European Optical Society

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EOS Topical Meetings in Capri

27 - 30 September 2009

1st EOS Topical Meeting on Lasers

Hotel La Residenza, Capri, Italy

3rd EOS Topical Meeting on Optical Microsystems (OMS09)

Palazzo dei Congressi, Capri, Italy

ON-SITE PROGRAMME

Cooperating Organisations

Laser Institute of America
Laser Applications and Safety

► 1st EOS Topical Meeting on Lasers

SPIE Europe

► 3rd EOS Topical Meeting on Optical Microsystems (OμS'09)

Sponsor OμS'09

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* Associate members are requested to upgrade to a full membership first (12.50 €/year).

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for attendees of all EOS Events

The paper submitted must be an original contribution that is connected to the topics of the EOS event.

Publication rates

280 € (member rate)

320 € (non-member rate)

Submission deadline

Please check **www.myeos.org** for submission deadlines or send an email to **info@myeos.org**.

JEOS:RP - the Online Journal of the European Optical Society Rapid Publications
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Please return this form by fax to:
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Please tick off the topical meeting

- ❑ 1st EOS Topical Meeting on Laser
- ❑ 3rd of the EOS Topical Meeting on Optical Microsystems

Registration category	Late/on-site excl. dinner	Late/on-site incl. dinner (80 €)
Full member*	❑ 450 €	❑ 530 €
Non- member* **	❑ 500 €	❑ 580 €
Student member* (Copy of student ID required)	❑ 290 €	❑ 370 €
Student non-member* ** (Copy of student ID required)	❑ 300 €	❑ 380 €

* admission to the two Topical Meetings, the participation in all three meeting days, a digest CD-Rom with the complete volume of all abstracts of both Topical Meetings and 3 course lunches on the first and second meeting day are included in the registration fee.
** includes an EOS membership for the year 2009.

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Requests for cancellation must be made in writing to the EOS Office (address see above). Refunds are subject to a processing fee of 50 €.

Cancellations received **by 20 September 2009**: full refund minus processing fee (50 €).

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Membership

NOTE:

The non-member registration fee for the EOS Topical Meetings in Capri includes an individual/student membership for the year 2009.

Membership modes & fees 2009

Individual membership
Annual fee: 50 €

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Every member of an EOS Branch is automatically an individual member of the EOS, too, with all benefits.
Annual fee: 18 € (included in the Branch membership fee)
www.myeos.org/societies

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If you would like to join the EOS through an EOS Branch or Affiliated Society, please visit www.myeos.org/societies to select your national optical society.

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Associate members (through an Affiliated Society)

- Free subscription to the Optics & Laser Europe magazine (OLE) published by IOPP
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- Postal communication from EOS

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- Presence in the printed EOS Directory (logo and profile)
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Further information is available at: www.myeos.org/members/membership

Hotel list

Room must be booked directly with the hotels. Please note that we do not have personal experience with all these hotels. Some of them have been recommended to us, some of them have been chosen due to their location near to the venue. Room rates may vary according to room availability and reservation date. Please contact the hotel directly for detailed information and to make your reservation.

La Residenza****
Address: Via Federico Serena, 22
80073 Capri (Napoli)
Prices: 150,00 € - 1.010,00 € (incl. breakfast)
URL: www.laresidenzacapri.com
E-Mail: info@laresidenzacapri.com
Phone: +39 081 8370833
Fax: +39 081 8377564

- 25 rooms are reserved at the special rate
- of 210 € (for double room) instead of € 300.
- 180 € for DUS (instead of 250)

Hotel Regina Cristina****
Address: Via Federico Serena, 20
80073 Capri (Napoli)
Prices: 220 € - 410 €
(incl. breakfast)
URL: www.reginacristina.it
E-Mail: info@reginacristina.it
Phone: +39 (0)81 8370744
Fax: +39 (0)81 8370550

Best Western Hotel Syrene****
Address: Via Camerelle 51,
Capri, I-80073, IT
Prices: 280 € - 350 €
URL: www.hotelsyrene.com
E-Mail: syrene.na@bestwestern.it
Phone: +39 (0)81 8370102
Fax: +39 (0)81 8370957

Hotel Capri****
Address: Via Roma 71
80073 Capri
Prices: 140 € - 600 €
URL: www.htlcapri.it
E-Mail: h.capri@capri.it
Phone: +39 081 8370003
Fax: +39 081 8378913

Hotel Flora****
Address: Via Serena Federico
80073 Capri (NA)
Prices: 200 € - 340 €
(incl. breakfast)
URL: floracapri.com
E-Mail: info@floracapri.com
Phone: + 39 (0)81 8370211
Fax: +39 (0)81 8378949

Hotel A Paziella****
Address: Via Fuorlovado, 36
80073 Capri
Prices: 180 € - 410 €
(incl. breakfast)
URL: www.apaziella.com/en/index
E-Mail: info@apaziella.com
Phone: +39 (0)81 8370044
Fax: +39 (0)81 837 0085

Hotel La Palma****
Adress: Via Vittorio Emanuele,
39 - 80073 CAPRI (Na)
Prices: 335 € - 475 €
(incl. breakfast)
URL: www.lapalma-capri.com/index-2.html
E-Mail: info@lapalma-capri.com
Phone: +39 (0)81 8370133
Fax: +39 (0)81 8376966

Hotel Luna S.R.L.****
Adress: Viale Matteotti, 3,
80073 Capri Island
Prices: 210 € - 555 €
(incl. breakfast)
URL: www.lunahotel.com/en/index
E-Mail: info@lunahotel.com
Phone: +39 081 8370433
Fax: +39 081 8377459

Hotel La Floridiana****
Address: Via Campo di Teste 16,
80073 Capri NA
Prices: 108 € - 282 €
(incl. breakfast)
URL: www.lafloridiana-capri.com
E-Mail: info@lafloridiana-capri.com
Phone: +39 081 8370166
Fax: +39 081 8370434

Hotel Gatto Bianco****
Address: Via V.Emanuele, 32,
80073 Capri (Napoli)
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(incl. breakfast)
URL: www.gattobianco-capri.com
E-Mail: h.gattobianco@capri.it
Phone: +39 081 8370446
Fax: 39 081 8378060

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80073 Capri (Napoli)
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(incl. breakfast)
URL: www.laminervacapri.com
E-Mail: laminerva@capri.it
Phone: +39 081 8370374
Fax: +39 081 8375221

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Address: Via Mulo, 14
80073 Capri (Napoli)
Prices: 180 € - 380 €
(incl. breakfast)
URL: www.hoteldellapiccolamarina.it
E-Mail: info@hoteldellapiccolamarina.it
Phone: +39 081 8379642
Fax: +39 081 8378483

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80073 Capri (Napoli)
Prices: 150 € - 280 € (incl. breakfast)
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Phone: +39 081 8379671
Fax: +39 081 8376973

Capri Hotel Canasta***
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E-Mail: canasta@capri.it
Phone: +39 081 8370561
Fax: +39 081 8376675

La Piscina de La Vega***
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Phone: +39 081 8370713
Fax: +39 081 8376113

Hotel Villa Sarah***
Address: Via Tiberio, 3/a, 80073 Capri (Na)
Prices: 90 € - 293 € (incl. breakfast)
URL: www.villasarahcapri.com
E-Mail: info@villasarah.it
Phone: +39 081 8377817
Fax: +39 081 8377215

Hotel Bristol***
Address: Via Marina Grande, 217
80073 Capri (NA) Italy
Prices: 90 € - 380 € (incl. breakfast)
URL: www.hotelbristolcapri.com (italian version)
E-Mail: info@hotelbristolcapri.com
Phone: +38 (0)81 837 6144
Fax: +39 (0)81 837 6150

Hotel Punta Tragara*****
Address: Via Tragara, 57
80073 Capri
Prices: 420 € - 2.600 € (incl. breakfast)
URL: www.hoteltragara.com/en/index
E-Mail: info@hoteltragara.it
Phone: +39 081 8370844
Fax: +39 081 8377790

Villa Marina Hotel & Spa*****
Address: Via Provinciale Marina Grande
80073 Capri (Napoli)
Prices: 500 € - 1200 € (incl. breakfast)
URL: www.villamarinacapri.com
E-Mail: info@villamarinacapri.com
Phone: +39 081 8376630
Fax: +39 081 8374079

La Scalinatella*****
Address: Via Tragara, 8
80073 Capri
Prices: 430 € - 700 € incl. breakfast)
URL: www.scalinatella.com
E-Mail: info@scalinatella.com
Phone: +39 (0)81 8370633
Fax: +39 (0)81 8378291

Casa Morgano*****
Address: Via Tragaro, 6
6 - Capri
Prices: 250 € - 600 € (incl. breakfast)
URL: www.casamorgano.com
E-Mail: info@casamorgano.com
Phone: +39 (0)81 8370 158
Fax: +39 (0)81 8370 681

JW Marriott. Capri Tiberio Palace Resort & Spa******deluxe***
Address: Via Croce 11-15
Capri, 80073 Italy
Prices: 399 € - 1499 € (incl. breakfast)
URL: www.tiberiopalace.com
E-Mail: info@tiberiopalace.com
Phone: +39 (0)81 978 7111
Fax: +39 (0)81 837 4493

Further information on hotels in Capri is available at: →www.capritourism.com/en/index

Information for authors and attendees

ON-SITE REGISTRATION HOURS

Sunday, 27 Sept.	13.00 - 18.00
Monday, 28 Sept.	09:00 - 13:00
	15:30 - 17:15
Tuesday, 29 Sept.	09:00 - 13:00
	15:30 - 19:00
Wednesday, 30 Sept.	09:00 - 13:00

INFORMATION / RECEIPTS / CONFIRMATION OF ATTENDANCE / CASH PAYMENT

The **EOS registration desk for both meetings** is located at Palazzo dei Congressi (Via Sella Orta, 3).

