM-POD
ISBN (Print-On-Demand):	978-1-5090-6572-1
ISBN (Online):	978-1-5090-6571-4
ISSN:	1099-4742

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

SYNTHESIS OF GE-SN ALLOYS BY ION IMPLANTATION AND PULSED LASER MELTING: TOWARDS A GROUP IV DIRECT BAND GAP SEMICONDUCTOR	1
<i>J S Williams ; T T Tran</i>	
α-SN AND α-$Sn_{1-x}Ge_x$ FILM GROWTH, CHARACTERIZATION, AND STABILITY	3
<i>Arnold M. Kiefer ; Gordon J. Grzybowski ; Stephanie A. Chastang ; Bruce B. Claflin</i>	
A NEW ARCHITECTURE FOR FABRICATION OF ON-CHIP ARRAYS OF NANOSCALE LIGHT SOURCES IN THE UV-VISIBLE.....	5
<i>Babak Nikoobakhsh</i>	
NANOPHOTONIC DEVICES FOR POWER-EFFICIENT COMPUTING AND OPTICAL INTERCONNECTS	7
<i>Zheng Wang ; Zhoufeng Ying ; Shounak Dhar ; Zheng Zhao ; David Pan ; Ray T. Chen</i>	
ELASTIC OPTICAL TECHNOLOGIES AND SDN/NFV CONTROL FOR 5G MOBILE X-HAUL.....	9
<i>R. Muñoz ; J. M. Fàbregas ; R. Casellas ; M. Svaluto Moreolo ; R. Vilalta ; L. Nadal ; R. Martínez</i>	
REMINISCENCES ON 25 YEARS OF DOD INVESTMENTS LEADING TO QUANTUM INFORMATION	11
<i>Peter Reynolds</i>	
GESN-BASED LIGHT SOURCES AND PHOTOCONDUCTORS TOWARDS INTEGRATED PHOTONICS FOR THE MID-INFRARED	13
<i>Joe Margetis ; John Tolle ; Wei Du ; Seyed Ghemtiri ; Mansour Mortazavi ; Sattar Al-Kabi ; Yiyin Zhou ; Huong Tran ; Thach Pham ; Wei Dou ; Perry Grant ; Shui-Qing Yu ; Greg Sun ; Richard Soref ; Yiyin Zhou ; Perry Grant ; Baohua Li</i>	
(SI)GESN PLASMONICS	15
<i>Inga Anita Fischer ; Lion Augel ; Audrey Berrier ; Michael Oehme ; Jörg Schulze</i>	
WIDE BAND PARAMETRIC OPTICAL PROCESSES IN CRYSTALLINE MICRORESONATORS	17
<i>Wei Liang ; Anatoliy A. Savchenkov ; Vladimir S. Ilchenko ; Danny Eliyahu ; Andrey B. Matsko ; Lute Maleki</i>	
POLARIZATION BISTABLE VCSELS AND THEIR APPLICATIONS TO ALL-OPTICAL SIGNAL PROCESSING	19
<i>Hitoshi Kawaguchi</i>	
OPTICAL TIME-SLOT INTERCHANGER AND SI-BASED DELAY LINES TOWARDS INTEGRATED FEED-FORWARD BUFFERS.....	21
<i>Miltiadis Moralis-Pegios ; George Mourigas-Alexandris ; Theonitsa Alexoudi ; Matteo Cherchi ; Mikko Harjanne ; Timo Aalto ; Nikos Pleros ; Konstantinos Vrysokinos</i>	
ENTANGLEMENT SWAPPING WITH TWO IMPERFECT STATES	23
<i>B. T. Kirby ; S. Santra ; V. S. Malinovsky ; M. Brodsky</i>	
QUANTUM-SCHEME FOR IMPROVING INTERFEROMETRIC VISIBILITY WITH IMPERFECT DISTRIBUTED ENTANGLED-STATES.....	25
