Latin America Optics & Photonics 2012

Conference Program and Technical Digest

10 - 13 November 2012

Maresias Beach Hotel

São Sebastião, Brazil

Contents

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Plenary Speakers

Science and Technology in Brazil
Carlos Henrique de Brito Cruz, *São Paulo Research Foundation, FAPESP, Brazil*

Carlos Henrique de Brito Cruz graduated in Electrical Engineering (Inst. Tecn. de Aeronáutica, ITA, 1978) and has a MSc in Physics and a DSc in Physics (1980 and 1983, Physics Inst., Univ. of Campinas, Unicamp). He was a visitor at the Quantum Optics Laboratory, at the University of Rome (1981), at AT&T Bell Laboratories in Holmdel, NJ (1986-7) and Murray Hill, NJ (1990). Brito Cruz directed the Physics Institute at Unicamp for two terms. He has been the Dean of Research at Unicamp, the President of the São Paulo Research Foundation, FAPESP (1996-2002) and Rector of Unicamp (2002-05). Since 2005 he is the Scientific Director at the São Paulo Research Foundation, FAPESP. Brito Cruz is a member of the Brazilian Academy of Sciences.

Novel Light-Matter Interactions in Glass Fibre Microstructures
Philip Russell, *Max Planck Institute for the Science of Light, Germany*

Philip Russell is a Director at the Max-Planck Institute for the Science of Light in Erlangen, Germany and holds the Krupp Chair in Experimental Physics at the University of Erlangen-Nuremberg. His research interests currently focus on scientific applications of photonic crystal fibers and related structures. He is a Fellow of the Royal Society and the Optical Society of America and has won several international awards for his research including the 2005 Körber Prize for European Science, the 2005 Thomas Young Prize of the Institute for Physics (UK) and the 2000 OSA Joseph Fraunhofer Award/Robert M. Burley Prize.

Mid-infrared Generation with Two Color CPA Lasers
Donna Strickland, *University of Waterloo, Canada*

Donna Strickland received her B. Eng. Degree in Engineering Physics, from McMaster University in 1981. She graduated from the University of Rochester in 1989 with a Ph.D. in Optics. Along with her PhD supervisor, Dr. Gerard Mourou, Donna Strickland co-invented Chirped Pulse Amplification (CPA), which made it possible to amplify ultra-short pulses to unprecedented levels. From 1988 to 1991, Dr. Strickland was a research associate at the National Research Council of Canada. The following year, she was a physicist with the laser division of Lawrence Livermore National Laboratory. In 1992, she became a member of the technical staff of Princeton's Advanced Technology Center for Photonics and Optoelectronic Materials. Dr. Strickland joined the physics department of the University of Waterloo as an assistant professor in 1997. At Waterloo, Dr. Strickland's ultrafast laser group develops high-intensity laser systems for nonlinear optics investigations. She was promoted to Associate Professor in 2002 and since 2007 has been the Associate Chair of the Department. Dr. Strickland was selected as an Alfred P. Sloan Research Fellow in 1998. She received a Premier's Research Excellence Award in 1999 and a Cottrell Scholars Award from Research Corporation in 2000 and was named a Fellow of the Optical Society of America in 2008. Dr. Strickland has worked on several committees within the OSA, including the editorial board of OPN, topical editor for Optics Letters. She was elected to be a Director-at-large on the OSA board from 2005-2007 and sat on the Board executive committee during 2006-2007. Currently, she is the OSA appointed VP to the ICO board. Dr. Strickland is the 2011 OSA Vice-President and will serve as OSA President in 2013.

Special Events

Conference Reception
Saturday, 10 November
18:30-20:30
Toulouse Garden (Maresias Hotel Restaurant's Garden)
Meet your fellow conference attendees during this informal reception . It will feature light fare and beverages. It is open to all full technical attendees.

Poster Sessions
Monday, 12 November, 10:30–11:30
Tuesday, 13 November, 10:00–11:00
Exhibit Hall
The poster sessions are an integral part of the technical program and offer a unique networking opportunity, where presenters can discuss their results one-on-one with interested parties.

Postdeadline Session
Monday, November 12
17:30 -18:50
Maresias Room
The postdeadline sessions will give participants the opportunity to hear new and significant material in rapidly advancing areas. Only those papers judged to be truly excellent and compelling in their timeliness were accepted.

Conference Banquet
Monday, 12 November
17:45-23:00
Buses departure Maresias Beach Hotel Reception Lobby at 19:45. Buses will leave Viela de Praia at 23:00 and 24:00 to return to the hotel.
Conference attendees will be transferred to Viela da Praia for the conference banquet. The evening will feature multiple course including traditional Brazilian favorites: Seafood Tartlet, Potato cream with dried Beef and Cabbage Crisps, Shrimp Bobó, Penine with cubes of Filet Mignon with Capers and Olives Azapa, Shrimp Gabriela, Grilled Fish Sauce Seafood, Banana Cuca, Romeo and Juliet dessert and Caipirinhas. Guest will be entertained by a Brazilian Music Quartet and Samba Show. The banquet is open to all full technical attendees. Conference attendees may purchase extra tickets in advance for their guest.
Suggest dress: Cocktail attire, with jacket optional.

Exhibit Hall

Foier Hall
The exhibitors will be available during coffee breaks and Poster Sessions.

Date	Coffee Breaks	Poster Sessions
Sunday, 11 November	10:00 – 10:30 16:00—16:30	
Monday, 12 November	10:00 – 10:30 17:00 – 17:30	10:30 – 11:30
Tuesday, 13 November	10:00 – 10:30 17:00 – 17:30	10:30 – 11:30

Exhibitor Guide

BrLabs
Campinas, SP, Brazil
P: +55.19.4062.8090 R. 0500
E: helcias@br-labs.com
www.br-labs.com
BR Labs is a company based in Campinas, Sao Paulo, Brazil, dedicated to the development, manufacturing and sales of laser systems and optics. With selected partners such as Femtolasers, Laser Quantum, Northrop Grumman CEO, LIMO, Teem Photonics and Crystech, BR Labs can offer a broad selection of products and services.

CPqD
P: +55.19.3705.7066
E: paradisi@cpqd.com.br
www.cpqd.com.br
CPqD is an independent institution focused on innovation through Information and Communication Technologies (ICT) for telecommunication, finance, energy, and other industries, aiming at contributing to Brazil's competitiveness and the digital inclusion of the Brazilian society.

Energetiq Technology, Inc.
Woburn, Massacussetts, USA
P: +1.781.939.0763
E: info@energetiq.com
www.energetiq.com
Energetiq's Laser-Driven Light Source (LDLS™) offer the highest brightness, broadest ban (170nm-2100nm UV-Vis-NIR), and the longest life, for advanced spectroscopic, imaging, monitoring and analytical applications. Energetiq adds to its LDLS range with the easy-to-use EQ-99FC, with a convenient SMA fiber-coupling output.

FEIRA Co., Ltd.
Tokyo, Japan
P: +81.3.6380.0390
E: sales@feira.co.jp
www.feira.co.jp
FEIRA, is a opto-photonics specialized trading company in Japan. Our mission is to present great products all over the world, bridging the product culture gap and adding value for each customer through our service. Our profound experience and creditability built up for more than total accumulation 55 years enable us to execute this mission and we hope we can start having new acquaintances with you.

Fotônica Tecnologia Óptica Ltda.
Campinas, SP, Brazil
P: +55.19.3515.2200
E: walter@fotonica.com.br
www.fotonica.com.br
Fotônica manufactures passive optical components for optical communications, such as patch-cords, attenuators, splitters, connectorized cables, distribution frames, and related items. It also offers services in optical communications, such as system design, installation, comissioning, and audit.

Hamamatsu
Bridgewater, New Jersey, USA
P: +1.908.231.0960
E: usa@hamamatsu.com
www.sales.hamamatsu.com
Hamamatsu Corporation is the North American subsidiary of Hamamatsu Photonics K.K. (Japan), a leading manufacturer of devices for the generation and measurement of infrared, visible, and ultraviolet light. These devices include photodiodes, photomuliplier tubes, scientific light sources, infrared dectectors, photoconductive detectors, and image sensors. The parent company is dedicated to the advancement of photonics through extensive research. This corporate philosophy results in state-of-the-art products which are used throughout the word in scientific, industrial and commericial applications.

Micron Optics, Inc
Atlanta, Georgia, USA
P: +1.404.325.0005
E: info@micronoptics.com
www.micronoptics.com
Micron Optics, a leading provider of tunable optical technologies, offers a comprehensive portfolio of components and instruments for Optical Sensing and Imaging markets. Built upon its solid technology foundation, Micron Optics' products span from simple tunable components to fast swept laser modules to fast and accurate optical instrumentation.

PadTec
Campinas, SP, Brazil
E: comercial@padtec.com
www.padtec.com
Padtec is a company dedicated to the development, manufacturing and sales of high capacity optic communication systems.
The company provides solutions for long distance networks, metropolitan, access and storage networks and has distinguished itself through its presence in the trunking networks of the largest telecommunication service providers of Latin America.
With businesses and representatives in South America, Central America, Europe and Asia, Padtec has consolidated itself as a global provider of high technology customized solutions.
Padtec is based in Campinas-São Paulo, Brasil, and has offices in Argentina, Peru, Mexico, France and Israel.

Thorlabs
Newton, New Jersey, USA
P: +1.973.300.3000
E: sales@thorlabs.com
www.thorlabs.com
Thorlabs designs, develops, and manufactures building blocks for the Photonics industry, including optomechanics, motion control electronics, nanopositioning stages, fiber and optical components, laser diodes, tunable lasers, and vibration isolation systems. In addition, we can provide system-level solutions including complete OCT, confocal, and multiphoton imaging systems.

THORLABS

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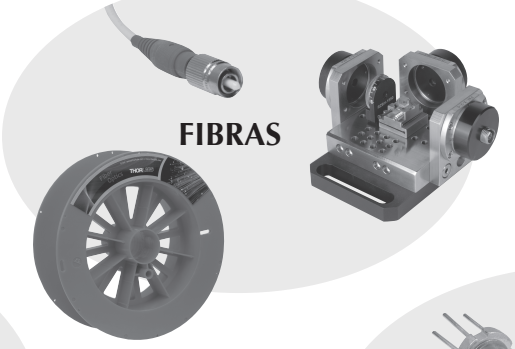

FIBRAS

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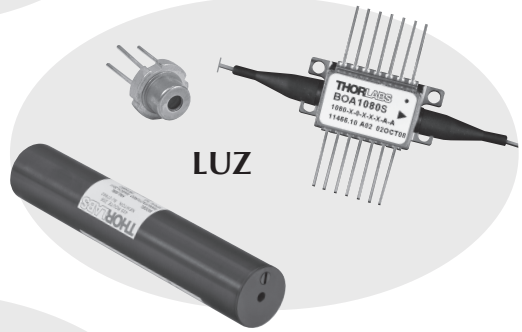
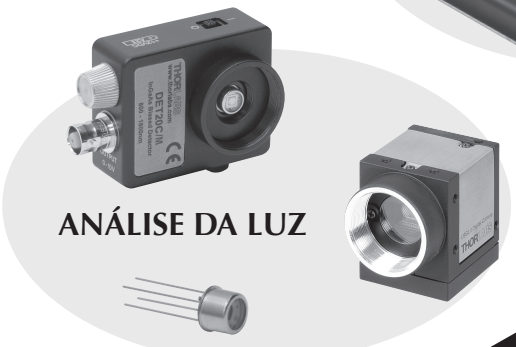


LUZ

OBTENÇÃO DE IMAGENS



ANÁLISE DA LUZ

Contato:
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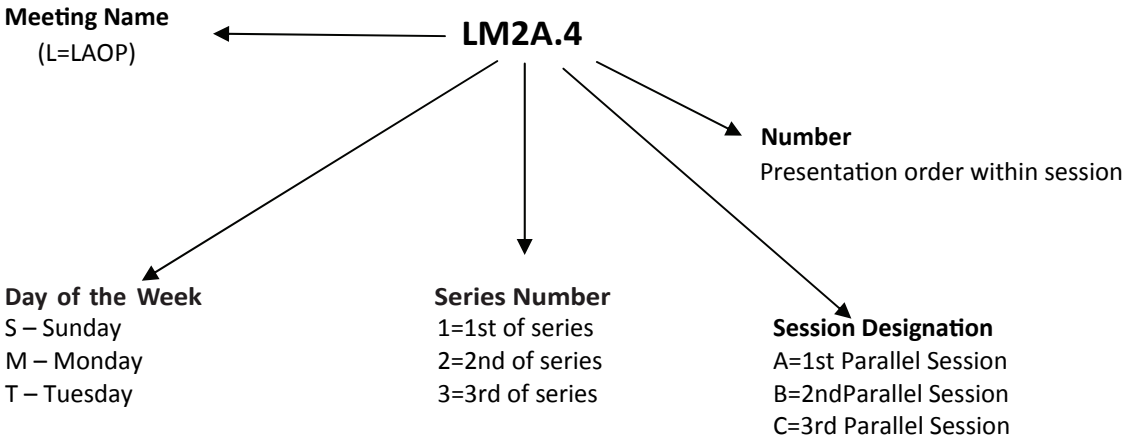
CNPJ: 15.689.776/0001-38

Explanation of Session Codes



The first letter of the code designates the meeting. The second element denotes the day of the week (Sunday =S, Monday=M, Tuesday=T). The third element indicates the session series in that day (for instance, 1 would denote the first parallel sessions in that day). Each day begins with the letter A in the fourth element and continues alphabetically through a series of parallel sessions. The number on the end of the code (separated from the session code with a period) signals the position of the talk within the session (first, second, third, etc.). For example, a presentation coded LM2A.4 indicates that this paper is being presented on Monday (M) in the second series of sessions (2), and is the first parallel session (A) in that series and the fourth paper (4) presented in that session.