Attendees requiring a payment receipt or a confirmation of attendance may obtain this document onsite at the registration desk.

Attendees paying by cash are requested to have the exact change in Euro.

ORAL PRESENTATION

If you plan to use slides for your presentation, we would like to ask you to upload your presentation prior to the Topical Meeting on-site. It is also possible to use your own laptop.

- Technical equipment: All technical equipment (presentation computers, video projector, sound system, laser pointer) will be provided on-site.
- Time slots: authors are allotted 15 minutes (12 minutes presentation plus 3 minutes for discussion). Please plan your presentation accordingly to meet the 15 minute maximum.

POSTER PRESENTATIONS

Poster authors are requested to be present at their posters during the official poster session. The posters shall be displayed on Monday, 28 Sept. 19.00 – 21.00. Poster set-up and removal is the responsibility of the authors only.
The posters should have a size of DIN A1 (594 x 841 mm) or DIN A0 (841 x 1189 mm) preferably in a portrait format (not landscape format). Double sided tape and similar pads will be provided. The size of the poster boards is 90 cm (width) x 200 cm (height).
The official poster sessions will be held on Monday, 28th of September at 19.15 at the Hotel La Residenza together with a welcome cocktail.

JOINT SESSION

The joint session of the 1st EOS Topical Meeting on Lasers and the 3rd EOS Topical Meeting on Optical Microsystems (OµS'09) will be held on Monday, 28 September, from 09:00 to 13:15 at the Palazzo dei Congressi, Via Sello Orta, 3.

EOS CONFERENCE DIGEST

The registration fee includes a CD-Rom with a complete volume of all abstracts of the two Topical Meetings (Lasers and Optical Microsystems (ISBN 978-3-00-024191-8). All accepted abstracts (keynote, invited and contributed) are published in the digital proceedings (CD-Rom).
The EOS does not publish conference proceedings with extensive papers. Authors who wish to publish in-depth papers are welcome to take advantage of the special publication offer for JEOS:RP (see next paragraph).

SPECIAL PUBLICATION OFFER

All authors of the EOS Topical Meeting on Lasers are offered a special publication rate for the e-journal of the European Optical Society - Rapid Publications (JEOS:RP, www.jeos.org). The paper submitted to JEOS:RP must be an original contribution that is connected to one of the topical meetings and must be submitted no later than 01 December 2009. The publication rates are 280 Euro for members and 320 Euro for non-members (regular publication rates members 350 Euro / non-members 400

EOS internal meeting schedule

► ADVISORY COMMITTEE MEETING

Sunday, 29 September 16.00-18.00 — **Location:** Palazzo dei Congressi, Via Sella Orta, 3, Capri, Italy; **Room:** Sala Azzurra

► EXECOM MEETING

Sunday, 29 September 18.00-18.30 — **Location:** Palazzo dei Congressi, Via Sella Orta, 3, Capri, Italy; **Room:** Sala Azzurra

► BOARD MEETING

Sunday, 29 September 18.30-21.00 — **Location:** Palazzo dei Congressi, Via Sella Orta, 3, Capri, Italy; **Room:** Sala Azzurra

Synopsis

Organized in cooperation with the Swedish Branch of the EOS

The European Optical Society (EOS) is proud to present their first topical Meeting on Lasers to be held in Italy, 27th - 30th September 2009, at the Island of Capri, Italy.

Laser physics and technology is a very diverse field in rapid development and of utmost importance for technological development in the 21st century. Advances in semiconductors, fibre lasers, solid-state lasers, parametric devices and nonlinear frequency conversion provide powerful tools for an increasingly broad range of applications including spectroscopy, metrology, remote sensing, communications, entertainment and display technology, material processing, astronomy, biology and life sciences. Europe has a strong position in the field of laser physics and technology, and the aim of this meeting is to further strengthen this position.

The conference programme will focus on fundamental as well as more applied topics. The major subjects will be: Semiconductor lasers, quantum-dot lasers, diode-pumped lasers, fiber lasers, nonlinear frequency conversion, parametric devices, ultrafast lasers, materials for lasers and nonlinear optics.

Scientific committee

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Invited speakers

MONDAY, 28 SEPTEMBER 2009

JOINT SESSION - TAILORED NONLINEAR MEDIA

JOINT SESSION together with TOM OμS'09

9:30-10:00, Sala Auditorium, Palazzo dei Congressi

Towards Periodically Poled Lithium Niobate (PPLN) Photonic Wires

Wolfgang Sohler, University of Paderborn, Department of Physics (DE).

The development of wafer-scale smart-cut lithium niobate (LN) single-crystal films is reported. It enables the fabrication of high index contrast ridge guides of sub-μm cross section dimensions ("photonic wires"). A novel local poling technique for X - and Y-cut LN ridge guides is presented, up to now applicable for guides of larger dimensions only. [2338]

JOINT SESSION - TAILORED NONLINEAR MEDIA

JOINT SESSION together with TOM OμS'09

11:45-12:15, Sala Auditorium, Palazzo dei Congressi

Quasi Phase Matched Gallium Arsenide for Mid-Infrared Applications

Éric Lallier, Thales Research & Technology (FR).

Powerful coherent laser sources are needed throughout the mid-infrared region for a number of civilian or defense applications, exploiting either the atmospheric transmission windows, or the fingerprint of common molecules. Nonlinear optical materials play a key role as they permit the frequency down-conversion of mature near-infrared solid-state lasers into the mid-IR, where few direct laser solutions exist.

JOINT SESSION - TAILORED NONLINEAR MEDIA

12:15-12:45, Sala Auditorium, Palazzo dei Congressi

Quantum cascade lasers

Jerome Faist, ETH Zurich (CH).

TUESDAY, 29 SEPTEMBER 2009

SESSION - FEMTOSECOND LASERS

9:00-9.30, Hotel la Residenza

Femtosecond lasers incorporating quantum-dot media

Wilson Sibbett, University of St Andrews (UK).

Femtosecond lasers have benefited substantially from the exploitable characteristics of tailored quantum-dot (QD) semiconductor media. When used as saturable absorbers, these have been shown to offer enhanced design flexibility and versatility in terms of saturation fluences and recovery times and some exemplars will be described for solid-state femtosecond lasers that operate in the 1-2μm spectral range. Complementarily, quantum-dot-based semiconductor structures are of interest as gain media and impressive results have been reported for QD diode lasers that operate into the femtosecond regime. A few representative examples of such lasers will be described to illustrate the attractive features of this type of compact device.

SESSION - DIODE AND SOLID STATE LASERS

11:30-12:00, Hotel la Residenza

Red and NIR emitting highly brilliant laser sources based on semiconductor diode lasers

Bernd Sumpf, Ferdinand-Braun-Institut für Höchstfrequenztechnik (DE).

High power, high brightness diode lasers with narrow vertical far fields and optimized lateral designs in the red and NIR spectral ranges will be presented. The lasers emit output powers up to 12 W with a brightness up to 1 GW·cm^{-2}·sr^{-1}. Their application as pump sources for non-linear frequency conversion will be demonstrated.

Invited speakers (continued)

TUESDAY, 29 SEPTEMBER 2009 (continued)

SESSION - DIODE AND SOLID STATE LASERS

12:00-12:30, Hotel la Residenza

Diode pumped Er- and Pr- lasers in the visible spectral region

Günter Huber, University of Hamburg, Institut für Laser-Physik (DE).

We review laser performance and basic spectroscopic properties of fluoride materials doped with Pr^{3+} or Er^{3+} ions. Recent advances on diode pumped lasing in the visible as well as intracavity frequency doubling to the UV spectral region are reported.

SESSION - FIBRE LASERS

17:30-18:00, Hotel la Residenza

High power two-micron fibre sources: Recent progress and future prospects

Andy Clarkson, University of Southampton (UK).

Over the last decade there has been rapid progress in scaling output power and brightness from cladding-pumped fibre lasers and amplifiers. To date most of the attention has focussed on Yb-doped silica fibre sources operating in the ~ 1 μm wavelength regime, which benefit from a low quantum defect pumping cycle as well as a broad pump absorption band extending from ~910 – 980 nm that coincides with the emission wavelengths available from commercial high-power laser diode pump sources.

WEDNESDAY, 30 SEPTEMBER 2009

SESSION - DIODE AND DISC LASERS

9:00-9:30, Hotel la Residenza

Power scalable frequency converted and mode-locked semiconductor disk lasers (VECSELs)

Oleg G. Okhotnikov, Optoelectronics Research Centre, Tampere University of Technology (FI).

We review achievements in an optically-pumped semiconductor disk lasers and demonstrate the high potential of wafer fusing technique for power scaling of short pulse SDLs as compared with monolithically grown structures. Intracavity frequency conversion, mode-locking and multiple-chip design will be presented.