<i>Siddhartha Santra ; Brian T. Kirby ; Vladimir S. Malinovsky ; Michael Brodsky</i>	
WILL GE AND GESN LASERS ENABLE SI PHOTONICS IN THE MID-INFRARED?	27
<i>A. Chelnokov ; N. Pauc ; A. Gasseng ; J. Aubin ; Q. M. Thai ; L. Milord ; M. Bertrand ; K. Guillot ; J. Rothman ; T. Zabel ; H. Sigg ; J. M. Hartmann ; V. Calvo ; V. Reboud</i>	
VISIBLE-WAVELENGTH PHOTONIC INTEGRATED CIRCUITS FOR TRAPPED-ION QUANTUM COMPUTING	29
<i>Karan K. Mehta ; Gavin N. West ; Rajeev J. Ram</i>	
SINGLE CRYSTAL ALN SUBSTRATES FOR ALGAN-BASED UV OPTOELECTRONICS	31
<i>Rafael Dalmau ; Baxter Moody ; H. Spalding Craft ; Raoul Schlessier</i>	
SILICON PHOTONIC SWITCH WITH SPOT SIZE CONVERTERS FOR LOW-LOSS, POLARIZATION-INSENSITIVE OPTICAL COUPLING TO FIBERS	33
<i>Shigeru Nakamura ; Shigeyuki Yanagimachi ; Hitoshi Takeshita ; Akio Tajima</i>	
SILICON 16×16 SWITCH MATRIX BASED ON DUAL-RING ASSISTED MZI STRUCTURES WITH FAST AND ENERGY EFFICIENT SWITCHING	35
<i>Linjie Zhou ; Liangjun Lu ; Zhanzhi Guo ; Jianping Chen</i>	
OPTICAL ACCESS NETWORK TECHNOLOGIES FOR FUTURE RADIO ACCESS NETWORKS.....	37
<i>Jun Terada ; Tatsuya Shimada ; Akihiro Otaka</i>	
OPTICAL ACCESS TECHNOLOGIES FOR 5G MOBILE COMMUNICATION NETWORKS.....	39
<i>Hwan Seok Chung ; Han Hyub Lee ; Keong-Hwan Doo ; Kwangok Kim ; Seoung-Hwan Kim ; Seung-Hyun Cho ; Jun Ki Lee ; Jong Hyun Lee</i>	

CONCEPTS AND REQUIREMENTS FOR THE ETHERNET-BASED EVOLVED FRONTHAUL	41
<i>Nathan J. Gomes ; Philippouss Assimakopoulos ; Jörg-Peter Elbers ; Daniel Münch ; Philippe Chanclou ; Volker Jungnickel</i>	
NOVEL GROUP IV NANO- AND MICRO-STRUCTURES FOR LIGHT SOURCES ON SILICON	43
<i>Y. Y. Li ; Y. Han ; Y. X. Song ; Z. P. Zhang ; Z. S. Zhu ; Q. M. Chen ; J. J. Liu ; S. M. Wang</i>	
SPIN-OPTOELECTRONIC FUNCTIONALITIES OF GROUP IV MATERIALS	45
<i>Fabio Pezzoli ; Sebastiano De Cesari ; Elisa Vitiello ; Maksym Myronov</i>	
HEXAGONAL BORON NITRIDE EPILAYERS FOR DEEP UV PHOTONICS	47
<i>H. X. Jiang ; J. Y. Lin</i>	
III-NITRIDE ON SILICON PHOTONIC CIRCUITS	49
<i>P. Boucaud ; I. Roland ; Y. Zeng ; F. Tabataba-Vakili ; M. El Kurdi ; S. Sauvage ; X. Checoury ; M. Gromovyi ; S. Rennesson ; F. Semond ; J. -Y. Duboz ; M. De Micheli ; J. Selles ; C. Brimont ; T. Guillet ; B. Gayral</i>	