Agenda of Sessions

Saturday, 10 November	
17:30—20:30	**Registration**, *Camburi Room*
18:30—20:30	**Welcome Reception,** *Toulouse Garden (Maresias Hotel Restaurant's Garden)*

Agenda of Sessions

Sunday, 11 November			
	Guaeca	**Pauba**	**Una**
07:00 – 18:00	**Registration,** *Foyer*		
08:00—10:00	**LS1A • Opening General Session,** *Maresias*		
10:00—10:30	**Exhibit Hall Opening and Coffee Break,** *Foier*		
10:30—12:30	**LS2A• Mode-Locked Lasers**	**LS2B • Quantum Optics**	**LS2C• Fiber Bragg Gratings**
12:30—14:00	**Lunch,** *On your Own*		
14:00—16:00	**LS3A• Novel Sources I**	**LS3B• Fiber Sensors**	**LS3C• Active Optics and Imaging**
16:00—16:30	**Exhibit Hall and Coffee Break ,** *Foier*		
16:00—18:10	**LS4A• Novel Sources II**	**LS4B• Novel Sources and Precision Measurements**	**LS4C• Sensors**

Monday, 12 November			
	Guaeca	**Pauba**	**Una**
07:00 – 18:00	**Registration,** *Foyer*		
8:00—10:00	**LM1A• Nonlinear Optics I**	**LM1B• Ultracold Trapped Atoms**	**LM1C• WDM Transmission and Amplification**
10:00—10:30	**Exhibit Hall and Coffee Break,** *Foier*		
10:30—11:30	**LM2A• Poster Session I,** *Foier*		
11:30—13:30	**LM3A• Nonlinear Optics II**	**LM3B• Coherence and Physical Optics**	**LM3C• High Speed Optical Devices and Polarization Effects**
13:30—15:00	**Lunch,** *On your Own*		
15:00—17:00	**LM4A• Nonlinear Optics III**	**LM4B• Optical Forces and Imaging**	**LM4C• Optical Networking**
17:00—17:30	**Exhibit Hall and Coffee Break,** *Foier*		
17:30—18:50	**LM5A• Postdeadline Papers,** *Maresias Room*		
19:45—23:00	**Conference Banquet—** *Buses departure Maresias Beach Hotel Reception Lobby at 19:45.*		

Agenda of Sessions

Tuesday, 13 November			
	Guaeca	**Pauba**	**Una**
07:00 – 18:00	**Registration,** *Foyer*		
8:00—10:00	**LT1A• Biophotonics I**	**LT1B• Nanoparticles and Nanowires**	**LT1C• Fiber Optics and Materials**
10:00—10:30	**Exhibit Hall and Coffee Break,** *Foier*		
10:30—11:30	**LT2A• Poster Session II,** *Foier*		
11:30—13:30	**LT3A• Biophotonics II**	**LT3B• Active Devices**	**LT3C• Interferometry and Optical Characterization**
13:30—15:00	**Lunch,** *On your Own*		
15:00—17:00	**LT4A• Biophotonics III**	**LT4B• Passive Devices**	**LT4C• Terahertz and Heat**
17:00—17:30	**Exhibit Hall and Coffee Break,** *Foier*		
17:30—18:00	**Final Remarks,** *Maresias Room*		

Sunday, 11 November

07:00—18:00
REGISTRATION, *Sala de Apoio*

08:00–10:00
LS1A • Opening General Session
Maresias Room

LS1A.1 • 08:00
Science and Technology in Brazil, Carlos H. Brito Cruz[1]; [1]*Universidade Estadual de Campinas, Brazil.*
We will show an overview of S&T in Brazil, considering funding, the role of universities and business, and illustrative results, including data for the areas of Optics and Photonics.

LS1A.2 • 08:40
Mid-infrared Generation with Two Color CPA Lasers, Donna T. Strickland[1]; [1]*University of Waterloo, Canada.*
With the help of nonlinear optics, laser radiation can now span the electromagnetic spectrum from X-rays to THz radiation. However the mid-infrared radiation region known to spectroscopists as the "fingerprint region" from 5 to 20 μm still has very few coherent sources. Two-color chirped pulse amplification laser systems have been developed to generate mid-infrared wavelengths longer than 8μm by difference frequency mixing.

LS1A.3• 09:20
Novel Light-Matter Interactions in Glass Fibre Microstructures, Philip S. Russell[1]; [1]*Max-Planck Institute, Germany.*
The talk will include recent results on giant optomechanical nonlinearities in dual nanoweb fibre, optothermal particle trapping in a gas-filled hollow core, and excitation of orbital angular momentum states in twisted solid-core photonic crystal fibre.

10:00 - 10:30
EXHIBIT HALL and COFFEE BREAK, *Foier*

Guaecá Room

10:30–12:10

LS2A • Mode-Locked Lasers

Presider: Franklyn Quinlan; *NIST, USA.*

LS2A.1 • 10:30 Invited

Modelling of Semiconductor Mode-Locked Lasers, Salvador Balle[1], Julien Javaloyes[1]; [1]*IMEDEA, Universitat de les Illes Balears - CSIC, Spain.* Passively mode-locked semiconductor lasers, and the modelling strategies developed on the basis of Travelling-Wave Models are reviewed.

LS2A.2 • 11:10

Erbium-Doped Fiber Laser Hybrid Mode-Locked Operating With CNT at 10 GHz, Heidi Kaori Sato Pertile[1], Eunezio Antonio De Souza[1]; [1]*Lab de Fotonica, Universidade Presbiteriana Mackenzie, Brazil.* We present an Erbium-doped fiber laser operating at 10 GHz, hybrid mode-locked using an electro-optical phase modulator and carbon nanotubes (CNT) saturable absorbers generating pulses with duration of 1.77 ps and bandwidth of 4.04 nm

LS2A.3 • 11:30

New method for the fabrication of films incorporating carbon nanotubes for mode-locked Erbium-doped fiber lasers, Rodrigo M. Gerosa[1], David Steinberg[1], Henrique G. Rosa[1], Claudia B. dos Santos[1], Christiano de Matos[1], Eunezio Antonio De Souza[1]; [1]*Grupo de Fotônica, Mackenzie University, Brazil.* We present a new and simple method for the production of micron-thick polymeric films incorporating carbon nanotubes (CNTs) directly on the tip of an optical fiber ferrule using a microtip for EDFL.

Pauba Room

10:30–12:30

LS2B • Quantum Optics

Presider: Antonio Vidiella-Barranco; Universidade Estadual de Campinas, Brazil

LS2B.1 • 10:30 Invited

Revealing Hidden Entanglement in the Covariance Matrix, Fas Barbosa[1], As Coelho[1], Kn Cassemiro[2], P. Nussenzveig[1], Marcelo Martinelli[1], C. Fabre[3], As Villar[2]; [1]*Universidade de São Paulo, Brazil;* [2]*Universidade Federal de Pernambuco, Brazil;* [3]*Université Pierre et Marie Curienambuco, France.* Interferometric techniques, combined with electronic signal processing, have provided powerful tools for the precise reconstruction of quantum states of the field. Nevertheless, in most cases the completeness of the measurement relies in strong assumptions about its symmetry. In the present work, I will show how the use of optical cavities as a tool for state reconstruction can provide a complete description of the state, relaxing a priori assumptions and revealing a broad distribution of entanglement among sidebands of different optical beams, as in the case of those generated by an optical parametric oscillator.

LS2B.2 • 11:10

Quantum Correlations Between Two Oscillators Connected by a Time-Dependent Coupling, Thales Figueiredo Roque[1], Jos A. Roversi[1]; [1]*Universidade Estadual de Campinas, Brazil.* We analise the dinamics of quantum correlations in a system composed by two harmonic oscillators in contact with a common heat bath and coupled with each other by a time dependent coupling.

LS2B.3 • 11:30

The Interaction of a two-level Atom With the Electromagnetic Field in a Cross Cavity, Julio C. Garcia-Melgarejo[1], Cralos Stroud[2], Jose Javier Sanchez-Mondragon[1], Omar S. Magaña-Loaiza[2]; [1]*Departamento de Óptica, Instituto Nacional de Astrofísica, Óptica y Electrónica, Mexico;* [2]*Department of Physics and Astronomy, University of Rochester, USA.* We propose a model for studying a two-level atom (TLA) in a cross cavity configuration interacting with two electromagnetic fields. We calculate the wave function and present analytical results for the atomic inversion for a state in the weak intensity regime.

Una Room

10:30–12:30

LS2C • Fiber Bragg Gratings

Presider: Luiz Valente; Pontificia Univ Catolica Rio de Janeiro, Brazil

LS2C.1 • 10:30 Invited

Fiber Bragg Grating Sensors Novel Applications, Joao Pinto[1]; [1]*Universidade de Aveiro, Portugal.* Fiber sensors based on Bragg gratings technology have been proposed for many different engineering applications. Novel applications on hemodynamic evaluation, wine monitoring and lithium batteries performance studies will be presented.

LS2C.2 • 11:10

Forces of Orthodontic Closed Coil Springs Measured using Fiber Bragg Gratings, Cicero Martelli[1], Maura S. Milczewski[1], Felipe G. Dinisio[1], Paulo C. Borges[1], Hypolito J. Kalinowski[1], José M. Cunha[2]; [1]*UTFPR, Brazil;* [2]*ABO, Brazil.* The aim of this study is to compare forces generated by three different orthodontic closed coil springs supplied by three companies, optical fiber Bragg gratins are used to evaluate the force of closing of springs.

LS2C.3 • 11:30

Fabrication of Low-Cost Long-Period Fiber Gratings Using Tapered Optical Fibers Embedded in Polymer, Anabel Martínez-Gaytán[1], Jorge Soto-Olmos[1], Laura Oropeza-Ramos[1], Juan Hernandez-Cordero[2]; [1]*Departamento de Electrónica, Facultad de Ingeniería, UNAM, Mexico;* [2]*Instituto de Investigaciones en Materiales, UNAM, Mexico.* We report on the fabrication of long-period fiber gratings using tapered fibers embedded in PDMS polymer using a low-cost technique. Temperature sensitivity of these biocompatible devices is also evaluated.

Guaecá Room	Pauba Room	Una Room

LS2A • Mode-Locked Lasers - Continued

LS2A.4 • 11:50
Thermo-optical Tuning of Erbium-Doped Fiber Ring Laser, Jose E. Antonio-Lopez[1,2], Jose Javier Sanchez-Mondragon[1], J. G. Murillo[3], Patrick LiKamWa[2], Daniel A. May-Arrioja[4]; *[1]Departamento de Optica, INAOE, Macao; [2]CREOL, The Colege of Optics and Photonics, University of Central Florida, USA; [3]Centro de Investigación en Materiales Avanzados S C, Mexico; [4]Departamento de Electronica, Universidad Autonoma de Tamaulipas, Mexico.* A thermo-optically tunable multimode interference fiber laser is demonstrated. The laser emission can be easily tuned trough the C-band by simply changing the temperature around the multimode fiber liquid cladding of the filter.

LS2B • Quantum Optics - Continued

LS2B.4 • 11:50
Entanglement Between a Moving Mirror and a Trapped Ion, Clovis Correa[1], Antonio Vidiella-Barranco[1]; *[1]Universidade Estadual de Campinas, Brazil.* We present an interferometry-based scheme to entangle the quantum state of a moving mirror of an optomechanical cavity with the vibrational state of a single ion trapped inside a second cavity.

LS2B.5 • 12:10
Enhancement of the Quantum Coherence in a Two Qubits Systems by the Increases of the Temperature, Julio Cesar Gonzalez Henao[1], Jose Antonio Roversi[1]; *[1]IFGW, UNICAMP, Brazil.* In this work we study numerically and analytically, the interaction between two maximally entangled qubits in contact with a thermal reservoir is non-linear. It is analyzed the dynamics of the coherence of the system as a function of the temperature.

LS2C • Fiber Bragg Gratings - Continued

LS2C.4 • 11:50 Invited
Biophotonics with Block Surface Waves on Photonics Crystals, Francesco Michelotti[1], Alberto Sinibaldi[1], Norbert Danz[3], Francesca Frascella[3], Paola Rivolo[2], Pietro Mandracci[2], Natascia De Leo[4], Fabrizio Giorgis[2], Peter Munzert[3], Ulrike Schultz[3], Lorenzo Dominici[1], Emiliano Descrovi[2]; *[1]Department of Basic and Applied Sciences for Engineering, SAPIENZA Università di Roma, Italy; [2]Department of Applied Science and Technology, Politecnico di Torino, Italy; [3]Institute for Applied Optics and Precision Engineering, Fraunhofer Gesellshaft, Germany; [4]National Institute of Metrological Research, Italy.* We report on the experimental characterization of the peculiar properties of surface electromagnetic waves propagating at the truncation facet of finite one dimensional dielectric photonic crystals. Such waves are generally known as Bloch surface waves. In particular we show results on the direct experimental comparison of the performance of Bloch surface wave and surface plasmon polariton based optical biosensors and on the application of Bloch surface waves in fluorescence microscopy.

12:30 - 14:00
LUNCH, *On your Own*

Notes

Guaecá Room

14:00–16:00

LS3A • Novel Sources I

Presider: Salvador Balle; Universitat de les Illes Balears, Spain

LS3A.1 • 14:00

Investigation of a Blue Luminescence Power in Raman Crystals, Jonas Jakutis Neto[2,1], Niklaus U. Wetter[1], Helen M. Pask[2]; *[1]IPEN/Macquarie University, Brazil; [2]MQPhotonics, Macquarie University, Australia.* In order to improve the crystalline Raman lasers performance, this work presents the characterization of the power extracted by a blue luminescence present in some of the Raman crystals, seen as probable source of loss.

LS3A.2 • 14:20 Invited

Bright High Average Power Table-top Soft X-Ray Lasers, Jorge J. Rocca[1], Brendan Reagan[1], Keith Wernsing[1], Bradley Luther[1], Alden Curtis[1], Anthony Nichols[1], Yong Wang[1], David Alessi[1], Dale Martz[1], Liang Yin[1], Shoujun Wang[1], Mark Berrill[1], Federico Furch[1], Mark Woolston[1], Dinesh Patel[1], Mario C. Marconi[1], Carmen S. Menoni[1]; *[1]NSF Center for EUV Science & Technology, Colorado State University, USA.* We have demonstrated the generation of bright soft x-ray laser pulses with record-high average power from compact plasma amplifiers excited by ultrafast solid state lasers. These lasers have numerous applications in nanoscience and nanotechnology.

LS3A.3 • 15:00

Low-Cost High-Performance InP-Based Photonic-Integrated Circuits enabled by a Generic Foundry Process, Francisco Soares[1]; *[1]Photonic Components, Fraunhofer Heinrich-Hertz-Institut, Germany.* We present results for three different InP-based photonic integrated circuits (a high-quality-factor ring resonator, a 4-channel WDM receiver, and a frequency-modulation direct-detection microwave receiver) all realized on the same wafer using a generic foundry process.

Pauba Room

14:00–16:00

LS3B • Fiber Sensors

Presider: Walter Margulis; Acreo AB, Sweden

LS3B.1 • 14:00 Invited

Photonic Sensing Technology in the Energy Sector, Alexis Mendez[1]; *[1]MCH Engineering, LLC, USA.* A review of photonic sensing technologies based on spectroscopic, fiber optics, and LIDAR technologies used in energy sector for measurement and monitoring applications in wind, oil & gas and geothermal industries—among others—is made.

LS3B.2 • 14:40

Fiber Optic Multimirror Fabry-Perot Sensor for Liquids Analysis, Violeta A. Marquez-Cruz[1], Juan Hernandez-Cordero[1]; *[1]Instituto de Investigaciones en Materiales, Universidad Nacional Autonoma de Mexico, Mexico.* We propose a new technique to determine physical properties of liquids through analysis of a remnant drop pending from an optical fiber. Processing of the back-reflected signal is done using a multimirror Fabry-Perot interferometer model.

LS3B.3 • 15:00

Salinity Sensor based on a Two-Core Fiber, Jose Guzman-Sepulveda[1,2], Miguel Torres-Cisneros[2], Daniel A. May-Arrioja[1]; *[1]Department of Electrical Engineering, Universidad Autónoma de Tamaulipas, Mexico; [2]Engineering Division, Universidad de Guanajuato, Mexico.* A highly sensitive salinity sensor based on Two-Core fiber is demonstrated. The achieved sensitivity, 9.60 nm/(mol/L), is more than 12 and 400 times larger than that reported for both polymide-coated PCF and FBG, respectively.

Una Room

14:00–16:00

LS3C • Active Optics and Imaging

Presider: Armando Albertazzi; Universidade Federal de Santa Catarina , Brazil

LS3C.1 • 14:00 Invited

Active Optics Techniques and Complex Instrumentation for Future ELTs, Emmanuel Hugot[1], Marie Laslandes[1], Zalpha Challita[1], Marc Ferrari[1], Fabrice Madec[1], David Le Mignant[1], Jean-Gabriel Cuby[1]; *[1]Laboratoire d'Astrophysique de Marseille, CNRS/AMU, France.* In the frame of the future European Extremely Large Telescope, the Laboratoire d'Astrophysique de Marseille is developing manufacturing methods and complex instrumentation for astronomy, based on the active bending of mirrors.