Synopsis

Organized in cooperation with the Italian Branch of the EOS

OμS'09 is the 3rd edition of an international conference wholly dedicated to Optical Micro-Systems. It is organized by the European Optical Society (EOS) in the frame of its international Topical Meeting activity and will be held in Italy, 27th September 2009 - 30th September 2009, amidst the wonderful scenery of the Island of Capri.

A possible definition of an optical microsystem is a complex system, able to perform one or more sensing and actuation functions, where optical devices are integrated in a smart way with electronic, mechanical and sensing components by taking advantage of the progress in micro- and nano-technologies.

The increasing interest in this field arises from the expected applications that would significantly improve the quality of life. The list of possibilities offered by the optical microsystem enabling technologies is very long and seems to increase day by day. Optical-Micro-Systems will be at the base of the next generation not only of optical telecommunication networks and computers, but also for biotechnologies, environmental monitoring, sensors to improve safety in the avionic and automotive fields, health diagnostics and proteomic/genomic studies, imaging.

The conference programme will focus on fundamental as well as more applied topics. Microfluidic systems, optofluidic-systems, photonic crystals, non-linear and quantum optics in micro-devices, nanophotonic-based devices, silicon-based optoelectronics and MOEMS, microsensors, biochips and the new characterization methods for materials and devices were among the hot topics of the conference.

Local organizers

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(CSIC) (ES)

Pasqualino Maddalena,
Università di "Napoli Federico II" (IT)

Lisa Miccio,
Istituto Nazionale di Ottica Applicata
(IT)

Vito Mocella,
CNR IMM (IT)

Androula G. Nassiopoulou,
IMEL/NCSR Demokritos (GR)

Wolfgang Osten,
University of Stuttgart (DE)

Melania Paturzo,
CNR-INOA (IT)

Stefano Pelli,
Institute for Applied Physics "Nello
Carrara" - CNR (IFAC-CNR) (IT)

Angela Piegari,
ENEA (IT)

Demetri Psaltis,
Ecole Polytechnique Fédérale
de Lausanne (CH)

Roberta Ramponi,
Politecnico Di Milano (IT)

Graham Reed,
University of Surrey (UK)

Giancarlo Righini,
Italian National Research Council
(DMD - CNR) (IT)

Ali Serpenguezel,
Koç University (TR)

Luigi Sirleto,
Istituto per la Microelettronica
e Microsistemi (IMM) (IT)

Corrado Spinella,
Consiglio Nazionale delle Ricerche (IT)

Ralph Peter Tatam,
Cranfield University (UK)

Adam Wax,
Duke University, NC (US)

Zeev Zalevsky,
Bar-Ilan University (IL)

Keynote speakers

MONDAY, 28 SEPTEMBER

09:00-09:30, Sala Auditorium, Palazzo dei Congressi
Subwavelength Optical Elements and Nanoimprint Technology for Miniaturization and Wafer-Scale Integration of Optical System
Stephen Y. Chou, Princeton University (US).
To miniaturize and integrate optical systems on a chip and fabricate them monolithically on wafer or even larger scale, two new platform technologies besides guided-wave integrated optics are crucial: (a) subwavelength optical elements (SOEs) --a new class of optical devices well suited for miniaturization and wafer-scale integration, and (b) nanoimprint technology--an enabling nanopatterning method. The talk will present a broad range of examples in SOEs and nanoimprint.

TUESDAY, 29 SEPTEMBER

9:10-9:40, Sala Auditorium, Palazzo dei Congressi
New trends in organic nonlinear optics and its applications
Nasser Peyghambarian, College of Optical Sciences, the University of Arizona (US).
The talk will focus on new hybrid organic-inorganic material systems with large unprecedented electro-optic (EO) coefficients of 170pm/V and its application as optical modulators with drive voltages of less than 0.65 V; and nonlinear photorefractive polymers for first demonstration of large area dynamic 3D holographic display.

WEDNESDAY, 30 SEPTEMBER

9:10-9:40, Sala Auditorium, Palazzo dei Congressi
Imaging Interferometric Microscopy - Resolution to the Linear Systems Limits
Steven R. J. Brueck, University of New Mexico (US).
Imaging interferometric microscopy resolution to $\lambda/2(n_{sub}+1)$ (n_{sub} = substrate refractive index) is demonstrated using evanescent-wave illumination. Resolution to 150 nm ($\lambda/4.2$) is achieved using a 633 nm source and a 0.4 *NA* lens.

Invited speakers

MONDAY, 28 SEPTEMBER 2009

JOINT SESSION - TAILORED NONLINEAR MEDIA
JOINT SESSION together with TOM LASERS
9:30-10:00, Sala Auditorium, Palazzo dei Congressi
Towards Periodically Poled Lithium Niobate (PPLN) Photonic Wires
Wolfgang Sohler, University of Paderborn, Department of Physics (DE).
The development of wafer-scale smart-cut lithium niobate (LN) single-crystal films is reported. It enables the fabrication of high index contrast ridge guides of sub-μm cross section dimensions ("photonic wires"). A novel local poling technique for X - and Y-cut LN ridge guides is presented, up to now applicable for guides of larger dimensions only. [2338]

OMS II: SESSION - DIFFRACTIVE OPTICAL ELEMENT
9:45-10:15, Sala Azzurra, Palazzo dei Congressi
Lamellar grating interferometer in a Fourier transform IR spectrometer
Hans-Peter Herzig, École Polytechnique Fédérale de Lausanne (EPFL) (CH).
Spectroscopy with miniaturized systems is one of the fastest developing fields and enters now industrial applications. We discuss a lamellar grating interferometer for near and mid-IR infrared sensing systems.

Invited speakers

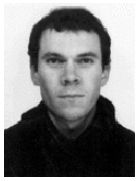
MONDAY, 28 SEPTEMBER 2009 (sontinued)

JOINT SESSION - TAILORED NONLINEAR MEDIA
11:45-12:15, Sala Auditorium, Palazzo dei Congressi
Quasi Phase Matched Gallium Arsenide for Mid-Infrared Applications
Éric Lallier, Thales Research & Technology (FR).
Powerful coherent laser sources are needed throughout the mid-infrared region for a number of civilian or defense applications, exploiting either the atmospheric transmission windows, or the fingerprint of common molecules. Nonlinear optical materials play a key role as they permit the frequency down-conversion of mature near-infrared solid-state lasers into the mid-IR, where few direct laser solutions exist.

JOINT SESSION
together with TOM
LASERS

OMS II: SESSION - SENSING AND METROLOGY
11:45-12:15, Sala Azzurra, Palazzo dei Congressi
Broadband terahertz spectroscopy: from free-space to on-chip devices
Giles Davies, School of Electronic and Electrical Engineering, University of Leeds (UK).
In this presentation, I will overview the development of the field of terahertz (THz) time-domain spectroscopy, in both free-space and guided-wave (on-chip) geometries. I will also discuss some recent applications of these techniques, and in particular, for the identification of materials of security relevance such as explosives.

OMS I: SESSION - OPTOFLUIDICS 1
15:15-15:45, Sala Auditorium, Palazzo dei Congressi
Particle manipulation, trapping, and analysis on planar optofluidic chips
Holger Schmidt, School of Engineering, University of California, Santa Cruz (US).
Optofluidics has recently emerged as a rapidly growing field that unites optics and microfluidics on a single device platform1,2. The most consequent implementation of this concept is to use planar integrated optics in combination with microfluidic channels. This bears the potential of creating optically and fluidically planar devices with numerous applications in analysis of liquid and gaseous substances, including chemical engineering, analytical chemistry, molecular biology, medical diagnostics, and pathogen detection.



OMS II: SESSION - HOLOGRAPHY FOR 3D IMAGING
15:30-16:00, Sala Azzurra, Palazzo dei Congressi
tba
Thomas Naughton, National University of Ireland (IE).

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Invited speakers

TUESDAY, 29 SEPTEMBER

OMS I: SESSION - INTERFEROMETRY AND HOLOGRAPHY
9:45-10:15, Sala Auditorium, Palazzo dei Congressi
Digital In-line Holographic Microscopy and Tomography in 4-D
Jürgen Kreuzer, Department of Physics and Atmospheric Science, Dalhousie University (CA).
Digital in-line Holography with numerical reconstruction has been developed into a new microscopy, specifically for micro-fluidic and biological applications, that routinely achieves both lateral and depth resolution at the submicron level in 3-D imaging. This is demonstrated for diverse objects such as suspensions of microspheres and biological samples (cells, algae, protozoa, bacteria).

OMS II: SESSION - BIOSENSORS AND BIOPHOTONICS
9:45-10:15, Sala Azzurra, Palazzo dei Congressi
Raman based biosensors by utilizing plasmonic nanostructures
Jürgen Popp, Institute of Physical Chemistry, Friedrich-Schiller University (DE) & Institute of Photonic Technology (DE).
Metal nanostructures represent ideal systems for light management in dimensions well below the illumination wavelength. This phenomenon originates in the excitation of collective carrier oscillations such as localized surface plasmon-polaritons (LSPP) and propagating surface plasmon-polaritons (PSPP). Both collective charge-carrier excitations result in highly localized enhanced evanescent fields, which are particularly concentrated around sharp edges of the metallic structures. Such drastic electromagnetic field-enhancements have been shown to be the source of increased Raman scattering intensities for analyte molecules in close contact to a metal nanostructure with an increase of Raman scattering intensities of up to 15 orders of magnitude. This effect termed surface-enhanced Raman scattering (SERS) has opened novel opportunities for chemical and biomedical analytics based on vibrational spectroscopy.