PHOTONIC INTERCONNECT WITH SUPERCONDUCTING ELECTRONICS FOR LARGE-SCALE NEUROMORPHIC COMPUTING (INVITED PAPER)	51
<i>Sonia M. Buckley ; Jeff Chiles ; Adam N. McCaughan ; Richard P. Mirin ; Sae Woo Nam ; Jeffrey M. Shainline</i>	
DEVICES AND ARCHITECTURES FOR RAPIDLY RECONFIGURABLE PHOTONIC SWITCHING SYSTEMS	53
<i>Benjamin G. Lee</i>	
LOSS AND CROSSTALK SOLUTIONS IN FAST SILICON PHOTONIC SWITCH SYSTEMS	55
<i>Dominic J. Goodwill ; Hamid Mehrvar ; Eric Bernier</i>	
PHOTONIC INTEGRATION TECHNOLOGY FOR THE INTERFACE BETWEEN THE OPTICAL AND WIRELESS PART IN 5G NETWORKS: THE H2020-ICT-HAMLET APPROACH	57
<i>P. Groumas ; C. Tsokos ; M. Kleinert ; D. Marchenko ; V. Katopodis ; M. Dekkers ; M. Falcucci ; R. B. Timens ; L. Gounaris ; C. G. Roeloffzen ; A. Vannucci ; R. G. Heideman ; N. Keil ; Ch. Kouloumentas ; H. Avramopoulos</i>	
100G SOLUTION TAILED FOR 5G BASED UPON CAPS3	59
<i>Luca Poti ; Gianluca Meloni ; Francesco Fresi ; Marco Secondini ; Enrico Forestieri ; Fabio Cavaliere ; Giancarlo Prati</i>	
STRUCTURAL AND ELECTRICAL CHARACTERIZATION OF SILICON SUPERSATURATED WITH GOLD BY PULSED LASER MELTING OF NANOMETER-THICK GOLD FILMS	63
<i>Philippe K. Chow ; Quentin Hudspeth ; Jeffrey Warrender</i>	
INTRINSIC DAMPING IN SILICON SLAB WAVEGUIDES IN THE MID-INFRARED	65
<i>Christian Ranacher ; Andreas Tortschanoff ; Cristina Consani ; Nithin Ravi Kumar ; Mohssen Moridi ; Thomas Grille ; Bernhard Jakoby</i>	
MATERIAL GAIN FOR BI-CONTAINING III-V QUANTUM WELLS GROWN ON GAAS, INP, AND GASB SUBSTRATES: TOWARDS LONGER WAVELENGTHS	67
<i>M. Gladysiewicz ; R. Kudrawiec</i>	
SUSPENDED GESN MICROSTRUCTURE FOR LIGHT SOURCE ON SI	69
<i>Y. Han ; Y. Y. Li ; Y. X. Song ; Z. P. Zhang ; J. J. Liu ; Z. Y. S. Zhu ; S. M. Wang</i>	
GESN/GE DUAL-NANOWIRE HETEROSTRUCTURE	71
<i>Zhongyunshen Zhu ; Yuxin Song ; Yi Han ; Yaoyao Li ; Zhenpu Zhang ; Liyao Zhang ; Shumin Wang</i>	
TUNABLE HMM-BASED DEVICES FOR INTEGRATED PHOTONICS	73
<i>B. Janaszek ; A. Tyszka-Zawadzka ; P. Szczepanski</i>	
100GB/S ULTRA WIDE MISALIGNMENT TOLERANCE WDM TRANSMITTER WITH NOVEL VERTICAL GRATING COUPLER	75
<i>Beiju Huang ; Zan Zhang ; Zanyun Zhang ; Chuantong Cheng ; Hongda Chen</i>	
PHOTONIC CRYSTAL SURFACE-Emitting LASERS ON SILICON SUBSTRATES	77