LS3C.2 • 14:40

Progressive Power Lenses (PPL) Characterization with Multi-Wavelength Speckle Interferometry, Eduardo A. Barbosa[1], Danilo Silva[2], Fábio Lima[1], Carlos Nascimento[1], Juan Mittani[1], Niklaus U. Wetter[2]; *[1]Laboratório de Óptica Aplicada, Fatec-SP, Brazil; [2]Centro de Laser e Aplicações, IPEN-CNEN, Brazil.* This work presents a method for spherical and aspherical lens characterization based in dual -wavelenght Digital Speckle Pattern Interferometry (DSPI). The spherical power and the astigmatism distribution are taken from reconstructed wavefront by using Zernike polynomials

LS3C.3 • 15:00

Imaging with extended depth of field by means of the peacock eye optical element, Rodrigo Henao[1], Zbigniew Jaroszewicz[2,3], Karol Kakarenko[4], Andrzej Kolodziejczyk[4], Maria Sagrario Millán[5], Krzysztof Petelczyc[4], Maciej Sypek[4], Izabela Ducin[4]; *[1]Instituto de Física, Universidad de Antioquia, Colombia; [2]Institute of Applied Optics, Poland; [3]National Institute of Telecommunications, Poland; [4]Faculty of Physics, Warsaw University of Technology, Poland; [5]Dep. Optics & Optometry, Technical University of Catalonia, Spain.* We present imaging properties of the peacock eye optical element. Its abilities for imaging with extended depth of field are illustrated experimentally. The element makes possible to maintain the acceptable resolution, contrast and brightness of the output images for a wide range of distances.

Guaecá Room	Pauba Room	Una Room
LS3A • Novel Sources I - Continued	**LS3B • Fiber Sensors - Continued**	**LS3C • Active Optics and Imaging - Continued**
LS3A.4 • 15:20 Invited **Coherent and Dynamic Nonlinear Interactions in 2D Photonic Crystal nanocavities,** J. Ariel Levenson[1], Patricio Grinberg[1], Maia Brunstein[1], Kamel Bencheikh[1], Alejandro Yacomotti[1], Isabelle Sagnes[1], Fabrice Raineri[1], Yannick Dumeige[2]; [1]*LPN-CCNRS, France;* [2]*Foton, France.* By coupling light resonantly into a nanocavity new avenues are open to efficiently produce nonlinear coherent interactions. We discuss recent results on optical bistability, excitability and slow light in semiconductor L3 Photonic Crystal nanocavities.	**LS3B.4 • 15:20** **MMI Fiber Optic Temperature Sensor,** Victor Ivan Ruiz Perez[1], Daniel Lopez-Cortes[1], Jose Javier Sanchez-Mondragon[1], Daniel A. May-Arrioja[2]; [1]*Departamento de Optica, INAOE, Mexico;* [2]*Departamento de Electronica, Universidad Autonoma de Tamaulipas, Mexico.* We report a temperature fiber sensor based on MMI effects using a No-Core fiber inserted in a glass tube filled with ethylene-glycol. A sensitivity of 0.4421 nm/°C has been achieved.	**LS3C.4 • 15:20** **Double Diffraction White Light Imaging: First Results With Bidimensional Diffraction,** Jose J. Lunazzi[1], Noemí I. Rivera[1]; [1]*Universidade Estadual de Campinas, Brazil.* The diffraction of white light can produce an image in certain conditions by using elements where diffraction happens in both directions. Some differences between the straight-groove and the almost circular curved-groove cases are described.
	LS3B.5 • 15:40 **Polymer Microbubble Fabry-Perot Temperature Sensor,** Beatriz Argumedo[1], Violeta Marquez[1], Juan Hernández[1]; [1]*Universidad Nacional Autónoma de México, Mexico.* A Fabry-Perot cavity generated between a microbubble and a single-mode fiber embedded in PDMS is evaluated as a temperature sensor. The sensor provides a linear response over a temperature range of 35 °C.	

16:00 - 16:30
EXHIBIT HALL and COFFEE BREAK, *Foier*

Notes

Guaecá Room

16:30–18:10

LS4A • Novel Sources II

Presider: Jorge J. Rocca; NSF Center for EUV Science & Technology, Colorado State University, USA

LS4A.1 • 16:30 Invited

The Optical Frequency Divider for High Spectral Purity Microwave Generation, Franklyn Quinlan[1], Tara M. Fortier[1], Haifeng Jiang[1], Jennifer Taylor[1], Scott Diddams[1]; [1]*National Inst of Standards & Technology, USA.* An optical frequency comb locked to a stable optical reference can serve as a source for microwave signals having very high spectral purity. Here we describe the system architecture, and present our latest results.

LS4A.2 • 17:10

Thermo-optically Tunable Polymer-based Waveguide Bragg-Grating Lasers for the C-Band Domain, Norbert Grote[1], Zihang Zhang[1], Holger Klein[1], David De Felipe[1], Wolfgang Rehbein[1], Walter Brinker[1], Crispin Zawadzki[1], Norbert Keil[1], Panos Groumas[2], Cristos Kouloumentas[2], Raluca Dinu[3], Eric Miller[3]; [1]*Photonic Components, Fraunhofer Heinrich Hertz Institute, Germany;* [2]*School of Electrical and Computer Engineering, National Technical University of Athens, Greece;* [3]*GigOptix Inc., USA.* Thermo-optically tunable laser diodes comprised of hybridly integrated InP based gain chips and Bragg grating loaded polymer waveguides were developed for C-band applications. Passive and electro-optic polymer materials were used. Results will be reported.

LS4A.3 • 17:30

Solvent effects in conjugated polymer random lasers, Ana Ramirez-Ledesma[1], Juan Hernandez-Cordero[1]; [1]*Univ Nacional Autonoma de Mexico, Mexico.* We evaluate the performance of MEH-PPV in a random laser configuration using different solvents. UV-Vis spectroscopy and SEM images show that the solvent is important for the morphology of the samples

LS4A.4 • 17:50

Silver Nanoparticles Synthesized by Laser Ablation in Liquids and Application of Surface-Enhanced Raman Scattering, G. W. Yang[1]; [1]*Physics, Sun Yat-sen University, China.* we reported the synthesis and surface-enhanced Raman scattering (SERS) effect of silver nanoparticles (NPs) by using laser ablation in liquids. The as-synthesized silver NPs exhibit super SERS sensitivity.

Pauba Room

16:30–18:10

LS4B • Novel Sources and Precision Measurements

Presider: Vanderlei Bagnato; Univ. of São Paulo, São Carlos, Brazil

LS4B.1 • 16:30 Invited

Coherent Back Scattering and Anderson Localization of Ultra Cold Atoms, Alain Aspect[1]; [1]*Institut d'Optique, France.* We use ultra cold atoms transport in a laser speckle disordered potential to study experimentally Anderson Localization and Coherent Back Scattering (CBS) in 1D, 3D, and 2D.

LS4B.2 • 17:10 Invited

Precision Measurements with Ultra-cold Alkaline Earth Atoms, Jan W. Thomsen[1]; [1]*Kobenhavns Universitet, Denmark.* Techniques of modern quantum optics allows for the preparation of ultra-cold atoms in well controlled quantum states ideal for precision measurements and tests of fundamental laws of physics. We report on our recent progress with precision measurements using alkaline earth atoms.

LS4B.3 • 17:50

Optical Frequency Combs for Calibration of Spectra from Incoherent Sources: Improved Sensors for Pressure, Stark and Zeeman Shifts, Ricardo S. Moreira[1], Flavio C. Cruz[1]; [1]*Instituto de Fisica Gleb Wataghin, Universidade Estadual de Campinas, Brazil.* We report on the use of an optical frequency comb for calibration of spectra from incoherent broadband light sources. Increased accuracy in frequency calibration can be used for improved sensing of pressure or electrical and magnetic fields.

Una Room

16:30–18:10

LS4C • Sensors

Presider: Philip Russell; Max-Planck Institute, Germany

LS4C.1 • 16:30 Invited

High Contrast Metastructures for Silicon Photonics, Connie J. Chang-Hasnain[1]; [1]*University of California Berkeley, USA.* A new class of planar optics has emerged using near-wavelength gratings with a large refractive index contrast. We will review how this seemingly simple structure lends itself to extraordinary properties, which can be designed top-down based for integrated optics on a silicon substrate.

LS4C.2 • 17:10

Sensitivity Analysis of SPR Sensors Based on Suspended-core Microstructured Optical Fibers, Nelson Gomez-Cadona[1,2], Pedro Torres[2]; [1]*Centro de Investigación, Instituto Tecnológico Metropolitano, Colombia;* [2]*Escuela de Física, Universidad Nacional de Colombia, Colombia.* We compare the performance of two different suspended-core microstructured optical fibers for the development of SPR sensors. Furthermore, we show the behavior of these SPR sensors with metallic films of Au and Ag.

LS4C.3 • 17:30

Dengue Immunoassay using an LSPR-based Fiber Optic Sensor with Au Nanoparticles, Alexandre R. Camara[1], Ana CArolina M. Dias[2], Paula M. Gouvêa[1], Arthur M. Braga[1], Rosa F. Dutra[2], Renato E. Araújo[2], Isabel C. Carvalho[1]; [1]*Pontificia Univ Catolica Rio de Janeiro, Brazil;* [2]*Unversidade Federal de Pernambuco, Brazil.* An all-optical fiber sensor based on Localized Surface Plasmon Resonance (LSPR) and specular reflection from gold nanoparticles (NPs) has been functionalized detecting NS1 protein of dengue virus.

LS4C.4 • 17:50

Low-cost polymer Fresnel Microlens Array Fabricated by Maskless Lithography, Giuseppe A. Cirino[1], Sergio A. Lopera[2], Arlindo N. Montagnoli[1], Luiz G. Neto[3], Ronaldo D. Mansano[2]; [1]*Electrical Engineering, Universidade Federal de Sao Carlos, Brazil;* [2]*Electrical Engineering, Universidade de Sao Paulo, Brazil;* [3]*Electrical Engineering, Universidade de Sao Paulo, Brazil.* This work presents the fabrication of 8X8 PDMS Fresnel microlens array (MLA) by maskless lithographic system. The FWHM intensity values of each spot present a deviation of 8%. Such a MLA can be applied as Shack-Hartmann wavefront sensor and to enhance the efficiency of detector arrays

Guaecá Room	Pauba Room	Una Room

07:00—18:00
REGISTRATION, *Sala de Apoio*

08:00–10:00
LM1A • Nonlinear Optics I
Presider: Cid Bartolomeu Universidade Federal de Pernambuco , Brazil

LM1A.1 • 08:00 Invited
Nonlinear Absorption in Quantum Confined Semiconductors, Lazaro A. Padilha[1], David J. Hagan[2], Eric W. Van Stryland[2]; *[1]Los Alamos National Laboratory, USA; [2]CREOL, University of Central Florida, USA.* We show how the semiconductor band structure influences the size dependence trends of two-photon absorption in quantum dots. We demonstrate, via two-photon spectroscopy, that parity symmetry does not hold in small lead-chalcogenides quantum-dots.

LM1A.2 • 08:40

Withdrawn

LM1A.3 • 09:00
Charge-Transfer Dynamics in Rh6G-Functionalized TiO2 Nanoparticles Investigated by Pump-Probe Spectroscopy, Euclides Almeida[1,2], Antonio M. Brito-SIlva[2], Andréa F. da Silva[2,3], Giovanna Machado[2], Leonardo de S. Menezes[1], Cid Bartolomeu de Araujo[1]; *[1]Departamento de Física, Universidade Federal de Pernambuco, Brazil; [2]Centro de Tecnologias Estratégicas do Nordeste (CETENE), Brazil; [3]Programa de Pós-Graduação em Ciência de Materiais, Universidade Federal de Pernambuco, Brazil.* We investigate charge transfer dynamics in Rh6G-functionalized amorphous TiO2 nanoparticles using transient absorption (TA) spectroscopy. The TA shows a bleaching signal that is shortened compared to the bleaching of the free dye in solution.

LM1A.4 • 09:20 Invited
Complex Nonlinear Optofluidics - Optical Manipulation in Dense Suspensions, Mordechai Segev[1], Elad Greenfield[1], Demetri N. Christodoulides[2]; *[1]Technion Israel Institute of Technology, Israel; [2]CREOL - College of Optics & Photonics, University of Central Florida, USA.* We demonstrate optical manipulation in strongly scattering colloidal-suspensions: shock-waves of particles induced by radiation pressure and the gradient force, inducing local phase transitions, manipulating condensed nanoparticle 'balls' deep inside light diffusing suspensions.

08:00–10:00
LM1B • Ultracold Trapped Atoms
Presider: Vanderlei Bagnato, *Univ. of São Paulo, São Carlos, Brazil*

LM1B.1 • 08:00 Invited
Using Atomic Physics to Understand Condensed Matter, Steven L. Rolston[1]; *[1]Physics, University of Maryland, USA.* Using ultracold atomic systems as quantum simulators, many-body physics phenomena relevant to condensed matter systems can be explored. I will survey work in this area, and concentrate on the study of disorder in two-dimensional systems.

LM1B.2 • 08:40 Invited
Ultracold Atoms in Optical Lattices, Randall Hulet[1], Russell A. Hart[1], Pedro M. Duarte[1], Tsung-lin Yang[1]; *[1]Rice University, USA.* We cool a two spin-component gas of 6Li atoms to quantum degeneracy and confine them in optical lattices. We obtain the phase diagram for a spin-imbalanced gas in 1D and search for antiferromagnetism in 3D.

LM1B.3 • 09:20
Engineered Optical Potentials for Dynamical Control of Quantum Gases, Ryan Ketterer[1], Paulo C. Ventura da Silva[1], Luciano F. Santana[1], Sergio R. Muniz[1]; *[1]IFSC-DFCM/USP, University of São Paulo, Brazil.* Quantum gases became an important cross-disciplinary tool in contemporary physics. Here we present the development of new methods to produce and control engineered arbitrary optical potentials to create dynamical quantum simulators of condensed matter systems.

LM1B.4 • 09:40
Power Law on the Kinetic Energy Spectrum of a Turbulent Atomic Superfluid, Guilherme Bagnato[1], Gustavo Telles[1], Vanderlei S. Bagnato[1]; *[1]IFSC - USP, Brazil.* We report the observation of a scaling power law existing in the kinetic energy spectrum of an expanding turbulent BEC, analogous to the Kolmogorov "$5/3$" power law for classical turbulent fluids.

08:00–10:00
LM1C • WDM Transmission and Amplification
Presider: Andrew Chraplyvy; Alcatel-Lucent Bell Labs, USA

LM1C.1 • 08:00 Invited
Overview of the Nonlinear Shannon Limit for Optical Fibers, Rene-Jean Essiambre[1]; *[1]Alcatel-Lucent, USA.* We present a summary of a procedure for calculating a nonlinear fiber capacity limit estimate for optically-routed networks. We present nonlinear Kerr fiber capacity results for single-mode fibers and discuss spatial multiplexing in multicore and multimode fibers as a way to increase capacity.

LM1C.2 • 08:40
80 DWDM 112Gbps Channels over 2000km of SSMF Hybrid Amplified (DRA/EDFA) with 35dB of Span Loss, Getulio Paiva[1], Juliano R. F. Oliveira[1], Uiara C. Moura[1], Rafael L. Amgarten[1], Julio Oliveira[1]; *[1]Photonics, CPqD Foudation, Brazil.* We experimentally demonstrate the transmission of 80 channels over 2000km of SSMF fiber. Hybrid optical amplifiers (DRA couter-propagating and EDFA) were used to amplify the 112Gbps DP-QPSK channels leading to 1.14E-5 of BER after 2000km.