OMS II: SESSION - BIOSENSORS AND BIOPHOTONICS
10:45-11:15, Sala Azzurra, Palazzo dei Congressi
Modelling the photonic response of optical nano-micro-systems using the concept of stratified medium
Olivier Deparis, Centre de recherche en Physique de la Matière et du Rayonnement (PMR), Facultés Universitaires Notre-Dame de la Paix (FUNDP) (BE).
The concept of stratified medium is introduced to describe optical systems that take the form of layered structures with arbitrary lateral periodicity in the layers.The 3D transfer matrix method is presented and applied to the modelling of the photonic response of these complex systems.

OMS I: SESSION - OPTICAL SOURCES
11:30-12:00, Sala Auditorium, Palazzo dei Congressi
Quantum cascade lasers linked to optical frequency comb synthesizers: a new IR metrological tool
Paolo De Natale, Istituto Nazionale di Ottica Applicata – CNR and LENS (IT).
The work reports on the progresses towards the characterization and exploitation of the intrinsic properties of mid-IR quantum cascade lasers, in terms of linewidth and frequency stability. The results here discussed pave the way to a wide range of metrological applications of these innovative laser devices.

OMS II: SESSION - MICRO AND NANOSTRUCTURE FABRICATION
15:45-16:15, Sala Azzurra, Palazzo dei Congressi
Toward complete control of localized light
Jim Schuck, The Molecular Foundry, Lawrence Berkeley National Laboratory (US).
A principle theme in our "nano-optics" lab is the control and manipulation of light on the nanoscale. In this talk, I will discuss the manifestation of this theme in two contexts - sub-diffraction-limited concentration and manipulation of plasmonic near-fields, and far-field investigations of nano-scale structures - describing in detail an example of each:
Plasmonic Color Nanosorter (PCoN) - A central goal of plasmonics is complete control over optical signals at deeply sub-wavelength scales.

OMS I: SESSION - PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS
16:00-16:30, Sala Auditorium, Palazzo dei Congressi
Nano-optics for photonics: from optical field mapping to integrated spectroscopy and light condensing
Gilles Lerondel, Laboratoire de Nanotechnologies et d'Instrumentation Optique, ICD, CNRS (FRE2848), Université de Technologie de Troyes (FR).
Starting from scanning near field optical imaging, we intend in this paper to review different aspects of modern near field optics in the frame of photonics. The first aspect concerns quantitative analysis of silicon on insulator waveguiding structures focusing on signal amplification and millimeter scale i.e. chip-scale mapping. The second aspect lies in the near field detection of confined interferograms for highly integrated optical spectroscopy . Finally, we will illustrate the realization of a planar near field integrated optical components such as a light condenser based on plasmonic Fabry-Perot cavity.

Invited speakers

TUESDAY, 29 SEPTEMBER (continued)

OMS I: SESSION - PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS
17:45-18:15, Sala Auditorium, Palazzo dei Congressi
Applied plasmonics: Surface waves for sensing, switching and energy harvesting
Domenico Pacifici; Brown University, Division of Engineering (US).
In this talk, I will present effective approaches to the generation and manipulation of surface plasmon polaritons (SPPs) with application in various devices ranging from all-optical modulators to solar cells and bio-chemical sensors.

WEDNESDAY, 30 SEPTEMBER

OMS I: SESSION - SENSING AND METROLOGY
9:45-10:15, Sala Auditorium, Palazzo dei Congressi
Digital holography in opto-fluidic measurements
George Barbastathis; Massachusetts Institute of Technology (US).

MONDAY, 28 SEPTEMBER

08:45-09:00
► **WELCOME by Pietro Ferraro and Fredrik Laurell**

09:00-09:30
TOM OMS I & II & TOM Lasers
► JOINT SESSION
KEYNOTE TALK
Subwavelength Optical Elements and Nanoimprint Technology for Miniaturization and Wafer-Scale Integration of Optical System
Stephen Y. Chou, NanoStructure Laboratory, Department of Electrical Engineering, Princeton University (US).
[Sala Auditorium, Palazzo dei Congressi]

09:30-11:15
TOM OMS I & Lasers
► JOINT SESSION ON TAILORED NONLINEAR MEDIA
[Sala Auditorium, Palazzo dei Congressi]

09:45-11:00
TOM OMS II
► DIFFRACTIVE OPTICAL ELEMENT
[Sala Azzurra, Palazzo dei Congressi]

11:00/11:15-11:45 Coffee break

11:45-13:15
TOM OMS I & Lasers
► JOINT SESSION ON TAILORED NONLINEAR MEDIA (continued)
[Sala Auditorium, Palazzo dei Congressi]

11:45-13:15
TOM OMS II
► SENSING AND METROLOGY
[Sala Azzurra, Palazzo dei Congressi]

13:15-15:15/15:30/16:00 Lunch break

15:15-17:30
TOM OMS I
► OPTOFLUIDICS
[Sala Auditorium, Palazzo dei Congressi]

15:30-17:30
TOM OMS II
► HOLOGRAPHY FOR 3D IMAGING
[Sala Azzurra, Palazzo dei Congressi]

16:00-17:15
TOM Lasers
► NONLINEAR FREQUENCY CONVERSION
[Hotel la Residenza]

17:30-19:00
► **ANNUAL GENERAL ASSEMBLY**
Open to all EOS members and attendees

19:15
► **POSTER SESSION AND WELCOME**
[Patio, Hotel la Residenza]

TUESDAY, 29 SEPTEMBER

9:00-11:00
TOM Lasers
► FEMTOSECOND LASERS
[Hotel la Residenza]

09:10-09:40
TOM OMS I & II
► KEYNOTE TALK
New trends in organic nonlinear optics and its applications
N. Peyghambarian; College of Optical Sciences, the University of Arizona (US).
[Sala Auditorium, Palazzo dei Congressi]

09:45-11:15
TOM OMS I
► INTERFEROMETRY AND HOLOGRAPHY
[Sala Auditorium, Palazzo dei Congressi]

TOM OMS II
► BIOSENSORS AND BIOPHOTONICS
[Sala Azzurra, Palazzo dei Congressi]

11:00/11:15-11:30/12:00 Coffee break

11:30-13:00
TOM OMS I
► OPTICAL SOURCES
[Sala Auditorium, Palazzo dei Congressi]

11:30-13:30
TOM Lasers
► DIODE AND SOLID STATE LASERS
[Hotel la Residenza]

12:00-13:00
TOM OMS II
► BIOSENSORS AND BIOPHOTONICS (continued)
[Sala Azzurra, Palazzo dei Congressi]

13:00/13:30-15:30/15:45/16:00 Lunch break

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TUESDAY, 29 SEPTEMBER (continued)

15:45-17:30
TOM OMS II
► MICRO AND NANOSTRUCTURE FABRICATION
[Sala Azzurra, Palazzo dei Congressi]

16:00-17:00
TOM Lasers
► WAVEGUIDE AND SOLID STATE LASERS
[Hotel la Residenza]

16:00-17:30
TOM OMS I
► PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS
[Sala Auditorium, Palazzo dei Congressi]

17:00-17:30/17:30-17:45 Coffee break

17:30-19:00
TOM Lasers
► FIBRE LASERS
[Hotel la Residenza]

17:45-18:45
TOM OMS I
► PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS (continued)
[Sala Auditorium, Palazzo dei Congressi]

TOM OMS II
► MICRO AND NANOSTRUCTURE FABRICATION (continued)
[Sala Azzurra, Palazzo dei Congressi]

20:30 **GALA DINNER**
[Da Paolino" - Via Palazzo da Mare 11, 80073 Capri]

WEDNESDAY, 30 SEPTEMBER

9:00-11:00
TOM Lasers
► DIODE AND DISC LASERS
[Hotel la Residenza]

09:10-09:40
TOM OMS I & II

► KEYNOTE TALK
Imaging Interferometric Microscopy - Resolution to the Linear Systems Limits
S. R. J. Brueck, Center for High Technology Materials and Departments of Physics and Electrical Engineering, University of New Mexico (US).
[Sala Auditorium, Palazzo dei Congressi]

9:45-11:15
TOM OMS I
► SENSING AND METROLOGY
[Sala Auditorium, Palazzo dei Congressi]

TOM OMS II
► PHOTOREFRACTIVE MATERIALS
[Sala Azzurra, Palazzo dei Congressi]

11:00/11:15-11:30 Coffee break

11:30-12:15
TOM Lasers
► POST-DEADLINE SESSION
[Hotel la Residenza]

TOM OMS II
11:30-12:30
► OPTOELECTRONIC TECHNIQUES AND METHODS
[Sala Azzurra, Palazzo dei Congressi]

11:30-12:45
TOM OMS I
► POST-DEADLINE SESSION
[Sala Auditorium, Palazzo dei Congressi]

END OF EOS TOPICAL MEETINGS

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Sala Auditorium, Palazzo dei Congressi

JOINT SESSION - LASERS & OMS I

Sala Azzurra, Palazzo dei Congressi

OMS II

08:45-09:00 **WELCOME by Pietro Ferraro and Fredrik Laurell**

KEYNOTE TALK 09:00-09:30 Sala Auditorium, Palazzo dei Congressi

Subwavelength Optical Elements and Nanoimprint Technology for Miniaturization and Wafer-Scale Integration of Optical System

Stephen Y. Chou, NanoStructure Laboratory, Department of Electrical Engineering, Princeton University (US).