<i>Shih-Chia Liu ; Deyin Zhao ; Yonghao Liu ; Hongjun Yang ; Carl Reuterskiöld-Hedlund ; Mattias Hammar ; Zhengiang Ma ; Weidong Zhou</i>	
MATERIAL ANALYSIS OF GESN/SIGESN QUANTUM WELLS BASED ON MANY-BODY THEORY	79
<i>Takeshi Fujisawa ; Kunimasa Saitoh</i>	
MODELING OF THE ELECTRONIC BAND STRUCTURE AND THE MATERIAL GAIN IN GESN-BASED QUANTUM WELLS	81
<i>R. Kudrawiec ; H. S. Maczko ; M. Gladysiewicz</i>	
ANALYSIS OF DIRECT TRANSITION IN GESN/GE QUANTUM WELL SYSTEMS FOR PHOTONIC APPLICATIONS	83
<i>Guo-En Chang</i>	
TOP-DOWN FABRICATION FOR III-NITRIDE NANOPHOTONICS	85
<i>George T. Wang ; Benjamin Leung ; Changyi Li ; Miao-Chan Tsai ; Sheng Liu ; Jeremy B. Wright ; Daniel D. Koleske ; Ping Lu ; Jeffrey J. Figiel ; Ting S. Luk ; Igal Brener ; Arthur J. Fischer ; Xiaoyin Xiao ; Jeffrey Y. Tsao ; Michael E. Coltrin ; Ganesh Balakrishnan ; Steven R. J. Brueck</i>	
ALGAN NANOWIRE DEEP ULTRAVIOLET OPTOELECTRONICS	87
<i>Songrui Zhao ; Sharif Sadaf ; Xianhe Liu ; Zetian Mi</i>	

ATTOJOULE OPTOELECTRONICS — SAVING EVEN MORE ENERGY WITH OPTICS	89
<i>David A. B. Miller</i>	
ADVANCED PHOTONIC DEVICES FOR 5G NETWORK IN DENSE USER ENVIRONMENT	91
<i>Hiroshi Murata</i>	
ENTANGLEMENT AND DECOHERENCE IN OPTICAL AMPLIFIERS	93
<i>J. D. Franson</i>	
A COLD-ATOM QUANTUM MEMORY FOR LONG DISTANCE QUANTUM NETWORKS	95
<i>P. D. Kunz ; N. E. Solmeyer ; K. C. Cox ; D. H. Meyer</i>	
ON-CHIP QUANTUM OPTICAL NETWORKS COMPRISING CO-DESIGNED SPECTRALLY UNIFORM SINGLE PHOTON SOURCE ARRAY AND DIELECTRIC LIGHT MANIPULATING ELEMENTS	97
<i>Swarnabha Chattaraj ; Jiefei Zhang ; Siyuan Lu ; Anupam Madhukar</i>	
INTEGRATION OF SILICON CARBIDE ON SILICON FOR ITS APPLICATION IN ULTRAVIOLET PHOTODETECTORS	99
<i>Maksym Myronov ; Gerard Colston</i>	
RHOMBOHEDRAL SUPER HETERO EPITAXY OF CUBIC SIGE ON TRIGONAL C-PLANE SAPPHIRE	101
<i>Sang H. Choi ; Adam J. Duzik</i>	
QUANTUM EMISSION FROM ATOMIC DEFECTS IN WIDE-BANDGAP SEMICONDUCTORS	103
<i>Gabriele Grosso ; Benjamin Lienhard ; Hyowan Moon ; Diego Scarabell ; Tim Schroeder ; Kwang-Yong Jeong ; Tsung-Ju Lu ; Amanuel M. Berhane ; Shalom Wind ; Igor Aharonovich ; Dirk Englund</i>	
MULTI-LEVEL PHOTONICS FOR TRAPPED-ION QUANTUM COMPUTING	105
<i>Dave Kharas ; Cheryl Sorace-Agaskar ; Suraj Bramhavar ; William Loh ; Jeremy M. Sage ; Paul W. Juodawlkis ; John Chiaverini</i>	