LM1C.3 • 09:00 Invited
448 Gb/s Dual-Carrier PDM-RZ-16QAM on 75-GHz Grid over 720 km with 10 Flexi-Grid ROADM passes, Edson P. Silva[1], Luis Henrique H. Carvalho[1], Júlio César M. Diniz[1], Juliano R. Oliveira[1], Vitor B. Ribeiro[1], Reginaldo Silva[1], José Paulo K. Perin[1], Marcelo L. Silva[1], Pedro Paulo G. Cardoso[1], Julio Oliveira[1]; *[1]Optical Systems Division, CPqD, Brazil.* We show 448 Gb/s transmission of dual-carrier pre-filtered PDM-RZ-16QAM modulation in 75-GHz flexi-grid channel spacing over 720 km and 10 ROADM passes with 5.97-b/s/Hz spectral efficiency.

LM1C.4 • 09:40
Optical Amplifier based on a Er3+- doped Tellurite Microstructured Optical Fiber, Mariana Ando[1], Enver Chillcce[2], Jorge Marconi[1,2], Robert Narro-Garcia[3], Hugo L. Fragnito[2], Luis Barbosa[2], Jacson Menezes[2], Eugenio Rodriguez[3]; *[1]UFABC, Brazil; [2]Unicamp, Brazil; [3]Centro de Investigación em Ciencia Aplicada y Tecnología Avanzada, Mexico.* Optical gain from 1530 up to 1570 nm by using an Er3+-doped tellurite microstructured fiber is presented. A maximum optical gain of ~27 dB at 1554 nm is obtained for a 980/1480 nm pump scheme .

10:00 - 10:30
COFFEE BREAK, *Foier*

10:30–11:30
LM2A • Poster Session I
Exhibit Hall, Foier

LM2A.1
Investigation on Hydrogen-induced Attenuation in Optical Fibers for DTS Application, Sully M. Quintero[1], Henrique Penna[1], Adriana Triques[2], Arthur M. Braga[1], Luiz G. Valente[1]; *[1]Pontifícia Universidade Católica do Rio, Brazil; [2]CENPES, Petrobras, Brazil.* We analyze hydrogen-induced attenuation of the pure silica core and conventional fibers subjected to high temperature and hydrogen pressure. Hydrogen-induced attenuation in optical fibers is directly influenced by partial pressure of hydrogen surrounding the fiber

LM2A.2
Yb3+/Er3+ codoped Bi2O3-WO3-TeO2 pedestal type waveguide for photonic applications, Vanessa Cacho[1], Davinson M. da Silva[1], Luciana R. Kassab[2], Marco Alayo[1], Daniel Carvalho[1]; *[1]EPUSP, Brazil; [2]FATEC, Brazil.* This work presents, for the first time to our knowledge, experimental results on pedestal waveguides produced with Yb3+/Er3+ codoped Bi2O3-WO3-TeO2 thin films deposited by RF Sputtering.

LM2A.3
Transverse Force Sensitivity and Birefringence axes Rotation in Polarization-Maintaining Two-Hole Fiber Bragg Grating, Estebna González-Valencia[1], Pedro Torres[1]; *[1]Universidad Nacional de Colombia, Colombia.* We study the transverse force sensitivity and birefringence axes rotation in polarization-maintaining two-hole fiber Bragg grating. We found a relationship between the force sensitivity and the rotation of birefringence axes of such a grating.

LM2A.4
Diode Laser System for use in a Compact Cold Atoms Frequency Standard, Jair de Martin[1], Rodrigo D. Pechoneri[1], Felipe A. Otoboni[1], Stella T. Müller[1], Vanderlei S. Bagnato[2], Daniel Magalhaes[1]; *[1]Engenharia Mecânica, Escola de Engenharia de São Carlos - USP, Brazil; [2]Física e Ciência dos Materiais, Instituto de Física de São Carlos - USP, Brazil.* Our group has been developing a compact and robust laser source to be used in a mobile frequency standard with cold atoms. The opto-mechanical setup is designed to use an intracavity ultra narrow interference filter.

LM2A.5
Silver Nanoparticles Dimensional Tailoring by Ultrashort Pulses Temporal Shaping, Thiago Da Silva Cordeiro[1], Ricardo A. de Matos[2], Lilia C. Courrol[2], Nilson D. Vieira[1], Ricardo E. Samad[1]; *[1]Center For Lasers and Applications, IPEN, Brazil; [2]UNIFESP, Brazil.* A study of particles sizes and size dispersion was carry carried out, showing that nanoparticles characteristics can be controlled by shaping ultrashort pulses.

LM2A.6
Photorefractive holography for 2D mechanical vibrations measurement, Ivan de Oliveira[1], Jaime Frejlich[2]; *[1]Faculdade deTecnologia, Universidade Estadual de Campinas-UNICAMP, Brazil; [2]Departamento de Física da Materia Condensada, Instituto de Física, Universidade Estadual de Campinas-UNICAMP, Brazil.* We report an efficient holographic setup for the real time measurement of 2D mechanical vibration modes in surfaces, based on the time-average holographic interferometry technique using a low power red laser for illumination and a photorefractive titanosillenite crystal as sensing element.

LM2A.7
Multiplexed FBG Optical Instrumentation Using an FPGA-Based System, Yujuan Wang[1], Lucas H. Negri[1], Gustavo Cervi[2], Valmir de Oliveira[3], Hypolito J. Kalinowski[3], Aleksander S. Paterno[1]; *[1]Department of Electrical Engineering, Universidade do Estado de Santa Catarina, Brazil;[2]Department of Chemistry, Universidade do Estado de Santa Catarina, Brazil; [3]Graduate School of Electrical Engineering and Computer Science, Federal University of Technology - Paraná, Brazil.* An FBG interrogation system was developed. Data processing algorithms were implemented by FPGA. It was tested by monitoring the fabrication of an evanescent-field sensor, which is then applied in an refractive index sensing experiment.

LM2A.8
Peak Detection Algorithm for Fiber Bragg grating Sensors., Cicero Martelli[1], Felipe Mezzadri[1], Frederic C. Janzen[1]; *[1]UTFPR, Brazil.* Fiber Bragg gratings (FBGs) are widely studied because of their properties to measure variables like temperature, strain, pressure among others. This work proposes a simple and efficient FBG peak detection algorithm.

LM2A.9
Simulations of Time Multiplexed Fraunhofer Holograms Produced by Binary Phase SLMs for Video Projection, Yunuen Montelongo[1], Ananta Palani[1], Tim Wilkinson[1]; *[1]Engineering Department, University of Cambridge, United Kingdom.* We demonstrate the use of simulations to generate realistic representations of holographic projection of binary phase SLMs. Using an appropriate representation of the hologram at the simulation allows an accurate visualization of the projected image.

LM2A.10
Dynamic Speckle technique to analysis of hydro-adsorption processes in clay surfaces, Maria J. Gonzalez[2], Guillermo Bertolini[3], Irma Botto[2], Carmen I. Cabello[3], Ricardo Arizaga[1], Marcelo Trivi[1]; *[1]Centro de Investigaciones Opticas (CONICET La Plata CIC) and UID Optimo, Facultad Ingeniería, UNLP, Argentina; [2]Centro de Química Inorgánica, (CONICET La Plata -UNLP), Argentina; [3]Centro de Inv. y Desarrollo en Ciencias Aplicadas, Dr. J. J. Ronco, CINDECA, (CONICET La Plata - UNLP), Argentina.* We use dynamic speckle technique to analyze the hydro-adsorption capacity of original and iron modified clay species. Experimental speckle results showed different behavior depending on physicochemical and textural properties of the samples.

LM2A.11
Measuring polarization entanglement with a pulsed source, Mónica Beatriz Agüero[1], Marcelo G. Kovalsky[1], Alejandro A. Hnilo[1]; *[1]CITEDEF, Argentina.* Bell's inequality is measured recording the time of arrival of the pulses and detection of each single photon. The obtained results impose new restrictions to the class of hidden-variables theories that exploit the "time loopholes".

LM2A.12
Development of a Mobile Atomic Frequency Standard based on Cold Atoms, Daniel Magalhaes[1], Jair de Martin[1], Stella T. Müller[1], Rodrigo D. Pechoneri[1], Felipe A. Otoboni[1], Vanderlei S. Bagnato[2]; [1]*Engenharia Mecânica, Escola de Engenharia de São Carlos - USP, Brazil;* [2]*Física e Ciência dos Materiais, Instituto de Física de São Carlos - USP, Brazil.* We have been developing a compact frequency standard based on cold cesium atoms. The operation of this experiment is different from conventional cold atoms fountains, since all the steps are sequentially performed inside the microwave cavity.

LM2A.13
Production and Investigation in a Mixture of BECs, Edwin Eduardo Pedrozo Peñafiel[1]; [1]*Instituto de Física de São Carlos, Universidade de São Paulo, Brazil.* In this work we are dealing with a mixture of Bose-Einstein Condensates. With the mixture of these two superfluids, we are going to investigate the effects of transferring quantum excitations, collective excitations and vortices.

LM2A.14
Analysis of Experimental Production of Photonic Molecules of Sodium in a Magneto Optical Trap, Franklin A. Julca Vivanco[1]; [1]*Instituto de Física de São Carlos, Universidade de São Paulo, Brazil.* A experimental setup for the study of the sodium Na2+ molecule is presented. This molecular bond states are formed in the presence of light by photoassociation ionization (PAI). The pair of sodium atoms in the ground state absorbs two photons forming the photonic molecule.

LM2A.15
Analysis of Experimental Production of Photonic Molecules of Sodium in a Magneto Optical Trap, Franklin A. Julca Vivanco[1]; [1]*Instituto de Física de São Carlos, Universidade de São Paulo, Brazil.* A experimental setup for the study of the sodium Na2+ molecule is presented. This molecular bond states are formed in the presence of light by photoassociation ionization (PAI). The pair of sodium atoms in the ground state absorbs two photons forming the photonic molecule.

LM2A.16
Thermodynamic analysis of a trapped BEC: Phase transitions, Freddy Jackson Poveda Cuevas[1]; [1]*Instituto de Física de São Carlos, Universidade de São Paulo, Brazil.* The difficulty to define pressure in a medium which is not homogeneous, involves a difficulty in studying systems harmonically trapped cold gases. Thus, we need to define new thermodynamic variables that allow us to study phase transition.

LM2A.17
Thermodynamic analysis of a trapped BEC: Characterization of the experimental setup, Patrícia Castilho[1], Freddy Jackson Poveda-Cuevas[1], Sergio Muniz[1], Vanderlei S. Bagnato[1]; [1]*Instituto de Física de São Carlos - Universidade de São Paulo, Brazil.* To extend the study of thermodynamic properties of a trapped Bose-Einstein Condensate of 87Rb by the concept of global variables we make use of a hybrid trap which experimental setup is described on this paper.

LM2A.18
Mechanism of Vortices Generation for a Trapped Superfluid under Oscillatory Excitation, Pedro Ernesto Schiavinatti Tavares[1], GUSTAVO TELLES[1], Rodrigo F. Shiozaki[1], Cora C. Castelo Branco[1], Kilvia M. Farias[1], Vanderlei S. Bagnato[1]; [1]*Instituto de Física de São Carlos, Universidade de São Paulo, Brazil.* We observed a relative motion in between a 87Rb Bose-Einstein condensate and the thermal fraction, excited by a time-varying magnetic field. This motion produce ripples on the BEC/thermal interface and gives evidences of vortex nucleation mechanism.

LM2A.19
The role of surface roughness on the electron confinement in semiconductor quantum dots, Rair Macêdo[1], Michael S. Sena[2], Jusciane Costa e Silva[2], Andrey Chaves[3], José A. P. da Costa[1]; [1]*Departamento de Física, Univ. do Estado do Rio Grande do Norte, Brazil;* [2]*Departamento de Ciências Exatas e Naturais, Universidade Federal Rural do Semi-Árido, Brazil;* [3]*Departamento de Física, Universidade Federal do Ceará, Brazil.* Using the effective mass approximation, we present a theoretical study of surface roughness effects on electron energies in semiconductor quantum dots, which are demonstrated to increase up to approximately 6%

LM2A.20
Innovative OSNR Monitoring Technique Employing HiBi Fibre Bragg Gratings for 10Gb.s-1 Passive Optical Networks, Ana Sousa[1,2], Carlos A. Marques[1,2], Paulo André[1,2]; [1]*Instituto de Telecomunicações, Portugal;* [2]*Departamento de Física, Universidade de Aveiro, Portugal.* An innovative method to monitor OSNR based on high birefringent fibre Bragg gratings is presented. It was analyzed for a 10 Gb.s-1 channel, showing a maximum error of 0.9 dB for an OSNR range up to 25 dB.

LM2A.21
Practical Impairments in FBG-Based True Time Delays, Pablo A. Costanzo Caso[1,2], Sabastian Rabal[1,2], Emanuel Paulucci[1,2], Alejandro Giordana[1,2], Laureano A. Bulus Rossini[1,2]; [1]*Centro de Investigaciones Ópticas (Conicet La Plata - CIC), Argentina;* [2]*Facultad de Ingeniería, UNLP, Argentina.* The response of a OBF which employs TTDs based-on FBG is analyzed. Deviation in the Bragg wavelengths, instabilities in the laser wavelength, and misalignment in the fiber path lengths were considered.

LM2A.22
Numerical Analysis of Periodic Segmented Waveguides Directional Couplers, Ana Julia Oliveira[1], Matheus Silva Costa[1], Cosme E. Rubio Mercedes[2], Vitaly Felix Rodriguez Esquerre[1]; [1]*Electrical Engineering Department, Universidade Federal da Bahia, Brazil;* [2]*Mathematic and Engineering Physics Courses, State University of Mato Grosso do Sul, Brazil.* The coupling characteristics of directional couplers based on periodical subwavelength segmented waveguides of silicon on insulator have been analyzed by an efficient 2D finite element method in the frequency domain

LM2A.23
Athermal Directional Couplers: Theoretical Analysis, Joaquim J. Isidio de Lima[1], Vitaly Felix Rodriguez Esquerre[1], Bernardo Dantas Yoshida[1]; [1]*Electrical Engineering Department, Universidade Federal da Bahia, Brazil.* The optimal parameters to design athermal directional couplers have been theoretically analyzed by considering the influence of the thermo-optic coefficient of their constituent materials on the coupling distance

10:30–11:30
LM2A • Poster Session I—Continued
Exhibit Hall, Foier

LM2A.24
Oscillatory growth-erasure process of FBG recording, Valmir de Oliveira[1], Larissa N. da Costa[1], Ismael Chiamenti[1], Ilda Abe[1], Hypolito J. Kalinowski[1]; *[1]Universidade Tec Federal do Parana, Brazil.* We investigate and compare the oscillatory growth-erasure process of fiber Bragg gratings engraved in nonhydrogenated standard telecommunications-grade and photosensitive single-mode fibers.

LM2A.25
Luminescence of Er3+ doped TeO2-ZnO glass containing silicon nanocrystals, Giordano B. Crepaldi[1], Luciana R. Kassab[1,2], Diego Silvério da Silva[2], Thiago A. Alves de Assumpção[2], Davinson M. da Silva[2], Cid Bartolomeu de Araujo[3]; *[1]Faculdade de Tecnologia de São Paulo, Brazil;[2]Departamento de engenharia de sistemas eletrônicos, Escola Politécnica da USP, Brazil; [3]Departamento de Física, Universidade Federal de Pernambuco, Brazil.* We investigate the influence of silicon nanocystals on Er3+ doped TeO2-ZnO. Large enhancement of the photoluminescence is observed. This is the first observation of photoluminescence enhancement in Er3+ doped TeO2-ZnO composites due to silicon nanocrystals.