To miniaturize and integrate optical systems on a chip and fabricate them monolithically on wafer or even larger scale, two new platform technologies besides guided-wave integrated optics are crucial: (a) subwavelength optical elements (SOEs) --a new class of optical devices well suited for miniaturization and wafer-scale integration, and (b) nanoimprint technology--an enabling nanopatterning method. The talk will present a broad range of examples in SOEs and nanoimprint. [2279]

09:30-11:15

TAILORED NONLINEAR MEDIA

CHAIR: FREDRIK LAURELL,
KTH - Royal Institute of Technology (SE)

OMS & LASERS 09:30-10:00 Invited talk

Towards Periodically Poled Lithium Niobate (PPLN) Photonic Wires

W. Sohler, L. Gui, H. Hui, R. Ricken; University of Paderborn, Department of Physics (DE).

The development of wafer-scale smart-cut lithium niobate (LN) single-crystal films is reported. It enables the fabrication of high index contrast ridge guides of sub-µm cross section dimensions ("photonic wires"). A novel local poling technique for X- and Y-cut LN ridge guides is presented, up to now applicable for guides of larger dimensions only. [2338]

OMS 10:00-10:15

Quasi-phase-matched nonlinear generation of cw ultraviolet radiation in periodically poled $LiTaO_3$

I. Ricciardi[1], M. De Rosa[1], A. Rocco[1], P. Ferraro[1], A. Vannucci[2], P. Spano[2], P. De Natale[1]; [1]INOA – CNR (IT), [2]Andromeda s.r.l. (IT).

We present a cw source of ultraviolet radiation at 355 nm, based on a high-power laser at 1064 nm and a two-stage quasi-phase-matching nonlinear interaction in periodically poled $LiTaO_3$ crystals. [2214]

LASERS 10:15-10:30

6.2 W, Continuous-Wave, Single-Frequency, Yb-Fiber-Based Green Source at 532 nm Using Periodically-Poled $KTiOPO_4$

S. Chaitanya Kumar[1], G. K. Samanta[1], C. Canalias[2], V. Pasiskevicius[2], F. Laurell[2], M. Ebrahim-Zadeh[1,3]; [1]ICFO-Institut de Ciencies Fotoniques (ES), [2]Royal Institute of Technology (SE), [3]Institucio Catalana de Recerca i Estudis Avancats (SE).

We report efficient generation of 6.2 W, continuous-wave, single-frequency green radiation at 532 nm with linewidth of 8.5 MHz and TEM_{00} spatial profile with M^2<1.34 in a simple, compact, external single-pass configuration based on second-harmonic-generation of Yb-fiber laser in periodically-poled $KTiOPO_4$. [2160]

LASERS 10:30-10:45

Picosecond blue source at 463 nm by frequency doubling a Nd-doped fiber based Master Oscillator Power Amplifier

C. Bartolacci[1], M. Laroche[1], H. Gilles[1], S. Girard[1], T. Robin[2] and B. Cadier[2]; [1]Centre de recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen (FR), [2]iX Fiber (FR).

A Fabry-Perot laser diode emitting at 926 nm was gain-switched and spectrally narrowed and the output pulses were amplified in a W-type double-clad Nd-doped fiber. Output pulses with a duration of 96 ps at a repetition rate of 40 MHz were frequency doubled in a periodically poled MgO-doped Congruent Lithium Niobate. [2176]

09:45-11:00

DIFFRACTIVE OPTICAL ELEMENT

09:45-10:15 Invited talk

Lamellar grating interferometer in a Fourier transform IR spectrometer

H. P. Herzig[a], T. Scharf[a], S. Bühler[b]; [a]Ecole Polytechnique Fédérale de Lausanne (EPFL), Optics and Photonics Technology Laboratory (CH); [b]ARCOPTIX SA (CH).

Spectroscopy with miniaturized systems is one of the fastest developing fields and enters now industrial applications. We discuss a lamellar grating interferometer for near and mid-IR infrared sensing systems.

10:15-10:30

Instrument concepts for space missions using Programmable Micro Diffraction Gratings (PMDG)

L.M. Gaspar Venancio, European Space Agency, ESTEC (NL).

The increasing number of space projects involving low-cost micro-satellites or instruments on board rovers creates stringent requirements on the cost, size, weight, reliability and power consumption of optical instruments. Extreme miniaturisation is a possible solution for the reduction of the levels of resources required by the instruments. [2126]

10:30-10:45

Spectral uniformity of diffractive optical elements for spectroscopy

H. Angelskår[1], I.R. Johansen[2], M. Lacolle[2], H. Sagberg[2], A. S. Sudbø[1]; [1]University of Oslo, Department of Physics (NL), [2]SINTEF ICT, Microsystems and Nanotechnolgy (NO).

We report on simulations of different surface profile designs for a diffractive optical element (DOE) used in a micro-system for spectroscopy [1]. The DOE surface design is a critical part of the system, requiring sub-micron accuracy in fabrication. We study how the detailed surface profile affects the spectral behaviour of the DOE. [2163]

Sala Auditorium, Palazzo dei Congressi

JOINT SESSION - LASERS & OMS I

OMS

10.45-11.00

Nonlinear surface waves in curved photonic lattices

I. L. Garanovich[1], X. Qi[1],2, Z. Xu[1], A. A. Sukhorukov[1], D. N. Neshev[1], W. Krolikowski[1], A. Mitchell[3], Yu. S. Kivshar[1]; [1]Nonlinear Physics Centre and Centre for Ultra-high bandwidth Devices for Optical Systems (CUDOS), Research School of Physics and Engineering, Australian National University (AU), [2]The Key Laboratory of Weak Light Nonlinear Photonics, Ministry of Education, Nankai University (CN), [3]School of Electrical and Computer Engineering and Centre for Ultra-high bandwidth Devices for Optical Systems (CUDOS), RMIT University (AU).

We describe theoretically and demonstrate experimentally the formation of surface waves at the edges of curved waveguide arrays fabricated in $LiNbO_3$. We show that nonlinear coupling between different linear modes supported by the array leads to beam switching between output waveguides as the nonlinearity strength is increased. [2233]

OMS

11:00-11:15

Tailor nonlinear material towards integrated source based on stimulated Raman scattering

L. Sirleto[1], M.A. Ferrara[1], I. Rendina[1],G. Messina[2], M.G. Donato[2], L. Dal Negro[3], G. C. Righini[4]; [1]National Research Council-Institute for Microelectronics and Microsystems (IT), [2]Facoltà di Ingegneria, Università "Mediterranea" (IT), [3]Division of Materials Science and Engineering, Boston University (US), [4]CNR, Istituto di Fisica Applicata Nello Carrara (IT).

We report two possible approach in order to tailor nonlinear materials towards integrated Raman laser. We investigate the most important materials for photonics integration: glasses and silicon and we indicate some routes in order to improve their performances. [2370]

Sala Azzurra, Palazzo dei Congressi

OMS II

10:45-11:00

Micromachined optical microphone based on a modulated diffractive lens

M. Lacolle, T. Bakke, D. T. Wang, G. U. Jensen, H. Tofteberg, L. Breivik, I.R. Johansen; SINTEF ICT, Microsystems and Nanotechnolgy (NO).

We present a low-cost, miniaturised, yet highly sensitive microphone, consisting of a nitride membrane and a diffractive Fresnel lens micromachined on the same chip. The membrane and the reflective Fresnel lens form an interferometer, and the displacement is read by measuring light intensity at the lens focal point. [2151]

11:00/11:15-11:45 Coffee break

11:45-13:15

TAILORED NONLINEAR MEDIA (continued)

CHAIR: FREDRIK LAURELL,
KTH - Royal Institute of Technology (SE)

OMS & LASERS

11:45-12:15 **Invited talk**

Quasi Phase Matched Gallium Arsenide for Mid-Infrared Applications

E. Lallier[1], D. Faye[1], A. Grisard[1], B. Gérard[2]; [1]Thales Research & Technology (FR); [2]Alcatel-Thales III-V Lab (FR).

Powerful coherent laser sources are needed throughout the mid-infrared region for a number of civilian or defense applications, exploiting either the atmospheric transmission windows, or the fingerprint of common molecules. Nonlinear optical materials play a key role as they permit the frequency down-conversion of mature near-infrared solid-state lasers into the mid-IR, where few direct laser solutions exist. [2328]

LASERS

12:15-12:45 **Invited talk**

Quantum cascade lasers

Jerome Faist, ETH Zürich (CH).

11:45-13:15

SENSING AND METROLOGY

11:45-12:15 **Invited talk**

Broadband terahertz spectroscopy: from free-space to on-chip devices

Giles Davies, School of Electronic and Electrical Engineering, University of Leeds (UK).

In this presentation, I will overview the development of the field of terahertz (THz) time-domain spectroscopy, in both free-space and guided-wave (on-chip) geometries. I will also discuss some recent applications of these techniques, and in particular, for the identification of materials of security relevance such as explosives.