OPTICAL ANTENNAS; LED'S FASTER THAN LASERS	107
<i>Eli Yablonovitch</i>	
NANOSCALE LIGHT EMITTERS AND THEIR DYNAMICS FOR CHIP-SCALE INTEGRATION	109
<i>Y. Fainman ; S. H. Pan ; Q. Gu ; A. El Amili ; F. Vallini</i>	
OPTICAL NETWORK ARCHITECTURES AND TECHNOLOGIES FOR DATACENTERS	111
<i>Lena Wosinska ; Rui Lin ; Yuxin Cheng ; Jiajia Chen</i>	
HARNESSING PATH DIVERSITY FOR LASER CONTROL IN DATA CENTER OPTICAL NETWORKS	113
<i>Y. Demir ; N. Terzenidis ; H. Han ; D. Syrivelis ; G. T. Kanelllos ; N. Hardavellas ; N. Pleros ; S. Kandula ; F. Bustamante</i>	
SCHEDULING AND CONTROL IN HYBRID DATA CENTERS	115
<i>Madeleine Glick ; Houman Rastegarfar</i>	
FIBER-WIRELESS CONVERGENCE FOR NEXT GENERATION HETEROGENEOUS MOBILE DATA COMMUNICATIONS	117
<i>Gee-Kung Chang ; Mu Xu ; Feng Lu</i>	
MULTI-WAVELENGTH PHOTON PAIR SOURCE ASSISTED BY A SILICON-ON-INSULATOR MICRO-RING RESONATOR	119
<i>Bernhard Schrenk ; Fabian Laudenbach ; Paul Müllner ; Winfried Boxleitner ; David Fowler ; Rainer Hainberger ; Hannes Hübel</i>	
GENERATION, CHARACTERIZATION, AND MANIPULATION OF FIBER-COUPLED ENTANGLED PHOTONS	121
<i>K. F. Lee ; G. S. Kanter</i>	
IN-SITU CALIBRATION OF FIBER-OPTICS ENTANGLED PHOTON DISTRIBUTION SYSTEM	123
<i>D. E. Jones ; B. T. Kirby ; M. Brodsky</i>	
N-GE ON SI FOR MID-INFRARED PLASMONIC SENSORS	125
<i>Douglas J. Paul ; Kevin Gallacher ; Ross W. Millar ; Valeria Giliberti ; Eugenio Calandrini ; Leonetta Baldassarre ; Marco P. Fischer ; Jacopo Frigerio ; Andrea Ballabio ; Emilie Sakat ; Giovanni Pellegrini ; Daniele Brida ; Giovanni Isella ; Michele Ortolani ; Paolo Biagioni</i>	
HYPERDOPING SILICON BEYOND SULFUR: STRUCTURAL AND ELECTRONIC PROPERTIES WITH METAL DOPANTS	127
<i>Jeffrey M. Warrender ; Jay Mathews ; Quentin Hudspeth ; Philippe K. Chow ; Wenjie Yang ; Austin J. Akey ; James S. Williams</i>	
FULL SPECTRUM VISIBLE INTEGRATED PHOTONICS IN SCALED MICROELECTRONIC CMOS	129
<i>A. H. Atabaki ; G. N. West ; K. K. Mehta ; D. Kramnik ; R. J. Ram</i>	
INTEGRATED Al₂O₃ WAVEGUIDE FOR ULTRAVIOLET SPECTROSCOPY	131
<i>Xiaochuan Xu ; Elham Heidari ; Lijun Huang ; Naimei Tang ; Ray T. Chen</i>	
ALUMINA WAVEGUIDES FOR FULL-SPECTRUM INTEGRATED PHOTONICS	133
<i>Gavin N. West ; Karan K. Mehta ; Rajeev J. Ram</i>	

PHOTONIC INTEGRATED CHIPS FOR LOW-POWER, HIGH-BANDWIDTH COMMUNICATIONS	135