LM2A.26
Green Synthesis of Spherical Gold Nanoparticles Using Amino Acids, Lilia C. Courrol[1], Ricardo A. de Matos[1], Mariana T. Iwasaki[1], Rafael J. Tomita[1]; *[1]Universidade Federal de São Paulo, Brazil.* This study compares five amino acids (tryptophan, histidine, methionine, valine, threonine) for the spherical gold nanoparticles synthesis. Dieonized water, HAuCl4, amino acid and Xe light were used to represent a "green" alternative to traditional techniques.

LM2A.27
Slow Surface Plasmon-Polaritons in a Metal-Dielectric Structure Incorporating a Lorentzian Gain Medium, Abraham Vázquez-Guardado[1], Gisela Lopez-Galmiche[1], Israel De Leon Arizpe[2], Rafael Paez-López[1], Miguel Torres-Cisneros[3], Jose Javier Sanchez-Mondragon[1]; *[1]Optics, INAOE, Mexico; [2]Physics, U of Ottawa, Canada; [3]FIMME, U of Guanajuato, Mexico.* We investigate slow surface plasmons supported at the surface of a semi-infinite metal bound by a gain medium with Lorentzian lineshape and the induced slow light regime due to the active medium.

LM2A.28
Nanowires geometry dependence of coupling properties of a hybrid directional coupler, Nestor Lozano -Crisostomo[1], Daniel A. May-Arrioja[2], Miguel Torres-Cisneros[3], Jose A. Andrade-Lucio[4], Govind P. Agrawal[5], Jose J. Sanchez-Mondragon[1]; *[1]Departamento de Óptica, INAOE, Mexico;[2]Departamento de Ingeniería Electrónica, Universidad Autónoma de Tamaulipas, Mexico; [3]Dirección de Apoyo a la Investigación, Universidad de Guanajuato, Mexico; [4]División de Ingenierías, Universidad de Guanajuato, Mexico; [5]The Institute of Optics, University of Rochester, USA.* In this work we have modeled and characterized the near infrared coupling between a plasmonic wire and a silicon nanowire. We have studied the coupling parameters dependence on the dimensions of the directional coupler nanowires

LM2A.29
Analysis of Extrinsic Losses in a Corrugated Photonic Crystal Waveguide, Gisela Lopez-Galmiche[1], Abraham Vázquez-Guardado[1], David L. Romero Antequera[1], Sangeeta Murugka[2], Jose Javier Sanchez-Mondragon[1]; *[1]Optics, INAOE, Mexico; [2]Physcis, University of Ottawa, Canada.* We analyzed the scattering produced by technological imperfections in a corrugated photonic crystal waveguide. Modeling and losses analysis of the slow-light structures were carried out by plane wave expansion method using the MPB software.

LM2A.30
Resonance Characteristics of Layered Cylinder Resonator, David L. Romero[1], Nestor Lozano-Crisostomo[1], Gisela López-Galmiche[1], Jose Javier Sanchez-Mondragon[1]; *[1]INAOE, Mexico.* Abstract We present resonance characteristics of Layered Cylinder Resonators. High Q resonances can be achieved within the inner rings of the resonator, leading to an exponential dependence with the number of layers.

LM2A.31
Energy transfer between CdSe/ZnS quantum dots in colloidal solution studied by thermal lens technique, Djalmir N. Messias[1], Vanessa M. Martins[1], Adamo F. Monte[1], Acacio A. Andrade[1]; *[1]Universidade Federal De Uberlandia, Brazil.* Energy transfer between CdSe/ZnS quantum dots of different sizes were studied through the Thermal Lens technique. It was possible to obtain the energy transfer efficiency and the individual luminescence quantum efficiency.

LM2A.32
Optical Fiber Ring Resonator (OFRR) as temperature sensor for single mode laser system, Emiliano Callegari[1], Santiago Suarez[1], Demian Biasetti[1], Matias Tejerina[1], Gustavo Torchia[1]; *[1]Centro de Investigaciones Opticas, Argentina.* We present an optical fiber ring resonator (OFRR) as temperature sensor for a DFB single mode laser system. The room temperature change produces a wavelength detuning of 0.25 pm which was perfectly measured by the OFRR system.

Guaecá Room

11:30–13:30

LM3A • Nonlinear Optics II

Presider: Lazaro A. Padilha; *Los Alamos National Laboratory, USA*

LM3A.1 • 11:30 Invited

High-field THz Pulses from Laser-Induced Ionization and their Nonlinear Interaction with Optical Fields, Roberto Morandotti[1]; [1]*INRS-Energie Mat & Tele Site Varennes, Canada.* We developed a novel scheme for intense terahertz pulse generation by two-color driven ionization of gasses that allows for MV/cm level peak-fields. The nonlinear mixing between such high-field terahertz pulse and an optical pulse results in an electric-field-induced second harmonic generation, both in gasses and in condensed media. We report on our recent investigations on this phenomenon that allows e.g. for the terahertz pulses three-dimensional mapping.

LM3A.2 • 12:10

A simple Picosecond Tuneable Pulse Generator at GHz Frequencies Using a SBS Frequency Comb, Sébastien Loranger[1], Victor Lambin-Iezzi[1], Raman Kashyap[1]; [1]*Engineering Physics, École Polytechnique de Montréal, Canada.* We propose a new method to generate high frequency phase-locked tuneable pulses in the ps regime by using a Stimulated Brillouin Scattering frequency comb in single mode fiber at any wavelength.

LM3A.3 • 12:30

Fresnel-Limited Extraction Algorithm for X-SPIDER, Alessia Pasquazi[1], Marco Peccianti[2], Jose Azana[1], David J. Moss[3], Roberto Morandotti[1]; [1]*INRS-Energie Mat & Tele Site Varennes, Canada;* [2]*Institute for Complex Systems - CNR, Italy;* [3]*CUDOS, School of Physics, University of Sydney, Australia.* We introduce a novel algorithm for phase reconstruction X-SPIDER that significantly extends the measurement time windows and test it in an integrated CMOS SPIDER device.

LM3A.4 • 12:50

Nonlinear Optics With Backward Waves, Alexander K. Popov[1], Mikhail I. Shalaev[2], Sergey A. Myslivets[3], Vitaly V. Slabko[2], Igor S. Nefedov[4]; [1]*Physics and Astronomy, University of Wisconsin-Stevens Point, USA;* [2]*Siberian Federal University, Russian Federation;* [3]*Institute of Physics of Siberiand Branch of the Russian Academy of Sciences, Russian Federation;* [4]*Aalto University, Finland.* Extraordinary properties of nonlinear-optical propagation processes in double-domain positive/negative phase velocity metamaterials such as second harmonic generation, three- and four-wave frequency conversion and optical parametric amplification are reviewed. Novel types of materials are proposed.

LM3A.5 • 13:10

Tunable all-angle negative refraction in antiferromagnets, Rair Macêdo[1], Thomas Dumelow[1], José A. P. da Costa[1]; [1]*UERN, Brazil.* We consider how the magnon response of an antiferromagnet may be used to induce negative refraction at terahertz frequencies and how the angle of refraction may be tuned using an external magnetic field.

Pauba Room

11:30–13:30

LM3B • Coherence and Physical Optics

Presider: Pedro Torres; Universidad Nacional de Colombia, Colombia

LM3B.1 • 11:30 Invited

Mesoscale Optics: Sensing and Action, Aristide Dogariu[1]; [1]*University of Central Florida, CREOL, USA.* Harnessing light at wavelength scales offers unique possibilities for sensing material properties and controlling the mechanical action of light. We will review both passive and active applications of controlling the coherence and polarization properties at these scales.

LM3B.2 • 12:10

Maximal Polarization Order of Random Electromagnetic Light Beams, Ari Tapio Friberg[1,2], Tero Setala[1], Philippe Refregier[3]; [1]*Department of Applied Physics, Aalto University, Finland;* [2]*Department of Physics and Mathematics, University of Eastern Finland, Finland;* [3]*Fresnel Institut, Domaine Universite de Saint Jerome, France.* We consider the mean spectral degree of polarization and show that it represents the maximal polarization order of fluctuating optical beams, leading to a classification of time-domain polarization changes into reversible and irreversible processes.

LM3B.3 • 12:30

Edge Detection of Fingerprint with the Radial Hilbert Transform, Leonardo Díaz[1], Yaileth Morales[1], Cesar Torres[1], Lorenzo Mattos[1]; [1]*Cesar, UPC, Colombia.* In this paper we present the radial Hilbert transform as a tool for the detection of edges, having the advantage of being immune to noise, thereby achieving the edge of the image of the fingerprint.

LM3B.4 • 12:50

Modified Fourier transform Fractional FRFTM in the study of wave propagation through optical systems., duber avila padilla[2,1], Cesar Torres[1]; [1]*Laboratorio de Optica e Informatica, Universidad Popular del Cesar, Colombia;* [2]*Departamento de Matematicas y Fisica, Universidad de Sucre, Colombia.* In this paper we study wave propagation in a second order approximation of canonical systems of Lohmann type I y II using the modified fractional Fourier transform (FRFTM).

Una Room

11:30–13:30

LM3C • High Speed Optical Devices and Polarization Effects

Presider: Alberto Paradisi; CPqD, Brazil

LM3C.1 • 11:30 Invited

Advanced Optical Modulators Using Silica-LiNbO3 Hybrid Configuration, Shinji Mino[1], Ken Tsuzuki[1], Hiroshi Yamazaki[1], Takashi Goh[1], Atsushi Aratake[1], Takashi Saida[1]; [1]*NTT Photonics Laboratories, NTT Corporation, Japan.* We review optical modulators with a hybrid configuration of silica PLCs and LiNbO3 phase modulators. The hybrid configuration is highly scalable for advanced modulation formats, and is reliable both thermally and mechanically.

LM3C.2 • 12:10

A Simple Method to Localize and Estimate PMD in Optical Fibers using the Polarization Optical Time Domain Reflectometry Technique, Carolina Franciscangelis[1], Claudio Floridia[2], LIVIA A. RIBEIRO[2], Fabiano Fruett[1]; [1]*DSIF, Unicamp, Brazil;* [2]*DRC, CPqD, Brazil.* We propose and demonstrate experimentally a method for PMD localization and estimation based in the analysis of the ripple of polarization optical time reflectometry trace as a function of temporal pulse width launched signal

LM3C.3 • 12:30 Invited

The Role of a Fabless Silicon Photonics Industry in the Era of Quantum Engineering, Michael Hochberg[2], Christophe Galland[1], Ran Ding[1], Yang Liu[1], Yi Zhang[1], Nicholas Harris[1], Tom - Baehr Jones[1]; [1]*Univ. of Delaware, USA;* [2]*National Univ. of Singapore, Singapore.* OpSIS is a foundry service for silicon photonics offering open processes and low access costs. We present the success of our project in conventional applications and how it can enable breakthroughs in applied quantum optics.

LM3C.4 • 13:10

Performance Analysis of Lossless Polarization Attractors, matteo barozzi[1], Armando Vannucci[1]; [1]*Dipartimento di Ingegneria Dell'Informazione, Università degli Studi di Parma, Italy.* Following recent studies on Kerr-based polarization attractors, we characterize their performance by introducing the Degree Of Attraction. Results provide the guidelines for selecting pump power and fiber length, in the attractor's design.

Guaecá Room	Pauba Room	Una Room
13:30 - 15:00 **LUNCH, On your Own**		
15:00–17:00 **LM4A • Nonlinear Optics III** *Presider: Jorge Tocho; CIOp - UNLP, Argentina*	**15:00–17:00** **LM4B • Optical Forces and Imaging** *Presider: Ari Tapio Friberg; Aalto Yliopisto, Sweden*	**15:00–17:00** **LM4C • Optical Networking** *Presider: Hypolito Kalinowski; Universidade Tec Federal do Parana, Brazil*
LM4A.1 • 15:00 Invited **THz Sensing and Imaging with Silicon Field-effect Transistors up to 9 THz,** Hartmut G. Roskos[1], Alvydas Lisauskas[1], Sebastian Boppel[1], Dalius Seliuta[2], Linas Minkevičius[2], Irmantas Kašalynas[2], Gintaras Valušis[2], B. Khamaisi[3], Viktor Krozer[1], E. Socher[3]; *[1]University Frankfurt am Main, Germany; [2]Center for Physical Science and Technology, Lithuania; [3]Tel-Aviv Univeristy, Israel.* The detection of THz radiation is linked with mainstream silicon technology using plasmonic mixing in MOSFETs. We report imaging in heterodyne and sub¬harmonic-mixing mode for enhanced dynamic range, and present a 220-GHz all-silicon imager.	**LM4B.1 • 15:00** Invited **On the Foundational Equations of the Classical Theory of Electrodynamics,** Masud Mansuripur[1]; *[1]University of Arizona, USA.* We describe an approach to a complete and consistent theory of classical electrodynamics based on Maxwell's macroscopic equations, Poynting's postulate, Abraham's linear and angular momentum densities, and the Einstein-Laub equations of force and torque densities.	**LM4C.1 • 15:00** Invited **Photonic Technologies for Short Range Hybrid Optical Fibre-Wireless Data Links,** J.j. Vegas Olmos, A. Caballero, D. Zibar, J. Jensen, Idelfonso Tafur Monroy[1]; *[1]Technical Univ. of Denmark, Denmark.* This paper presents an overview of activities within our laboratory in the area of photonic technologies, including high-capacity radio-over-fiber systems, optical MIMO and optical switching.
LM4A.2 • 15:40 **Influence of Gas Pressure on High Harmonic Generation on Argon,** Rabia Qindeel[1], Paulo S. Matos[1], Ricardo E. Samad[1], Edilson L. Falcão[2], Anderson Z. de Freitas[1], Nilson D. Vieira[1]; *[1]Center for Lasers And Applications, IPEN/CNEN-SP, Brazil; [2]Physics Department, UFPE, Brazil.* A Ti:Sapphire laser was employed to generate harmonics in argon gas flowing through a nozzle. We present here the current results of high-harmonic generation at different gas pressure and discuss phase matching.	**LM4B.2 • 15:40** Invited **Quantitative Phase Imaging: Seeing Transparent Objects,** Gabriel Popescu[1]; *[1]Univ of Illinois at Urbana-Champaign, USA.* Quantitative phase imaging is an emerging approach to biomedical imaging that provides label free information about completely transparent structures such as live cells. I will review some recent QPI methods developed in our laboratory and their applications to cell and tissue imaging.	**LM4C.2 • 15:40** **1GbE Media-converter Topology for 1.25 Gbps RSOA-based WDM-PON Transceiver,** Fernando R. Pereira[1], Fernando F. Padela[1], Joao A. Cremasco[1], Rivael S. Penze[1], Joao B. Rosolem[1], Ulysses Duarte[1]; *[1]CPqD Foundation, Brazil.* We present a cost-effective C-band 1.25 Gbps RSOA-based colorless WDM-PON transceiver evaluating a 1GbE full duplex plug-and-play media-converter topology. Bidirectional transmission of 1GbE packets is demonstrated over 40 km.
LM4A.3 • 16:00 **Highly Accurate Wavelength-Dependent Characterization of Second-Order Nonlinear Optical Molecules,** Jochen Campo[1], Filip Desmet[1], Wim Wenseleers[1], Etienne Goovaerts[1]; *[1]Physics, University of Antwerp, Belgium.* A very sensitive experimental setup is presented for extensive and accurate tunable wavelength hyper-Rayleigh scattering measurements of the molecular first hyperpolarizability, allowing its wavelength-dependence to be studied in detail throughout and beyond resonance.	**LM4B.3 • 16:20** **Optimization of Pseudorandom Code Apertures for Compressive Spectral Imaging,** Henry Arguello[1,2], Gonzalo Arce[1]; *[1]University of Delaware, USA; [2]Universidad Industrial de Santander, Colombia.* A new pseudorandom code aperture design framework for multi-frame Code Aperture Snapshot Spectral Imaging (CASSI) system is presented. A set of selective code apertures is optimized to reduce the required number of FPA shots.	**LM4C.3 • 16:00** **Security issues in m-sequence spectral phase-encoded time spreading (SPECTS) OCDMA systems,** Pedro L. Bertarini[1], Ben-Hur V. Borges[1]; *[1]Department of Electrical Engineering - Engineering School of São Carlos, University of São Paulo, Brazil.* In this paper, we investigate security issues due to crosstalk in a m-sequence codes family and prove that an inadequate choice of these codes, in fact, compromises the overall performance of the SPECTS-OCDMA system.
LM4A.4 • 16:20 Invited **Synchronization of Micromechanical Oscillators using Light,** Gustavo S. Wiederhecker[1]; *[1]Instituto de Física "Gleb Wataghin" - IFGW, Universidade Estadual de Campinas - UNICAMP, Brazil.* In this talk I will review our recent results on the synchronization of optomechanical oscillators that are coupled only through the optical field.		**LM4C.4 • 16:20** **Limitations of the Power Auto-Correlation-Based Chromatic Dispersion Estimation Method in Dispersion-Managed Links,** Fernando Pereira[1], Valery Rozental[1], Darli A. Mello[1]; *[1]Electrical Engineering, University of Brasilia, Brazil.* We propose to extend an existing chromatic dispersion (CD) estimation algorithm, based on the auto-correlation of the signal power waveform, by electronically adding CD, to overcome the limitations of the original proposal in dispersion-managed links.