12:15-12:30

Adaptive micro-slit array for a spectral sensor

R. Riesenberg, A. Wuttig; Institute of Photonic Technology (DE).

A new adaptive measurement principle is presented and demonstrated on a spectral sensor. If a set of spectra to be detected is known, an entrance optical aperture, a micro-slit array, can be designed to increase the signal without any lost of resolution. [2317]

Sala Auditorium, Palazzo dei Congressi

JOINT SESSION - LASERS & OMS I

Sala Azzurra, Palazzo dei Congressi

OMS II

12:30-12:45

Low cost silicon based spectrometers for polymer recycling

I.R. Johansen[1], H. Angelskår[2], T. Bakke[1], M. Lacolle[1], H. Sagberg[1], A. Eikenes[3], P. Amiri[3], H. E. Øverjordet[3], D. Wang[1], O. Løvhaugen[1], A. Nordbryhn[3], A. S. Sudbø[2]; [1]SINTEF ICT, Microsystems and Nanotechnology (NO), [2]University of Oslo, Department of Physics (NO), [3]Tomra Systems ASA (NO).

The functions of lenses, beam-splitters and band pass filters are integrated into a single surface hologram. The design makes built-in wavelength reference for scanning spectrometers possible, and a low cost micro-system spectrometer for plastic recycling has been developed. [2168]

LASERS

12:45-13.00

Optical Parametric Amplification of a DFB Quantum Cascade Laser in Orientation-Patterned GaAs

G. Bloom[1], E. Lallier[1], C. Larat[1], A. Grisard[1], M. Carras[2], X. Marcadet[2]; [1]Thales Research And Technology (FR), [2]Alcatel Thales III-V Lab (FR).

We demonstrate an optical parametric amplifier (OPA) in Orientation-Patterned GaAs (OP-GaAs) pumped by an Ho:YAG laser. This OPA is used to amplify the emission of a Quantum Cascade lasers (QCL) with a distributed feedback (DFB) structure. We report a preliminary gain as high as 32dB at 4.5µm. [2285]

12:45-13:00

Concave Micro-mirror Arrays for Large Field Confocal Microscopy

B. Rachet[1], F. Merenda[2], R.-P. Salathé[1]; [1] EPFL, STI/LOA (CH), [2] Arcoptrix S.A. (CH).

We demonstrate that arrays of high numerical aperture (NA) parabolic micro-mirrors can be used for diffraction limited high-resolution confocal imaging within a very large field of view: hundred times larger than with conventional high-NA microscope objectives. [2235]

OMS

13.00-13.15

Analytical Modelling of Linear and Nonlinear Properties of Metamaterials Based on Multipole Expansion

A. Chipouline[1], J. Petschulat[1], A. Tünnermann[1], T. Pertsch[1], C. Menzel[2], C. Rockstuhl[2], T. Paul[2], F. Lederer[2]; [1]Institute of Applied Physics, Friedrich-Schiller-Universität Jena (DE), [2]Institute of Condensed Matter Theory and Solid State Optics, Friedrich-Schiller-Universität Jena (DE).

We present the multipole interpretation of plasmonic resonances occurring in metamaterials. Effective material parameters for metamaterials which coincide with rigorous simulated ones and nonlinear aspects occurring by considering higher order multipoles are reported. [2174]

13:00-13:15

Refractometric Sensor Based on Silicon Photonic Wires

L.J. Kauppinen, H.J.W.M. Hoekstra, R.M. de Ridder; University of Twente, MESA+ Institute for Nanotechnology, Integrated Optical MicroSystems Group (NL).

We have characterized the refractive index sensing properties of a compact refractometric sensor based on a grated silicon photonic wire. A resolution of 10-5 in refractive index has been measured. [2118]

13:15-15:15/15:30/16:00 Lunch break

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Hotel la Residenza

LASERS

16:00-17:15

NONLEAR FREQUENCY CONVERSION

CHAIR: ÉRIC LALLIER,
Thales Research & Technology (FR)

16:00-16:15
10-GW, 3-optical-cycle, 2.2-µm-wavelength parametric amplifier with high stability
J. Moses[1], S.-W. Huang[1], K.-H. Hong[1], E. L. Falcão-Filho[1], A. Benedick[1], J. Bolger[2], B. Eggleton[2], F. X. Kärtner[1]; [1]Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics (US); [2]CUDOS ARC Centre of Excellence School of Physics, University of Sydney (AU).
We demonstrate a 23-fs duration, 230-µJ energy, CEP-stabilized, 2.2-µm pulsed source by means of optical parametric chirped pulse amplification. The rms energy and intensity fluctuations are 1.5% and 0.8%, respectively. Implementation of superfluorescence suppression makes stability and energy scalability possible. [2319]

Sala Auditorium, Palazzo dei Congressi

OMS I

15:15-17:30

OPTOFLUIDICS

15:15-15:45 **Invited talk**
Particle manipulation, trapping, and analysis on planar optofluidic chips
Holger Schmidt; School of Engineering, University of California, Santa Cruz (US).
Optofluidics has recently emerged as a rapidly growing field that unites optics and microfluidics on a single device platform1,2. The most consequent implementation of this concept is to use planar integrated optics in combination with microfluidic channels. This bears the potential of creating optically and fluidically planar devices with numerous applications in analysis of liquid and gaseous substances, including chemical engineering, analytical chemistry, molecular biology, medical diagnostics, and pathogen detection. [2340]

15:45-16:00
Integrated tunable optofluidic MMI coupler
R. Bernini[1], G.Testa[1], L. Zeni[2], P. M. Sarro[3]; [1]IREA-CNR (IT), [2]DII, Seconda Università di Napoli (IT), [3]ECTM-DIMES, TU Delft (NL).
In this paper we present a 2x2 optofluidic multimode interference (MMI) coupler based on liquid-core antiresonant reflecting optical waveguide (ARROW) integrated in silicon. The experimental results confirm the correct behaviour of the device that can be used both as a tunable optical filter and power splitter. [2242]

16:00-16:15
Manipulation of liquids for dispensing nano- and pico-droplets through electrohydrodynamic shooting induced pyroelectrically
P. Ferraro, S. Coppola, S. Grilli, M. Paturzo, V. Vespini; CNR, Istituto Nazionale di Ottica Applicata-Sezione di Napoli (IT).
Liquid nano- and pico-droplets have been extracted and dispensed from sessile droplets or liquid film reservoirs through an electrohydrodynamic streaming effect induced by the pyroelectric effect activated by a heated-tip or a IR laser source onto polar dielectric substrates. The technique does not require high-voltage power supply or specific electric circuits, thus providing high versatility. [2318]

Sala Azzurra, Palazzo dei Congressi

OMS II

15:30-17:30

HOLOGRAPHY FOR 3D IMAGING

15:30-16:00 **Invited talk**
Title tba
Thomas Naughton, National University of Ireland (IE).

16:00-16:15
Digital holographic microscopy for micro-systems investigation in near infrared
Yves Delacrétaz, Isabelle Bergoënd and Christian Depeursinge; Ecole Polytechnique Fédérale de Lausanne (EPFL), Advanced Photonics Laboratory (CH).
We have demonstrated the suitability of digital holographic microscopy (DHM) with near infra-red illumination for micro-optical elements and silicon micro-systems characterization, opening a wide field of quality control applications. [2302]

Hotel la Residenza

LASERS

16:15-16:30
Narrowband and tunable optical parametric oscillator near and at degeneracy using a transversely chirped Bragg grating
Björn Jacobsson, Nicky Thilmann, Valdas Pasiskevicius, Fredrik Laurell; Laser Physics, KTH – Royal Institute of Technology (SE).
We demonstrate locking and tuning of a nanosecond optical parametric oscillators near and at degeneracy with oscillating wavelengths from 1000 to 1066 nm using transversely chirped Bragg gratings. The signal had bandwidths of <0.6 nm and energies of ~0.4 mJ. [2304]

16:30-16.45
Fiber-Based-SHG-Pumped, High-Power, Single-Frequency Continuous-Wave Optical Parametric Oscillator
G. K. Samanta[1], S. Chaitanya Kumar[1], Ritwick Das[1], and M. Ebrahim-Zadeh[1,2]; [1]ICFO-Institut de Ciencies Fotoniques (ES), [2]Institucio Catalana de Recerca i Estudis Avancats (ICREA) (ES).
We describe a cw, singly-resonant parametric oscillator pumped at 532 nm by a frequency-doubled fiber laser. Single-frequency idler (signal) powers >2 W (>800 mW) are generated across 855-1408 nm, with 10.7% peak-peak power fluctuation and frequency stability <10 MHz. [2159]

16:45-17:00
Micro-laser pumping of an achromatic phase-adapted, single longitudinal mode, doubly resonant OPO
B. Hardy, M. Raybaut, A. Godard and M. Lefebvre; ONERA The French Aerospace Lab (FR). F.Thibault, G.Souhaité; Teem Photonics (FR).
We present a new, low threshold, entangled cavity architecture for nanosecond OPO. With this compact design, open loop single longitudinal mode operation is achieved over hours with 5 MHz short term stability. Micro laser pumping is also demonstrated. [2180]

Sala Auditorium, Palazzo dei Congressi

OMS I

16:15-16:30
Tunable optofluidic device using Micro-Air-Bag
Wuzhou Song, Andreas E. Vasdekis, Demetri Psaltis; Swiss Federal Institute of Technology Lausanne (EPFL), School of Engineering (CH).
We introduce a novel tuning mechanism for optofluidic devices by embedding a Micro-Air-Bag actuator inside a microfluidic chip. Multiple tunable optical devices remotely controlled by filling the air or liquid with different pressure were demonstrated. [2323]