<i>Tin Komljenovic ; Chong Zhang ; Shangjian Zhang ; John E. Bowers</i>	
INGAN NANOWIRE INTEGRATED NANOPHOTONICS	137
<i>Zetian Mi ; Yong-Ho Ra ; Roksana Rashid ; Renjie Wang ; Ishiang Shih</i>	
COMBINING OPTICS AND SDN TO ENABLE TRUE HYBRID INTEGRATION OF ELECTRONIC AND PHOTONIC SWITCHING SOLUTIONS.....	139
<i>Gonzalo Guelbenzu ; Wang Miao ; Yaniv Ben-Itzhak ; Cosmin Caba ; Liran Schour ; Shay Vargaftik ; Karel Van De Plassche ; Nicola Calabretta ; Oded Raz</i>	
HIGH DATA RATE 6 GBIT/S STEERABLE MULTIBEAM 60 GHZ ANTENNAS FOR 5G HOT-SPOT USE CASES.....	141
<i>Matthias Steeg ; Andreas Stöhr</i>	
NOVEL TECHNOLOGIES FOR QUANTUM KEY DISTRIBUTION NETWORKS.....	143
<i>Z. L. Yuan ; G. L. Roberts ; J. F. Dynes ; B. Fröhlich ; M. Lucamarini ; A. W. Sharpe ; W. W. -S. Tam ; A. Plews ; A. J. Shields</i>	
EXPERIMENTAL EVALUATION OF THE IMPAIRMENTS ON A QKD SYSTEM IN A 20-CHANNEL WDM CO-EXISTENCE SCHEME	145
<i>F. Karinou ; L. Comandar ; H. H. Brunner ; D. Hillerkuss ; F. Fung ; S. Bettelli ; S. Mikroulis ; D. Wang ; Q. Yi ; M. Kuschnerov ; C. Xie ; A. Poppe ; M. Peev</i>	
SUB-WAVELENGTH STABILIZATION OF LONG, DEPLOYED OPTICAL FIBERS FOR QUANTUM NETWORKS.....	147
<i>Matthew E. Grein ; Mark L. Stevens ; Nicholas D. Hardy ; P. Ben Dixon</i>	
OPTIMIZED ARCHITECTURES FOR LONG DISTANCE QUANTUM COMMUNICATION	149
<i>Linshu Li ; Sreraman Muralidharan ; Chang-Ling Zou ; Victor V. Albert ; Jungsang Kim ; Norbert Lütkenhaus ; Mikhail D. Lukin ; S. M. Girvin ; Liang Jiang</i>	
ELECTRO-OPTIC AND SECOND-ORDER NONLINEAR EFFECTS IN THIN FILM LITHIUM NIOBATE ON SILICON	151
<i>Ashutosh Rao ; Aniket Patil ; Marcin Malinowski ; Jeff Chiles ; Saeed Khan ; Amirmahdi Honardoost ; Seyfollah Toroghi ; Guillermo F. Camacho-González ; Payam Rabiei ; Sasan Fathpour</i>	
ALL-OPTICAL SWITCH BASED ON 4-WAVE MIXING IN SI WAVEGUIDES.....	153
<i>Imad Agha ; Yun Zhao ; Jay Mathews</i>	
OPTICAL ANTENNAS; LED'S FASTER THAN LASERS	155
<i>Ming C. Wu</i>	
III-NITRIDE INTEGRATED PHOTONICS PLATFORM FOR THE ULTRAVIOLET AND VISIBLE SPECTRAL RANGE.....	157
<i>Yuji Zhao</i>	
MODULATION BANDWIDTH OF A DOUBLE TUNNELING-INJECTION QUANTUM DOT LASER: THE UPPER LIMIT AND LIMITING FACTORS	159
<i>Levon V. Asryan</i>	
SLOTTED OPTICAL DATACENTER NETWORK WITH SUB-WAVELENGTH RESOURCE ALLOCATION	161