LM4C • Optical Networking
- Continued

LM4C.5 • 16:40
Demonstration of orbital-angular-momentum-based multiple-channel free-space communication, Jaime A. Anguita[1], Camilo Quezada[1]; [1]*College of Engineering and Applied Sciences, Universidad de los Andes, Chile.* We demonstrate the feasibility of multi-channel orbital-angular-momentum (OAM)-based laser communication by transmitting and detecting three coaxial channels, individually modulated at 100 Mb/s using OOK. Selection of OAM states and channel cross-talk are discussed.

17:00 - 17:30
COFFEE BREAK, *Foier*

17:30—19:30
Postdeadline Papers, *Maresias*

LM5A.1 • 17:30
PCF interferometer to temperature sensor, F.C. Fávero[1], R. Spittel[1], J. Kobelke[1], M. Rothhardt[1], H. Bartelt[1]; [1]*Institut of Photonics and Technology, Germany.* We demonstrate the use of a very short Photonic Crystal Fiber (PCF) stub as temperature sensor. The length of the PCF stub is 2.2 mm and exhibits high thermal sensitivity of 84 pm/°C.

LM5A.2 • 17:50
Production of coherent extreme ultraviolet radiation by phase matched high order harmonic generation in hollow fiber with argon, J.D. Siqueira[1], L. Misogut[1]i, C. Mendonça[1], S.C. Zilio[1]; [1]*Universidade de Sao Paulo, Brazil.* We present the generation of coherent extreme ultraviolet light in the range of 30 to 45 nm by the process of high order harmonic generation using the recently implemented guided wave phase-matched frequency conversion technique.

LM5A.3 • 18:10
High conversion efficiency from qcw to Q-switched operation in a side-pumped Nd:YLiF laser, A. Deana[1], N.U. Wetter[2]; [1] *Universidade Nove de Julho, Brazil;* [2]*Centro de Lasers e Aplicações, CNEN-IPEN/SP, Brazil.* A record 66% conversion efficiency from qcw to Q-switched operation is demonstrated whilst maintaining diffraction limited diode-side-pumped laser resonator.

LM5A.4 • 18:30
Random Lasing of Rhodamine 6G Solution Containing TiO2:Silica Core:Shell Nanoparticles, P.C. de Oliveira[1], V. Mestre[1], E. Jimenez[2]; [1] *Departamento de Física, Universidade Federal da Paraiba, Brazil;* [2]*Instituto de Ciencia Molecular, Universitat de València, Spain.* High efficiency and low rate of photodegradation was obtained in a random laser suspending TiO2@Silica nanoparticles in ethanol solution of Rhodamine 6G. The TiO2 nanoparticles were coated with a silica shell prepared via Stöber method.

19:45—23:00
Conference Banquet

Buses departure Maresias Beach Hotel Reception Lobby at 19:45.
Buses will leave Viela de Praia at 23:00 and 24:00 to return to the hotel.

Guaecá Room	Pauba Room	Una Room
07:00—18:00 **REGISTRATION,** *Sala de Apoio*		
08:00–10:00 **LT1A • Biophotonics I** *Presider: Laura Lechuga; CIN2 (CSIC), Spain*	**08:00–10:00** **LT1B • Nanoparticles and Nanowires** *Presider: Newton Frateschi; UNICAMP, USA*	**08:00–10:00** **LT1C • Fiber Optics and Materials** *Presider: Daniel May; Universidad Autonoma de Tamaulipas Mexico*
LT1A.1 • 08:00 Invited **Totally Integrated Linear and Non-Linear Optics Multimodal Microscopy Platform to Understand Single Cell Processes,** Carlos L. Cesar[1]; [1]*Universidade Estadual de Campinas, Brazil.* We describe a multimodal non linear optics platform which integrates all modalities in one instrument to allow us to observe single cell/single molecule events in time and space without information losses.	**LT1B.1 • 08:00** **Integration of multiple SiO2 nanoparticles on a tapered fiber through evanescent wave,** Amado M. Velazquez-Benitez[1], Juan Hernandez -Cordero[1], Reinher Pimentel-Domínguez[1]; [1]*Instituto de Investigaciones en Materiales, UNAM, Mexico.* We present a simple method to incorporate SiO2 nanoparticles on the surface of tapered optical fibers exploiting optically driven transport of SiO2 nanoparticles. Changes in the transmission spectrum are registered during particle deposition.	**LT1C.1 • 08:00** Invited **Advances in Fibre Optic Lasers and Amplifiers,** John D. Harvey[1]; [1]*University of Auckland, New Zealand.* This talk discusses theoretical and experimental investigations of self similar solutions of the equation governing pulse propagation in optical fibre amplifiers. Several such similariton solutions have been discovered and experimentally realised in the last decade.
LT1A.2 • 08:40 **Curcumin in living biofilm: A study with confocal microscopy,** Mariana T. Carvalho[1], Lívia N. Dovigo[2], Alessandra Rastelli[3], Vanderlei S. Bagnato[1]; [1]*Optics Group, IFSC, Universidade de Sao Paulo, Brazil;* [2]*Dept. of Social Dentistry, Araraquara Dental School, UNESP - Univ Estadual Paulista, Brazil;* [3]*Dept. of Restorative Dentistry, Araraquara Dental School, UNESP - Univ Estadual Paulista, Brazil.* This study aimed to use confocal microscopy to evaluate different microorganisms and how photosensitizers bind to it, for this purpose we evaluate the Curcumin. We show the relation between incubation time and concentration of PS.	**LT1B.2 • 08:20** **RLC ladder networks for relatively and very small negative refractive index scatterers,** Leonardo A. Ambrosio[1], Hugo E. Hernández-Figueroa[1]; [1]*Department of Mircrowaves and Optics, University of Campinas, UNICAMP, Brazil.* We present RLC ladder networks for the Mie scattering coefficients of small negative refractive index particles, extending previous analysis for dielectric materials and revealing the fundamental differences associated with the NRI circuits obtained.	**LT1C.2 • 08:40** **Photographic technologies based on liquid crystals,** M. G. Tomlin[1]; [1]*Physics Department, St.-Petersburg University of Information Technologies, Mechanics and Optics, Russian Federation.* The LCs recording mediums are described in conception of one step and two steps photography. Such formalism opens the possibilities to describe LCs in recording radiation and physical field's images using photographic methods.
LT1A.3 • 09:00 **Orientation, rotation and position control of multiple birefringent microparticules with optical tweezers,** Augusto Arias[1,2], Sebastian S. Etchverry[2,3], Pablo P. Solano[2,3], Juan Pablo Staforelli[2,3], Halina Rubinsztein-Dunlop[4], Carlos Saavedra[2,3]; [1]*Center for Research, Instituto Tecnológico Metropolitano, Colombia;* [2]*Center for Optics and Photonics, Universidad de Concepción, Chile;* [3]*Departamento de Física, Universidad de Concepción, Chile;* [4]*School of Mathematics and Physics, The University of Queensland, Australia.* We report both the design and the experimental results of a novel method for generating multiple mobile optical tweezers, with linear polarization states where each one has a programmable orientation.	**LT1B.3 • 08:40** **Optical Properties of Zinc Oxide Based Nanostructures,** Ricardo Marotti[1]; [1]*Instituto de Física, Facultad de Ingeniería, Universidad de la República, Uruguay.* ZnO nanowires and nanostructures (nanowires sensitized with other semiconductors) for photovoltaic devices, prepared mainly by electrochemical deposition, are studied. Optical properties can be understood from single materials absorption edges and light scattering.	**LT1C.3 • 09:00** Invited **Second-order Nonlinearity in Fibers and Applications,** Walter Margulis[1,2], Mikael Malmström[1,2], Patrik Rugeland[1,2], Oleksandr Tarasenko[1]; [1]*Department of Fiber Photonics, Acreo AB, Sweden;* [2]*Department of Applied Physics, Royal Institute of Technology, Sweden.* Fiber modulators with strong field recorded exhibit the linear electrooptic effect. Interferometry transforms phase- into intensity modulation. Vπ ~100-V is obtained, with an electrical bandwidth of tens of MHz. Applications and limitations are discussed.

LT1A • Biophotonics I - Continued

LT1A.4 • 09:20
Atheroma optical imaging using europium Chlortetracycline complex fluorescent probe, Letícia B. Sicchieri[2], Daliana C. Silva[1], Lilia C. Courrol[1,2]; [1]*Departamento de Ciências Exatas e da Terra, Universidade Federal de São Paulo, Brazil;* [2]*Centro de Lasers e Aplicações, Instituto de Pesquisas Energéticas e Nucleares, Brazil.* The analyses of the arteries of rabbits subjected to high-cholesterol diets were performed by fluorescence microscopy. The images were obtained by using the complex Europium Chlortetracycline as fluorescent probe, following the development of the hypercholesterolemia framework.

LT1A.5 • 09:40
Corneal Cells Metabolic Imaging using FAD Fluorescence Lifetime, Ana Batista[1], Custódio Loureiro[2,3], José P. Domingues[1,2], José Silva[3,4], Antonio M. Morgado[1,2]; [1]*IBILI-Institute of Biomedical Research in Light and Image, Faculty of Medicine, University of Coimbra, Portugal;*[2]*Department of Physics, University of Coimbra, Portugal;* [3]*Instrumentation Center, Faculty of Sciences and Technology, University of Coimbra, Portugal;* [4]*School of Technology and Management, Polytechnic Institute of Portalegre, Portugal.* We tested the feasibility of a new method for imaging in vivo corneal cells metabolism. Fluorescence lifetime images of rat corneal epithelial layer were measured. The lifetime values correspond to the metabolic co-factor FAD.

LT1B • Nanoparticles and Nanowires - Continued

LT1B.4 • 09:00
Spectroscopic Approach to Structure, Configuration and Size Determination of Cu Nanoparticles Generated by fs Laser Ablation in Liquids, Lucía Scaffardi[1], Jesica M. Santillán[1], Fabian A. Videla[1], Daniel C. Schinca[1]; [1]*Plasmonics, Centro de Investigaciones Ópticas CIOp, Argentina.* We report on the analysis of structure and sizing of resulting species of nanoparticles produced by femtosecond laser ablation of solid copper target in liquids through optical extinction spectroscopy, using Mie theory to fit the full experimental spectra.

LT1B.5 • 09:20
Coupling Properties of Novel Directional Couplers Composed of Silicon Nanowires Waveguides, Lucas Uzeda Souza[1], Ana Julia Oliveira[1], Vitaly Felix Rodriguez Esquerre[1]; [1]*Electrical Engineering Department, Universidade Federal da Bahia, Brazil.* The coupling characteristics of novel directional couplers made of silicon nanowires waveguides have been analyzed by an efficient 2D finite element method in the frequency domain.

LT1C • Fiber Optics and Materials - Continued

LT1C.4 • 09:20
Multimode Interference All-Fiber Sensors , Cristiano M. Cordeiro[1]; [1]*UNICAMP, Brazil..* Fiber optic structures based on multimode interference were investigated to strain, curvature, refractive index and temperature sensing. Devices sensitivity and spectral profile were analyzed both experimentally and numerically. Tapered structures were also explored.

10:00 - 10:30
EXHIBIT HALL and COFFEE BREAK, *Foier*

Notes

10:30–11:30
LT2A • Poster Session II
Exhibit Hall, Foier

LT2A.1
D-Scan Measurement of the Ablation Threshold and Incubation Parameter of Optical Materials in the Ultrafast Regime, Ricardo E. Samad[1], Leandro M. Machado[1], Wagner de Rossi[1], Nilson D. Vieira[1]; *[1]IPEN/CNEN-SP, Brazil.* The D-Scan technique for the measurement of the ablation threshold in the ultrafast regime is extended to consider the pulses superposition, and the ablation parameters dependences on it for optical materials are measured.

LT2A.2
First Hyperpolarizability Dispersion of the Octupolar Molecule Crystal Violet, Jochen Campo[1], Anna Painelli[2], Francesca Terenziani[2], Tanguy Van Regemorter[3], David Beljonne[3], Etienne Goovaerts[1], Wim Wenseleers[1]; *[1]Physics, University of Antwerp, Belgium; [2]Chemistry, Università di Parma, Italy; [3]Chemistry of Novel Materials, University of Mons-Hainaut, Belgium.* The first hyperpolarizability dispersion curve is measured for the first time for an octupolar nonlinear optical molecule (crystal violet), using highly sensitive tunable wavelength hyper-Rayleigh scattering, and the results are succesfully modeled theoretically.

LT2A.3
Ultraviolet third-harmonic femtosecond Maker fringes technique, Lino Misoguti[1], Emerson C. Barbano[1], Sergio C. Zilio[1]; *[1]Instituto de Fisica de Sao Carlos, Brazil.* We present new results on femtosecond third-harmonic generation Maker fringes technique at 267 nm-UV range. We have measured two UV transparent materials: fused silica and sapphire to demonstrate our method.

LT2A.4
Optical determination of H2O2 vapor concentration: a sterilizer agent and biomarker, Tadashi Oshisawa[1], Flavio C. Cruz[1]; *[1]Universidade Estadual de Campinas, Brazil.* We report on a simple apparatus for real time optical measurement of H2O2 vapor concentration. It is based on absorption in the UV and is insensitive to water contamination.

LT2A.5
Mode-locked laser based on an integrated nonlinear microring resonator generating a dual comb, Alessia Pasquazi[1], Marco Peccianti[2], Brent Little[3], Sai T. Chu[4], David J. Moss[5], Roberto Morandotti[1]; *[1]INRS-Energie Mat & Tele Site Varennes, Canada; [2]Institute for Complex Systems - CNR, Italy; [3]Infinera Ltd, USA; [4]University of Hong Kong, Hong Kong; [5]CUDOS, School of Physics, University of Sydney, Australia.* We report a mode locked laser based on an integrated high-Q microring resonator with a highly monochromatic radiofrequency modulation thanks to the stable operation of two slightly shifted spectral optical comb replicas.