16:30-16.45
Combining low-coherence reflectometry, laser ablation and microfluidics in a fiber
A. Sudirman[1, 2], G. Björk[2], W. Margulis[1]; [1]Acreo (SE), [2]Royal Institute of Technology (SE).
A controlled technique combining reflectometry, microfluidics and laser ablation has been developed suited for collection of small liquid inclusions. [2301]

16:45-17:00
Fabrication of microchannels for integrated optofluidic devices
Krishna Chaitanya Vishnubhatla, Jenny Clark, Guglielmo Lanzani, Roberta Ramponi, Roberto Osellame, Tersilla Virgili; Dip. di Fisica - Politecnico di Milano and Istituto di Fotonica e Nanotecnologie – CNR (IT).
We demonstrate fabrication of embedded microfluidic-channels with access holes by femtosecond laser irradiation and chemical etching (FLICE) technique. By femtosecond laser irradiation it is also possible to fabricate buried waveguides, thus integrating optical functionalities in microfluidic devices. A polymer based optofluidic device which acts as an optical amplifier capable of ultrafast switching is shown as an example. [2255]

Sala Azzurra, Palazzo dei Congressi

OMS II

16:15-16:30
Adaptive deformation of digital holograms for full control of depth-of-focus in 3D imaging
M. Paturzo, P. Memmolo, A. Finizio, P. Ferraro; CNR- Istituto Nazionale di Ottica Applicata (INOA) (IT).
We show that through an adaptive deformation of digital holograms it is possible to manage the depth of focus in the numerical reconstruction. Deformation is applied to the original hologram with the aim to put simultaneously in-focus, and in one reconstructed image plane, different objects lying at different distance from the hologram plane (i.e. CCD sensor), but in the same field of view. In the same way it is possible to extend the depth of field for 3D object having a tilted object whole in-focus. [2292]

16:30-16.45
Development of a microfluidic system based on a digital holography microscope for the analysis of bovine sperm cells
G. Di Caprio[1], N. Saffioti[1], M. Gioeffrè[1], G. Coppola[1], S. Grilli[2], P. Ferraro[2], R. Puglisi[3], D. Balduzzi[3], A. Galli[3]; [1]Istituto per la Microelettronica e Microsistemi, CNR (IT), [2]Istituto Nazionale di Ottica Applicata, CNR (IT), [3]Istituto Sperimentale Italiano "Lazzaro Spallanzani" (IT).
A digital holography based technique was used to retrieve three-dimensional images of bovine sperm heads. The proposed approach offers some important advantages compared to other methods, mainly due to its non-invasive character and its high resolution. [2366]

16:45-17:00
An interferometric test station for massive parallel inspection of passive and active M (O)EMS
Malgorzata Kujawinska[1], Kay Gastinger[2], Michal Jozwik[1], Karl H. Haugholt[2], Christoph Schaeffel[3], Stephan Beer[4]; [1]IMiF, Warsaw University of Technology (PL), [2]SINTEF IKT (NO), [3]IMMS (DE), [4]CSEM (CH).
The paper presents the optical, mechanical, and electro-optical design of an interferometric inspection system for massive parallel inspection of M(O)EMS. The basic idea is to adapt an micro-optical probing wafer containing interferometer arrays to the M (O)EMS wafer under test. [2358]

Hotel la Residenza	Sala Auditorium, Palazzo dei Congressi	Sala Azzurra, Palazzo dei Congressi
LASERS	**OMS I**	**OMS II**
17:00-17:15 **Optimally-coupled and mode-synchronized intracavity frequency doubled cw Nd :YLF ring laser** *F. Camargo[2], T. Zanon-Willette[1], T. Badr[1], N.U. Wetter[2], J.-J. Zondy[1]; [1]Institut National de Métrologie (LNE-INM-Cnam) (FR), [2]Instituto de Pesquisas Energéticas e Nucleares (BR).* Optimal intracavity second-harmonic generation of a Nd:YLF ring laser has been achieved using periodically-poled KTiOPO4, yielding 1.4 W of single-frequency red power at 660.5 nm. Without a suitable etalon spectral gain broadening and self-pulsing were observed due to complex nonlinear cascading processes. [2146]	17:00-17:15 **Electrode-less liquid microlenses with tunable focal length and different shapes** *L. Miccio[1,2], M. Paturzo[1], S. Grilli[1], V. Vespini[1], P. Ferraro[1,2]; [1]Istituto Nazionale di Ottica Applicata del CNR (INOA-CNR) (IT), [2]European Laboratory of Non Linear Spectroscopy - LENS (IT).* Tunable liquid lens fabrication and their interferometric characterization is presented. The pyro-electric properties and the periodic poling patterning of the Lithium Niobate substrate is used to select the shape and the focal length of the liquid droplet acting as a lens. [2322]	17:00-17:15 **Post-deadline talk** **An exactly-transverse Helmholtz equation** *Bruno Crosignani [1,3], Paolo Di Porto[2], and Amnon Yariv[3]; [1]Dipartimento di Fisica, Universita' dell'Aquila (IT) and Centro di Ricerca e Sviluppo SOFT.CNR, Universita' di Roma "La Sapienza" (IT), [2]Dipartimento di Fisica, Universita' dell'Aquila (IT) and Laboratorio Regionale CASTI-CNR, Universita' dell'Aquila (IT), [3]Department of Applied Physics, California Institute of Technology (US).* Guiding structure with large refractive index and small spatial scale variations, such as optical fiber nanowires and microwires, are becoming more and more accesible. The description of optical propagation in these waveguides requires the use of nonparaxial optics. Here, we describe an exact transverse Helmholtz equation which appears to be particularly apt for this task. [2391]
	17:15-17:30 **Optical microsystems for micromanipulation and fluorescence detection** *A. Oeder, M. Amberg, C. Bauer, S. Stoebenau, S. Sinzinger; Ilmenau University of Technology (DE).* We present design concepts and fabrication strategies for highly integrated microoptical systems for optofluidic lab-on-a-chip applications. Based on refractive planar optically integrated microsystems fabricated through ultraprecision micromachining we demonstrate compact multifunctional systems for biomedical applications. [2164]	17:15-17:30 **Infrared digital holography using CO_2 laser** *A. Geltrude[1], M. Locatelli[1], A. Pelagotti[1], R. Meucci[1], K. Al-Naimee[1], P. Poggi[1], M. Paturzo[2], P. Ferraro[2]; [1]INOA-CNR – Firenze (IT), [2]INOA-CNR - Pozzuoli (IT).* This paper presents some wavefront amplitude reconstructions, achieved, by means of digital holography, using a CO_2 laser as source and a thermal camera as optical imaging system. This explorative work demonstrates the feasibility of such a method and investigates its characteristics. [2251]

17:30-19:00 **Annual General Assembly** - Sala Auditorium, (Palazzo)
Open to all EOS members and attendees

19:15 **Poster session and welcome** - Patio , Hotel la Residenza
[For poster presentation please see pages 36 to 43]

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Hotel la Residenza

LASERS

09:00-11:00

FEMTOSECOND LASERS

CHAIR: MARKUS POLLNAU, University of Twente (NL)

09:00-9:30 **Invited talk**

Femtosecond lasers incorporating quantum-dot media

Wilson Sibbett, University of St. Andrews (UK).

Femtosecond lasers have benefited substantially from the exploitable characteristics of tailored quantum-dot (QD) semiconductor media. When used as saturable absorbers, these have been shown to offer enhanced design flexibility and versatility in terms of saturation fluences and recovery times and some exemplars will be described for solid-state femtosecond lasers that operate in the 1-2µm spectral range.

09:30-9:45

Single-walled carbon nanotube saturable absorber mode-locking of Tm:KLuW at 1.95 µm

Won Bae Cho[1,2], Andreas Schmidt[1], Jong Hyuk Yim[2], Sun Young Choi[2], Soonil Lee[2], Fabian Rotermund[1,2], Uwe Griebner[1], Günter Steinmeyer[1], Valentin Petrov[1], Xavier Mateos[1,3], Maria C. Pujol[3], Joan J. Carvajal[3], Magdalena Aguilo[3], Francesc Diaz[3];; [1]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy (DE), [2]Division of Energy Systems Research, Ajou University (KR), [3]Física i Cristal·lografia de Materials, Universitat Rovira i Virgili (ES).

Passive mode-locking in the 2 µm spectral range based on a bulk Tm-doped tungstate laser is demonstrated. Single-walled carbon nanotubes were used as saturable absorbers resulting in stable and self-starting mode-locked operation with pulse durations of 10 ps at 126 MHz and a maximum output power of up to 240 mW. [2161]

09:45-10:00

Femtosecond high-power thin-disc laser oscillators

T. Dekorsy[1], D. Bauer[1, 2], J. Neuhaus[1, 2], F. König[1], M. Guinea[3], J. Kleinbauer[2], A. Killi[2], S. Weiler[2], D. H. Sutter[2]; [1]Department of Physics, University of Konstanz (DE), Center for Applied Photonics, University of Konstanz (DE), [2]TRUMPF Laser GmbH + Co. KG (DE), [3]Tampere University of Technology (FI).