<i>Paraskevas Bakopoulos ; Konstantinos Tokas ; Christos Spatharakis ; Hercules Avramopoulos</i>	
QUAD CHANNEL BLOCKER ARRAY BASED ON A COMMODITY LIQUID CRYSTAL DISPLAY.....	163
<i>Bernhard Schrenk ; Paraskevas Bakopoulos ; Hannes Hübel</i>	
MILLIMETER- AND TERAHERTZ-WAVE RADIO-OVER-FIBER FOR 5G AND BEYOND	165
<i>Pham Tien Dat ; Atsushi Kanno ; Toshimasa Umezawa ; Naokatsu Yamamoto ; Tetsuya Kawanishi</i>	
A 300GHZ-BAND WIRELESS TRANSCEIVER USING SI-CMOS INTEGRATED CIRCUITS	167
<i>Minoru Fujishima</i>	
OPTICAL AND WIRELESS INTEGRATED TECHNOLOGIES FOR MOBILE NETWORKS TOWARDS BEYOND 5G ERA	169
<i>Masatoshi Suzuki ; Shota Ishimura ; Kazuki Tanaka ; Sinobu Nanba ; Kosuke Nishimura</i>	
COUPLING QUBITS TO PHOTONS USING DUAL ATOMIC SPECIES FOR QUANTUM NETWORKING	171
<i>Trent Graham ; Matthew Ebert ; Yuan Sun ; Mark Saffman</i>	
TOWARDS A QUANTUM NETWORK BASED ON TRAPPED IONS IN CAVITY.....	173
<i>F. Ong ; K. Schüppert ; P. Jobez ; F. Kranzl ; D. A. Fioretto ; M. Teller ; K. Friebel ; M. Lee ; B. Ames ; T. E. Northup ; R. Blatt</i>	
INP-BASED MULTIPLE TYPE-II QUANTUM-WELL INTEGRATED WAVEGUIDE P-I-N PHOTODIODES FOR MID-INFRARED DETECTION	175
<i>Bassem Tossoun ; Ye Wang ; Sadhvikas Addamane ; Ganesh Balakrishnan ; Archie L. Holmes ; Andreas Beling</i>	

HIGH RESOLUTION SILICON-ON-INSULATOR MID-INFRARED SPECTROMETERS OPERATING AT 3.3 μM.....	177
<i>Anton Vasiliev ; Muhammad Muneeb ; Roel Baets ; Günther Roelkens</i>	
INGAAS/INASSB TERNARY SLS MWIR PHOTODETECTORS	179
<i>Joshua Duran ; Gamini Ariyawansa ; Charles Reyner ; Elizabeth Steenbergen ; John Scheiring</i>	
ON-CHIP QUANTUM STATE GENERATION BY MEANS OF INTEGRATED FREQUENCY COMBS	181
<i>Stefania Sciarra ; Michael Kues ; Christian Reimer ; Piotr Roztocki ; Benjamin Wetzel ; Yaron Bromberg ; Brent E. Little ; Sai T. Chu ; David J. Moss ; Lucia Caspani ; Roberto Morandotti</i>	
MID-INFRARED SILICON PHOTONIC DEVICES AND SENSORS	183
<i>Swapnajit Chakravarty ; Hai Yan ; Yi Zou ; Ray T. Chen</i>	
1.9–3.3 μM TYPE-I QUANTUM-WELL CASCADE DIODE LASERS	185
<i>L. Shterengas ; T. Hosoda ; G. Kipshidze ; T. Feng ; M. Wang ; G. Belenky</i>	
NANOMATERIAL-ENHANCED OPTICAL MICROCAVITY-BASED LASERS	187
<i>Andrea M. Armani ; Xiaoqin Shen ; Vinh Diep ; Dongyu Chen ; Vladan Jankovic ; Brock Hudnut ; Soheil Soltani ; Andre Kovach ; Hyungwoo Choi</i>	