LT2A.6
Parametric oscillation in CMOS-compatible microring resonators induced with a self-locking scheme, Marco Peccianti[2], Alessia Pasquazi[1], Lucia Caspani[1], Luca Razzari[3], Marcello Ferrera[4], David Duchesne[5], Matteo Clerici[1], Brent Little[6], Sai T. Chu[7], David J. Moss[8], Roberto Morandotti[1]; *[1]INRS-Energie Mat & Tele Site Varennes, Canada; [2]Institute for Complex Systems - CNR, Italy; [3]Italian Institute of Technology (IIT), Italy; [4]University of St Andrews, United Kingdom; [5]Massachusetts Institute of Technology, USA;[6]Infinera Ltd, USA; [7]University of Hong Kong, Hong Kong; [8]CUDOS, School of Physics, University of Sydney, Australia.* We introduce an innovative geometry for OPOs in a CMOS-compatible microring resonator that is robust against the effect of thermal fluctuations. It exploits lasing of the pump inherently positioned within the resonances of the microcavity.

LT2A.7
Validation of a Sterilization Methods in FBG Sensors for in vivo Experiments, Leandro Zen Karam[1], Ana Paula Franco[1], Paulo Tomazinho[2], Hypolito J. Kalinowski[1]; *[1]CPGEI, Federal University of Technology - Paraná, Brazil; [2]Dentistry Departament, Positivo University, Brazil.* A sterilization method is proposed to use fiber Bragg grating in vivo experiments. The operation of the sensors were not influenced by any of the sterilization methods. The results suggest that the autoclave and ethylene oxide are of the choice to sterilization.

LT2A.8
Accurate and Practically Implementable Model for First Hyperpolarizability Dispersion, Jochen Campo[1], Wim Wenseleers[1], Joel M. Hales[2], Nikolay Makarov[2], Joe W. Perry[2]; *[1]Physics, University of Antwerp, Belgium; [2]School of Chemistry and Biochemistry, Georgia Institute of Technology, USA.* We present a practical yet accurate dispersion model for the molecular first hyperpolarizability β, incorporating both homogeneous and inhomogeneous line-broadening. With a single shape-determining parameter, a reliable description of the wavelength-dependence of β is obtained.

LT2A.9
Effective high-order susceptibilities in composites containing ellipsoidal nanoparticles and nanoshells, Anderson M. Amaral[1], Cid Bartolomeu de Araujo[1], Edilson L. Falcao-Filho[1]; *[1]Universidade Federal de Pernambuco, Brazil.* Expressions for the effective nonlinear susceptibilities are derived for nanocomposites containing ellipsoidal nanoparticles and nanoshells. The intrinsic third- and fifth-order contributions are considered for the nanoinclusions. The field enhancement is determined for silver particles.

LT2A.10
Photobiomodulation lactate and TNF-alfa concentration in rats submitted resistance training, Adalberto Corazza[1,2], Fernanda Paolillo[2], Francisco C. Groppo[1], Vanderlei S. Bagnato[2], Paulo H. Caria[1]; *[1]Anatomy, UNICAMP-FOP, Brazil; [2]Optics Group from Physics Institute of São Carlos, USP, Brazil.* Sarcopenia promove increased inflammatory caused by lower levels of estrogen. In this study, we examined whether a resistance training associated with light-emitting diode therapy (LEDT) was able prevent lactate and TNF-α concentration in ovariectomized rats.

LT2A.11
Bifurcation Effects in Speckle Fields, Gerardo Diaz Gonzalez[1], Javier Muñoz Lopez[1], Javier Silva Barranco[1], Gabriel Martínez-Niconoff[1]; *[1]Optics, INAOE, Mexico.* We describe the synthesis of rough surfaces by means of a holographic technique. During the reconstruction process we obtain a speckle band gap, so that we can implement an amplitude-correlation interferometer. Bifurcation effects are identified.

LT2A.12
Random Laser based on a polymer film supported by TiO2-nanomembranes, Christian T. Dominguez[1], Yvon Lacroute[2], Denis Chaumont[2], Marco A. Sacilotti[1,2], Anderson Gomes[1], Cid Bartolomeu de Araujo[1]; *[1]Departamento de Física, Universidade Federal de Pernambuco, Brazil;[2]Nanoform Group, UFR Sc. Techn., Université de Bourgogne, France.* We report coherent random laser emission in polymer films doped with rhodamine 6G having as scatterers TiO2 nanomembranes randomly distributed on the surface of a glass substrate.

LT2A.13
Monitoring of thermally driven drying varnish kinetics, Pedro Zambianchi[1], Marlos O. Ribas[1], Fernanda M. Dala Rosa de Oliveira[1], Fernando A. Moura Saccon[1], José L. Fabris[1], Marcia Muller[1]; *[1]DAFIS - Physics, Federal University of Technology of Parana, Brazil.* Time dependence of solvent mass loss taking place in drying varnish kinetics is investigated. A simplified theoretical model based on Fick's law is presented and its relation to actual polymer drying diffusion process is discussed.

LT2A.14
Appraisal "In Vitro" of Antimicrobial Activity Photodynamic Therapy on Streptococcus Mutans over Dental Biofilm "In Situ", Vitor Panhóca[1], Fernando Florez[2,1], Alessandra Rastelli[1,2], Cristina Kurachi[2], Juliane Tanomaru[2], Vanderlei S. Bagnato[1]; *[1]Instituto de Física de São Carlos, Universidade de São Paulo, Brazil; [2]Clinica Integrada - Odontologia, UNESP, Brazil.* This in situ work is to investigate the antimicrobial effect of photodynamic therapy over biofilms by the use of Curcumine and Photogem® and to clarify the mechanisms of action involved in this photobiochemical process.

LT2A.15
Elevation Maps with and without Defocus Correction by Using Null Screen Testing: A Potential Application for Corneal Topography, Amilcar Estrada-Molina[1], Manuel Campos-García[1], Rufino Díaz-Uribe[1]; *[1]Univ Nacional Autonoma de Mexico, Mexico.* Elevation maps for a calibration sphere with and without defocus correction were obtained. Experimental results of two different evaluations show that when the defocus correction was performed these maps decrease around two orders of magnitude.

LT2A.16
Biological System Modeling based on Fourier Series, Rafael Guzman[1], Jose Guzman-Sepulveda[1], Miguel Torres Cisneros[1], Oscar Gerardo Ibarra-Manzano[1]; *[1]Ingenieria Electrica, Universidad de Guanajuato, Mexico.* In this paper we propose an approach based on Fourier series for effective mathematical model of a biological system.

LT2A.17
Z-scan modeling by Split Step Fourier Method, Juan D. Barranco[1], Erwin Marti[1]; *[1]BUAP, Mexico.* We analyze Gaussian beam Z-scan, using a hyperbolic equation getting from Helmholtz, solving by split step Fourier method in paraxial approximation.

LT2A.18
Breast Cancer Classification of Mammograms using a Combined Classifier, Rafael Guzman[1], Jose Guzman-Sepulveda[1], Miguel Torres Cisneros[1], Gabriel Avina Cervantes[1]; *[1]Ingenieria Electrica, Universidad de Guanajuato, Mexico.* In this paper, we propose an approach to computationally perform mammograms images classification based on a combined classifier.

LT2A.19
Fluorescence Monitoring of Haematoporphyrin Derivatives for Photodynamic Diagnosis, Cintia T. Andrade[1], José Dirceu Vollet_Filho[1], Ana Gabriela Salvio[2], Vanderlei S. Bagnato[1], Cristina Kurachi[1]; *[1]University of Sao Paulo, Brazil; [2]Hospital Amaral Carvalho Foundation, Brazil.* In vitro and in vivo tests were performed to investigate marked fluorescence diagnosis of basal cell carcinoma. Results showed improved differentiation between normal and lesion tissues. Excitation light showed to be limiting factor for diagnosis.

LT2A.20
Beam shifts of Far-Infrared Radiation on Reflection off the Anisotropic Crystal LiYF4, Rair Macêdo[1], Thomas Dumelow[1], José A. P. da Costa[1]; *[1]UERN, Brazil.* We investigate the Goos-Hänchen shifts associated with phonons in the anisotropic crystal LiYF4. In p-polarization the shifts can be either positive or negative, and various mechanism are discussed.

LT2A.21
Effect of Electron Withdrawing Substituents on the two-photon absorption Properties of a Novel Class of Push-Pull Triarylamine Compounds, Marcelo G. Vivas[1], Leonardo De Boni[1], Cleber Mendonca[1], Elena Ishow[2]; *[1]IFSC - USP, Brazil; [2]Ecole Normale Supérieure de Cachan,, France.* In this report, we study the effect of Electron Withdrawing substituents (EWG) on the two-photon absorption properties of a novel class of push-pull triarylamine compounds containing trifluoromethyl (CF3).

LT2A.22
Influence of Conformational Change Induced by Solvent on the Two-photon Absorption spectrum of Poly(3,6 phenanthrene)s, Marcelo G. Vivas[1], Guy Koeckelberghs[2], Cleber Mendonca[1]; *[1]IFSC - USP, Brazil; [2]Laboratory of Molecular Electronics and Photonics/ Universiteit Leuven, Belgium.* The aim of this report was investigate the conformational change effect of Poly(3,6 phenanthrene)s induced by the action of solvent on their two-photon absorption (2PA) properties. Such properties were investigated employing the wavelength-tunable femtosecond Z-scan technique.

LT2A.23
Construction of a Low-Cost Stereo Retinal Camera and Quantitative 3D Diagnosis for Early Glaucoma, Luis Carvalho[1,2], Andre Romano[2,3], Elizeu Ramos[2]; *[1]Grupo de Óptica, Instituto de Fisica de Sao Carlos, Universidade de Sao Paulo, Brazil; [2]Departamento de Pesquisa e Desenvolvimento, Wavetek Technologies, Brazil; [3]Escola Paulista de Medicina, Universidade Federal de São Paulo - UNIFESP, Brazil.* Glaucoma has no symptoms in the early stages and most retinal cameras in the market are expensive and have features targeted to other diseases. The instrument developed here is cost-effective and targeted towards glaucoma diagnosis.

LT2A.24
LED-Therapy and Physical Exercise to Improve Aerobic Capacity and Treatment of Cellulite, Fernanda Paolillo[1], Adalberto Corazza[1], Alessandra R. Paolillo[1], Marcela S. Fiorese[1], Antonio Eduardo de Aquino Jr[1], Cristina Kurachi[1], Vanderlei S. Bagnato[1]; *[1]University of São Paulo (USP), Brazil.* LED arrays were developed to irradiate a large area, such as hip and quadriceps muscles. This study evaluates the effects of an infrared-LED (850nm) therapy associated with treadmill training regarding aerobic capacity and cellulite.

LT2A.25
Low Level Laser Therapy and Physical Exercise Accelerates Muscle Recovery After Injury, Mayna Adabbo[1,2], Fernanda Paolillo[1], Vitória M. Coelho[1], Vanderlei S. Bagnato[1], Nivaldo A. Parizotto[2]; *[1]University of São Paulo (USP), Brazil; [2]Federal University of São Carlos (UFSCar), Brazil.* Due to photobiostimulation, Low-level laser therapy (LLLT) has been presented as an alternative to soft tissue treatment. This study evaluates the effects of LLLT associated with treadmill training on the muscle regeneration process.

10:30–11:30
LT2A • Poster Session II —Continued
Exhibit Hall, Foier

LT2A.26
Fluorescence Diagnosis in the characterization of basal cell carcinoma, Vitoria Maciel[1,2], Wagner Correr[2], Cristina Kurachi[2], Vanderlei S. Bagnato[2], Cacilda Silva Souza[1]; *[1]Medical School, University of São Paulo, Brazil; [2]Physical Institute, University of São Paulo, Brazil.* Fluorescence spectroscopy has been proposed as potential method for the evaluation of various skin disorders. The purpose in this study was to evaluate, by fluorescence spectroscopy the basal cell carcinoma and compared to normal skin.

LT2A.27
Effect of LLLT Combined with Aerobic Exercise and High Fat Diet on The Glycogen Stores and The Workload of Wistar Rats, Antonio Eduardo de Aquino Jr[1,2], Marcela S. Fiorese[1], Fernanda Paolillo[1], Vanderlei S. Bagnato[1], Nivaldo A. Parizotto[2]; *[1]University of São Paulo (USP), Brazil; [2]Federal University of São Carlos, Brazil.* The combination of exercise and high-fat diet promotes related effects on lipid metabolism, but opposite effects on the carbohydrate metabolism. The mechanisms of action of LLLT could alter these correlations for the carbohydrate metabolism.

LT2A.28
Digital Holographic Microscopy applied in the obtainment of hematological parameters in healthy and unhealthy individuals, Miriela Escobedo[1], Francisco Palacios[1], Ammis Sanchez[1], Inaudis Alvarez[1], Oneida Font[1], Guillermo Palacios[1], Mikiya Muramatsu[2], Isis Vasconcelos[2], Diogo Soga[2]; *[1]Computación, Universidad de Oriente, Cuba;[2]Phisycs Institute, University of São Paulo, Brazil.* The Digital Holographic Microscopy was applied to obtain hematological parameters in healthy and unhealthy individuals. The parameters analyzed were: mean corpuscular volume, mean corpuscular hemoglobin and the concentration of the mean corpuscular hemoglobin.

LT2A.29
Effects of Ultrasound and Laser on The Pain Relief, Alessandra R. Paolillo[1], Marcela S. Fiorese[1], Fernanda Paolillo[1], Vanderlei S. Bagnato[1]; *[1]University of São Paulo (USP), Brazil.* The use of laser and ultrasound shows promising results as non-pharmacological pain treatment. This study evaluated the effects of laser and ultrasound on abdominal pain in mice.

LT2A.30
Gain-Clamped SOA for Optical 16-QAM Amplification, C.M. Gallep[1], P. Rocha[2], E. Conforti[2]; *[1]Universidade Estadual de Campinas, Brazil; [2]Universidade Estadual de Campinas, Brazil.* The performance of 16-QAM optical carrier link employing gain-clamped SOA is simulated at 56 Gbps and compared for different pump/bias level, enabling even the use of short, non-(dispersion) compensated fiber links.

LT2A.31
Kinematic of Singular Regions
P. Martínez-Vara[1], J. Silva Barranco[2], G. Díaz Gonzales[2], G. Martínez-Niconoff[2]; *[1]Benemérita Universidad Autónoma de Puebla (BUAP), Mexico; [2]Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE), Mexico.* The scattering field generated by the coherent illumination on a three-dimensional slit-curve is described through the trihedral reference system. The projected curves on the orthogonal planes carries on the information of the curvature and torsion generated bifurcation effects.

Notes

Guaecá Room

11:30–13:30
LT3A • Biophotonics II
Presider: Masud Mansuripur[1]; *[1]University of Arizona, USA*

LT3A.1 • 11:30 Invited
Silicon Photonics: A New Paradigm in Multiplexed Biosensing, Ryan Bailey[1]; *[1]Univ of Illinois at Urbana-Champaign, USA.* Silicon photonic technologies are poised to revolutionize clinical diagnostics. This talk describes the development of silicon photonic biosensors as a rapid, multiplexed, and cost-effective platform to detect disease-related biomarkers for applications in personalized medical diagnostics.

LT3A.2 • 12:10
Monitoring Deformation of Resin Cements During Polymerization, Ana Paula Franco[1], Leandro Zen Karam[1], Maura S. Milczewski[1], Hypolito J. Kalinowski[1]; *[1]Federal University of Technology - Paraná, Brazil.* The aim of this study is to compare the strains that occur in two dental cements with different formulations after the same photoactivation conditions. The study suggest that the different contraction levels were found and may result clinically significant interference.

LT3A.3 • 12:30
FTIR spectroscopic analysis of chemical changes promoted by Er,Cr:YSGG laser and fluoride during dentin erosion, Patricia Ana[1,2], Larissa S. Silva[1,2], Denise M. Zezell[2,1]; *[1]Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas, Universidade Federal do ABC, Brazil; [2]Centro de Lasers e Aplicações, Instituto de Pesquisas Energéticas e Nucleares, Brazil.* It was evaluated the chemical changes promoted by Er,Cr:YSGG laser on dentin during erosive process by FTIR, and it was observed that the association of laser and fluoride is able to reduce erosive process.

LT3A.4 • 12:50
Elimination of Onychomycosis by Photodynamic Therapy: a Comparison of Two Photosensitizers, Ana Paula da Silva[1], Cristina Kurachi[1], Vanderlei S. Bagnato[1], Natalia Inada[1]; *[1]Physics Institute of Sao Carlos, Brazil.* Photodynamic Therapy (PDT) represents a non invasive technique for the treatment of onychomycosis, a resistant nail fungal infection. Here we are presenting clinical results comparing two different photosentitizers.

Pauba Room

11:30–13:30
LT3B • Active Devices
Presider: Roberto Morandotti; INRS-Energie Mat & Tele Site Varennes, Canada

LT3B.1 • 11:30
Silicon Photonics-based Nanobiosensors for Lab-on-a-chip Integration, Laura Lechuga[1],Daphne Duval[1], Stefania Dante[1], Ana B. Gonzalez[1], Luis J. Fernandez[2]; *[1]CIN2 (CSIC), Spain; [2]University of Zaragoza, Spain.* We present our work towards the assembly of label-free lab-on-a-chip platforms based on silicon nanointerferometers. The sensors show sensitivity of 10-7 RIU, which means an ability to discern concentrations of biomolecules at pM level.

LT3B.2 • 12:10
Geometry Optimization of Nanopatch Semiconductor Lasers: the Trade-off Between Quality Factor and Gain, Felipe Vallini[1], Qing Gu[2], Brett Wingad[2], Boris Slutsky[2], Michael Katz[2], Yeshaiahu Fainman[2], Newton Frateschi[1]; *[1]Department of Applied Physics, Universidade Estadual de Campinas, Brazil; [2] University of California at San Diego, USA.* In this work we present a design optimization of the nanopatch semiconductor laser. Geometry parameters are optimized for the best combination of quality factor (photonic lifetime) and stimulated emission (gain).

LT3B.3 • 12:30
Synthesis and Optical Characterizations of Energy Upconverting Yttrium Vanadium Oxide Nanocrystals, Yashji Dwivedi[1], Sergio C. Zilio[1]; *[1]Instituto de Física de São Carlos, Universidade de São Paulo,, Brazil.* Synthesis and optical characterizations of Y8V2O17:Eu:Yb nanocrystals were presented. Samples showed multicolor fluorescence and upconversion emissions on 325 and 976 nm excitations. Efficient energy transfer from Yb to Eu ions was established with the lifetime.

LT3B.4 • 12:50
Monolithic Erbium-Doped Al2O3 Waveguide Amplifier, Paulo F. Jarschel de Siqueira[1], Luís Barea[1], Antonio A. von Zuben[1], Rafael B. Merlo[1], Newton Frateschi[1]; *[1]Instituto de Fisica "Gleb Wataghin", Universidade Estadual de Campinas, Brazil.* We propose the development of an integrated optical amplifier, consisting of a 980 nm emission laser and an erbium-doped waveguide. Coupling simulations and current fabrication results are presented, which shows that the finished device should be able to achieve a gain of 1.55 dB/cm.

Una Room

11:30–13:30
LT3C • Interferometry and Optical Characterization
Presider: Jaime Frejlich; State Univ. of Campinas, Physics Institute, Brazil

LT3C.1 • 11:30 Invited
Interferometry in Harsh Environments - Design Considerations and Case Studies, Armando G. Albertazzi[1]; *[1]Mechanical Engineering, Universidade Federal de Santa Catarina, Brazil.* Sometimes interferometers need to be used outside laboratories. This paper analysis the main disturbing factors and how they degrade interferometer performance. It also presents and discuss possible solutions.

LT3C.2 • 12:10
Photorefractive reflection holography compound microscope for MEMS characterization, Merilyn Santos Ferreira[1], Eduardo A. Barbosa[1]; *[1]Departamento de ensino geral., Faculdade de Tecnologia de Sao Paulo, Brazil.* This work describes a reflection holography microscope setup based on sillenite photorefractive crystals and illuminated by a diode laser. The resulting compound microscope has shown to be suitable for MEMs characterization through holographic interferometry.

LT3C.3 • 12:30
Characterization of a Laser Induced Fluorescence Detection System for Microdroplets Fluorescence Quantification, Benjamin Vazquez[1], Luis Fernando Olguin[2], Laura Oropeza[1]; *[1]Electronica, UNAM, Mexico; [2]Fisicoquimica, UNAM, Mexico.* On this work a laser induced fluorescence system for microdroplets fluorescence quantification is described on detail, and it is characterized considering flow rate, laser power and fluorophore concentration. At the end, results of a microdroplet essay are presented.

LT3C.4 • 12:50
CO2 detection and characterization in the NIR region, Cicero Martelli[1], Rodolfo Luiz Patyk[1], Marco Silva[1], Rigoberto Morales[1]; *[1]UTFPR, Brazil.* In this paper we show the CO2 spectral signature obtained using a gas chamber operating at the C band. It is observed a relation between the absorption intensity and the gas pressure into the chamber.

Guaecá Room	Pauba Room	Una Room
LT3A • Biophotonics II - Continued	**LT3B • Active Devices - Continued**	**LT3C • Interferometry and Optical Characterization - Continued**
LT3A.5 • 13:10 **Characterization of irradiated bone tissue using ATR-FTIR technique,** Carolina Benetti[1], Denise M. Zezell[1]; *[1]CLA, IPEN/CNEN - SP, Brazil.* This work aims to establish the ATR-FTIR technique for the characterization of natural and irradiated osseous tissue, and to verify the possible chemical and structural changes caused by laser irradiation.	**LT3B.5 • 13:10** **Optomechanical devices with gain media: approach and challenges,** Debora Princepe[1], Luís Barea[1], Gustavo Luiz[1], Gustavo S. Wiederhecker[1], Newton Frateschi[1]; *[1]Applied Physics Department, University of Campinas, Brazil.* We propose the development of active devices with light emission modulated by optomechanics, exploring the interaction between photons emitted due to recombination in the semiconductor and mechanical oscillations excited by optical forces in the cavities.	**LT3C.5 • 13:10** **Design of a high voltage measurement transformer base in the electro - optic effect Pockels,** Nicolas A. Gomez Montoya[1], Hernan Salazar[1], Alberto Ciro[1]; *[1]Facultad de Ciencias, Instituto Tecnologico Metropolitano, Colombia.* This paper describes the construction of an optical voltage transformer for measuring A.C and D.C hihg potential based on the electro optical Pockels effect. Sensor element, we tested two types of photorefractive crystal, crystal Bi12SiO20 (BSO) and crystal Bi4Ge3O20 (BGO).

13:30 - 15:00
LUNCH, On your Own

Notes

Guaecá Room

15:40–17:00
LT4A • Biophotonics III
Presider: Denise Zezell; USP, Brazil

LT4A.1 • 15:00 Invited

Withdrawn

LT4A.2 • 15:40
Presbyopia Compensation with Elements of Extended Depth of Focus, Lope A. Ciro[1]; [1]*Universidad de Antioquia, Colombia.* The paper investigates the properties for imaging of two axicones quartic and two generalized zone plates, trying to find the item to correct presbyopia. The results show that the light sword optical element is a possible solution to the problem of presbyopia.

LT4A.3 • 16:00
Diagnosis of inflammatory lesions by high-wavenumber FT-IR spectroscopy, Luis Felipe Carvalho[1,2], Thiago Dreyer[1], Janete Almeida[2], Herculano Martinho[1]; [1]*Universidade Federal do ABC, Brazil;* [2]*Faculdade de Odontologia de São José dos Campos - UNESP, Brazil.* We evaluated FT-IR high wavenumber (2800-3600cm-1) for diagnosis of oral inflammatory lesions. Logistic binary regression was used for the spectral areas and gave 92.4% of concordant pairs and Sommers' D of 0.85.

Pauba Room

15:00–17:00
LT4B • Passive Devices
Presider: Laura Lechuga; CIN2 (CSIC), Spain

LT4B.1 • 15:00 Invited

Terahertz Resonant Dipole Nanoantennas, Luca Razzari[1], Andrea Toma[1], Matteo Clerici[2], Mostafa Shalaby[2], Salvatore Tuccio[1], Simone Panaro[1], Manohar Chirumamilla[1], Ibraheem Al-Naib[2], Sergio Marras[1], Carlo Liberale[1], Remo Proietti Zaccaria[1], Gobind Das[1], Francesco De Angelis[1], Andrea Falqui[1], Marco Peccianti[2], Tsuneyuki Ozaki[2], Roberto Morandotti[2], Enzo Di Fabrizio[1]; [1]*Italian Institute of Technology, Italy;* [2]*INRS-EMT, Canada.* We investigate the resonance characteristics of terahertz nanoantenna arrays, both numerically and experimentally. We demonstrate their tunability and their significant field enhancement properties, which can find several applications in terahertz spectroscopy and nonlinear optics.

LT4B.2 • 15:40
Lineshape Engineering in an All-Pass Ring Resonator with Backreflection Coupled to a Symmetrical Fabry-Perot Resonator, Vasily A. Melnikov[1], Iman S. Roqan[1]; [1]*Physical Sciences and Engineering Division, King Abdullah University of Science and Technology, Saudi Arabia.* We derive transfer functions for an all-pass ring resonator with internal backreflection coupled to a symmetrical Fabry-Perot resonator and demonstrate electromagnetically induced transparency-like and Fano-like lineshapes tunable by backreflection in the ring resonator.

LT4B.3 • 16:00
Estimate of Refractive Index Changes of Optical Waveguides Recorded by Femtosecond Laser in LiF Crystal, Ismael Chiamenti[1], Hypolito J. Kalinowski[1]; [1]*Universidade Tec Federal do Parana, Brazil.* A technique to estimate the refractive index increase in optical waveguide core, recorded in lithium fluoride crystal by femtosecond laser pulses, by an inverted scalar wave equation is used. The estimated refractive index changes are consistent with published data.

Una Room

15:00–16:20
LT4C • Terahertz and Heat
Presider: Flavio Cruz, UNICAMP, Brazil,

LT4C.1 • 15:00
Optical properties of silicon, sapphire, silica and glass in the Terahertz range, Jorge O. Tocho[1], Federico Sanjuan[1]; [1]*CIOp-UNLP, Argentina.* Optical properties, refractive index and absorption coefficient, of silicon, sapphire, silica and pyrex glass near 1 THz frequency were determined by simple transmission measurements of THz pulses.

LT4C.2 • 15:20
Imaging with monochromatic sources at 0.2 and 2.5 TeraHertz, Arline M. Melo[2], Mauricio Toledo[1], Andre Rocha[2], Matheus B. Plotegher[2], Daniel Pereira[1], Flavio C. Cruz[1]; [1]*Universidade Estadual de Campinas, Brazil;* [2]*BR Labs Ltda, Brazil.* We describe the design and construction of two Terahertz imaging systems based on sources at 0.2 and 2.52 THz. One is based on a single emitter and detector, in which the sample position is scanned across the beam. The other is based on a molecular gas laser at 2.52 THz and a microbolometer camera.

LT4C.3 • 15:40
Infrared thermography of integrated circuits heated by focused IR light soldering system, Marco Felix[1], Citlalli Anguiano[1], Andres Medel[1], Miguel Bravo[1], David Salazar[2], Heriberto Marquez[2]; [1]*Universidad Autonoma de Baja California, Mexico;* [2]*Centro de Investigacion Cientifica y de Educacion Superior de Ensenada, Mexico.* In this work, we present a thermal distribution measurement and analysis on the surface area of a Ball Grid Array (BGA), soldered by means of a Focused Infrared Light Soldering System (FILSS), which meets the BGA surface mount device (SMD) reflow solder heating profile.

Guaecá Room	Pauba Room	Una Room

LT4A • Biophotonics III - Continued

LT4A.4 • 16:20
New Device for PpIX Fluorescence Imaging and Non-melanoma Skin Cancer Treatment, Natalia Inada[1], Dora P. Ramirez[1], Lilian T. Moriyama[1], Cintia T. Andrade[1], Clovis Grecco[1], Ana Gabriela Salvio[2], Cristina Kurachi[1], Vanderlei S. Bagnato[1]; *[1]Physics Institute of Sao Carlos, Brazil; [2]Amaral Carvalho Hospital, Brazil.* Non melanoma skin cancer (NMSC) is the most frequent worldwide, and it is necessary the development of new technologies with successful results. We are presenting our National Program for the Photodynamic Therapy of NMSC.

LT4A.5 • 16:40
Random Laser Emission from Bovine Pericardium undergoing uniaxial tension, Celso Briones[1], Natanael Cuando-Espitia[1], Francisco Sánchez-Arévalo[1], Juan Hernandez-Cordero[1]; *[1]IIM-UNAM, Mexico.* Micromechanical behavior of bovine pericardium under uniaxial tension was associated with random laser emission for the first time. Spectral width variations of the laser emission due to collagen fiber alignment were observed during the tests.

LT4B • Passive Devices - Continued

LT4B.4 • 16:20
A confocal microscopy study on the transmission of light through a single sub-wavelength slit, Mariana T. Carvalho[1], Marcel T. Bezerra[2,3], Euclydes Marega-Junior[2], Ben-Hur V. Borges[3], Frederico D. Nunes[2,3]; *[1]Instituto de Física de São Carlos, Universidade de São Paulo, Brazil; [2]Departamento de Eletrônica e Sistemas, Universidade Federal de Pernambuco, Brazil; [3]Escola de Engenharia de São Carlos, Universidade de São Paulo, Brazil.* We measured a single sub-wavelength slit using confocal microscopy. The transmitted light was measured and the dependence with the input laser polarization was characterized. Results may be related to the coupled SPP throughout the slit.

LT4B.5 • 16:40
High Frequency Double-disk Optomechanical Oscillators, Gustavo Luiz[1], Luís Barea[1], Newton Frateschi[1], Thiago Alegre[1], Gustavo S. Wiederhecker[1]; *[1]"Gleb Wataghin" Physics Institute, Unicamp, Brazil.* We propose a double-disk optomechanical resonator with mechanical frequency close to 1 GHz. The design is based on the optimization of the optomechanical interaction of a second-order mechanical mode.

LT4C • Terahertz and Heat - Continued

LT4C.4 • 16:00
A Smart Window for Solar Energy Co-utilization, Flavio Horowitz[1], Giovane de Azambuja[2], Marcelo B. Pereira[1]; *[1]Univ Federal do Rio Grande do Sul, Brazil; [2]HABILIS Arquitetura Ltda., Brazil.* Aiming at thermal comfort and integrated to the building envelope, a low-emissivity, double-glazed window is presented, with adjustable blinds and spectrally selective heat reflection, which allows illumination control and climate-adaptive co-utilization of the reflected infrared.

17:00 - 17:30
EXHIBIT HALL and COFFEE BREAK, *Foier*

17:30—18:00
Final Remarks, *Maresias*

Key to Authors and Presiders

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