DEEP LEARNING WITH COHERENT NANOPHOTONIC CIRCUITS	189
<i>Yichen Shen ; Nicholas C. Harris ; Scott Skirlo ; Dirk Englund ; Marin Soljacic</i>	
CURRENT AND FUTURE TREND OF ENERGY/BIT FOR HIGH SPEED UNCOOL OPTICAL LINKS (50 GB/S AND 75° C)	191
<i>Milton Feng ; Nick Holonyak ; Junyi Qiu ; C. Y. Wang</i>	
PLASMONIC NANOPHOTONIC MODULATORS.....	193
<i>M. Z. Alam ; H. W. Lee ; Y-W. Huang ; R. A. Pala ; K. Thyagarajan ; G. K. Shirmanesh ; R. Sokhoyan ; H. A. Atwater</i>	
OPTICAL AND RF METROLOGY FOR 5G	195
<i>David A. Humphreys ; Irshaad Fatadin ; Mark Bieler ; Paul Struszewski ; Martin Hudlicka</i>	
OPTICAL FIBER NETWORK-CONNECTED DISTRIBUTED MM-WAVE RADAR SYSTEM.....	197
<i>Tetsuya Kawanishi ; Atsushi Kanno ; Naokatsu Yamamoto ; Naruto Yonemoto ; Nobuhiko Shibagaki ; Ken-Ichi Kashima</i>	
QUANTUM WALK SEARCHES	199
<i>Mark Hillery</i>	
REDUCING OPTICAL CONFINEMENT LOSSES FOR FAST, EFFICIENT NANOPHOTONIC MODULATORS	201
<i>Gordon A. Keeler ; Salvatore Campione ; Michael G. Wood ; Darwin K. Serkland ; S. Parameswaran ; Jon Ihlefeld ; Ting S. Luk ; Joel R. Wendt ; Kent M. Geib</i>	
TEMPERATURE DEPENDENCE OF A SUB-WAVELENGTH COMPACT GRAPHENE PLASMON-SLOT MODULATOR.....	203
<i>Zhizhen Ma ; Sikandar Khan ; Mohammad Tahersima ; Volker J. Sorger</i>	
PERFORMANCE ASSESSMENT OF VCSEL-BASED SYSTEMS FOR NEXT-GENERATION DATACENTER SWITCHING ARCHITECTURES	205
<i>Fotini Karinou ; Cristian Prodaniciuc ; Nebojsa Stojanovic</i>	
TERAHERTZ MICROJETS AND GRAPHENE: TECHNOLOGIES TOWARDS ULTRAFAST ALL-OPTICAL MODULATION	207
<i>Mark H. Bergen ; Brandon Born ; Simon Geoffroy-Gagnon ; Jonathan F. Holzman</i>	
A 16-GB/S MILLIMETER-WAVE CMOS TRANSMITTER WITH INTEGRATED OPTICAL RECEIVER FOR 5G BASEBAND-OVER-FIBER SYSTEMS.....	209
<i>Haikun Jia ; Guang Zhu ; Yipeng Wang ; Zhihua Wang ; C. Patrick Yue</i>	
HIGH-SPEED MODELING OF THIN-FILM LITHIUM-NIOBATE-ON-SILICON ELECTROOPTIC MODULATORS	211
<i>Amirmahdi Honardoost ; Ashutosh Rao ; Sasan Fathpour</i>	
TANDEM DUAL-ELECTRODE MACH ZEHNDER MODULATORS GENERATING W-BAND SIGNALS FOR AN OCDMA RADIO-OVER-FIBER SYSTEM.....	213
<i>Morad Eghbal ; Mehdi Shadaram</i>	
NEXT GENERATION DATA CENTER INTERCONNECTION NETWORKS	215
<i>Mohsen Kavehrad</i>	
Author Index	