We demonstrate the generation of pulses with twenty-five microjoules of energy at sub-picosecond pulse duration from a thin-disk oscillator at repetition rates below three megahertz. [2189]

Sala Auditorium, Palazzo dei Congressi

OMS I

KEYNOTE TALK 09:10-09:40 Sala Auditorium, Palazzo dei Congressi

New trends in organic nonlinear optics and its applications

N. Peyghambarian; College of Optical Sciences, the University of Arizona (US)

The talk will focus on new hybrid organic-inorganic material systems with large unprecedented electro-optic (EO) coefficients of 170pm/V and its application as optical modulators with drive voltages of less than 0.65 V; and nonlinear photorefractive polymers for first demonstration of large area dynamic 3D holographic display. [2337]

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09:45-11:15

INTERFEROMETRY AND HOLOGRAPHY

09:45-10:15 **Invited talk**

Digital In-line Holographic Microscopy and Tomography in 4-D

H.J. Kreuzer, Department of Physics and Atmospheric Science, Dalhousie University (CA).

Digital in-line Holography with numerical reconstruction has been developed into a new microscopy, specifically for microfluidic and biological applications, that routinely achieves both lateral and depth resolution at the submicron level in 3-D imaging. This is demonstrated for diverse objects such as suspensions of microspheres and biological samples (cells, algae, protozoa, bacteria). The motion of (many) living cells in water can be tracked in 3-D at subsecond rates. Microfluidic applications include sedimentation of suspensions, fluid motion around micron-sized objects in channels, motion of spheres and formation of bubbles. I will show results with a new method called Immersion DIHM which effectively does holography in the UV. [2339]

Sala Azzurra, Palazzo dei Congressi

OMS II

09:45-11:15

BIOSENSORS AND BIOPHOTONICS

09:45-10:15 **Invited talk**

Raman based biosensors by utilizing plasmonic nanostructures

Jürgen Popp, Institute of Physical Chemistry, Friedrich-Schiller University (DE) & Institute of Photonic Technology(DE).

Metal nanostructures represent ideal systems for light management in dimensions well below the illumination wavelength. This phenomenon originates in the excitation of collective carrier oscillations such as localized surface plasmon-polaritons (LSPP) and propagating surface plasmon-polaritons (PSPP). Both collective charge-carrier excitations result in highly localized enhanced evanescent fields, which are particularly concentrated around sharp edges of the metallic structures. Such drastic electromagnetic field-enhancements have been shown to be the source of increased Raman scattering intensities for analyte molecules in close contact to a metal nanostructure with an increase of Raman scattering intensities of up to 15 orders of magnitude. This effect termed surface-enhanced Raman scattering (SERS) has opened novel opportunities for chemical and biomedical analytics based on vibrational spectroscopy. [2326]

Hotel la Residenza

LASERS

10:00-10:15
74 fs Kerr-lens mode-locked Yb:LuScO3 single crystal laser
Andreas Schmidt[1], Valentin Petrov[1], Uwe Griebner[1], Rigo Peters[2], Klaus Petermann[2], Günter Huber[2], Won Bae Cho[3], Fabian Rotermund[3], Christian Fiebig[4], Katrin Paschke[4], Götz Erbert[4]; [1]Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (DE), [2]Institut für Laser-Physik, Universität Hamburg (DE), [3]Division of Energy Systems Research, Ajou University (KR), [4]Ferdinand-Braun-Institut für Höchstfrequenztechnik (DE).
Diode-pumped Kerr-lens mode locking of the disordered sesquioxide single crystal Yb:$LuScO_3$ is demonstrated. Pulse durations as short as 74 fs were obtained using a two-section distributed Bragg-reflector tapered diode-laser (DBR-TDL) as pump source. [2178]

10:15-10:30
***p-n* junction quantum dot SESAM passively mode-locked Cr:Forsterite laser**
S. A. Zolotovskaya[1], K. G. Wilcox[1], A. Abdolvand[1], D. A. Livshits[2], E. U. Rafailov[1]; [1]School of Engineering, Physics and Mathematics, University of Dundee (UK), [2]Innolume GmbH (DE).
Stable passive mode-locking of a Cr:forsterite laser using a voltage controlled *p-n* junction quantum dot SESAM is presented. Output shortening from 17.4 to 6.4 ps near-transform limited pulses was obtained by applying reverse bias. [2092]

10:30-10:45
Development of optical frequency comb generator from single quantum dot laser diode with interference injection seeding technique
N. Yamamoto[1], K. Akahane[1], T. Kawanishi[1], R. Katouf[1], H. Sotobayashi[1,2]; [1]National Institute of Information and Communications Technology (JP), [2]Aoyama Gakuin University (JP).
Ultrafine teeth of optical frequency comb can be obtained from a single quantum dot optical frequency comb laser (QD-CML) by using interference injection seeding. The optical frequency comb generator with a 100-GHz spacing as a compact multiwavelength light source for a 1-μm-waveband photonic-transport system is successfully demonstrated. [2300]

Sala Auditorium, Palazzo dei Congressi

OMS I

10:15-10:30
Optical tomography with digital holographic microscopy
I. Bergoënd, N. Pavillon, F. Charrière, C. Depeursinge; EPFL, Advanced Photonics Laboratory (CH).
Three-dimensional optical imaging by tomographic techniques is presented, especially with object rotation in a transmission configuration. In digital holographic microscopy, the complex field is measured, which permits either to study transparent objects with varying index of refraction or to compute diffraction tomography in which the phase is needed. [2310]

10:30-10:45
Enhanced resolution in lensless digital holographic microscope by a two-dimensional diffraction grating
M. Paturzo, P. Ferraro; CNR- Istituto Nazionale di Ottica Applicata (INOA) (IT).
We show how, by means of a diffraction grating, it is possible to increase synthetically the numerical aperture of an interferometric imaging system, thus improving the spatial resolution of the numerically reconstructed images in two dimensions. Exploiting the grating diffraction effect, it is possible to achieve a resolution enhanced up to three times compared to the usual holographic microscope without the diffraction grating. [2290]

Sala Azzurra, Palazzo dei Congressi

OMS II

10:15-10:30
Fluorescence-based optical platform for multiple biological assay
F. Baldini[1], L. Bolzoni[2], R. Falciai[1], A. Giannetti[1], G. Porro[2], R.Pozzi[2], F. Senesi[1], C. Trono[1]; [1]IFAC-CNR, Institute of Applied Physics (IT), [2]Datamed S.r.L. (IT).
A fluorescence-based optical platform was developed for the determination of multiple analytes by means of bioassay. The optical platform was characterized by the implementation of the sandwich assay for CRP and PCT spiked in serum. [2183]

10:30-10:45
An optical microsystem for the monitoring of multiple biomolecular events based on a porous silicon microarray
I. Rea[1], A. Lamberti[2], I. Rendina[1], G. Coppola[1], M. Gioffrè[1], M. Iodice[1], M. Casalino[1], E. De Tommasi[1], L. De Stefano[1]; [1]Institute for Microelectronics and Microsystems – National Council of Research, Dept. of Naples (IT), [2]Department of Biochemistry and Medical Biotechnologies, University of Naples "Federico II" (IT).
In this work, we have fabricated a porous silicon (PSi) Bragg mirrors microarray using a technological process based on photolithography and electrochemical anodization of silicon. Each element of the array is characterized by a diameter of 200μm. The PSi structures have been used as platform to immobilize label-free DNA probe and a simple optical method has been employed to investigate the interaction between probe-DNA and its complementary target. [2368]

Hotel la Residenza

LASERS

10:45-11:00

Frequency Comb based long distance measurement in air

M. Cui[1], M. G. Zeitouny[1], N. Bhattacharya[1], H.P. Urbach[1], S.A. van den Berg[2]; [1]Optics Research Group, Department of Applied Sciences, Technical University Delft (NL), [2]VSL (NL).

We present long distance measurements in air using a frequency comb laser. The experimental scheme is based on the interference of pulses in an unbalanced Michelson interferometer. Distances for up to 50 meters have been measured and compared to a conventional counting laser interferometer. The two measurements show an agreement within 2 μm. [2303]

Sala Auditorium, Palazzo dei Congressi

OMS I

10:45-11:00

High resolution displacement detection with speckles

T. Scharf, R. Filter, H.P. Herzig; EPFl – STI – IMT NE – OPT, Neuchâtel, 2000, Switzerland.

We propose a simple measurement setup and a movement evaluation procedure based on averaging of cross correlation functions. We show 10 nm precision on 50 micron measurement range with respect to systematical errors. Limitations are given and documented improvements are predicted to result in accuracy better than 5nm over a range of 150µm. [2284]

11:00-11:15

Wavefront Compensation for micro distortion in interference fringes

N. Ishii, T. Muroi, N. Kinoshita, K. Kamijo, N. Shimidzu; NHK (Japan Broadcasting Corporation) Sci. & Tech. Res. Labs. (JP).

Adaptive optics are used to compensate for the distortion caused by shrinkage in the photopolymer recording medium for holographic data storage. In adaptive optics, a generic algorithm for controlling the wavefront was used, and novel fitness was applied. Missing data were captured, and an improved signal-to-noise ratio of 1.3 dB was obtained. [2133]

Sala Azzurra, Palazzo dei Congressi

OMS II

10:45-11:15 Invited talk

Modelling the photonic response of optical nano-micro-systems using the concept of stratified medium

O. Deparis, Centre de recherche en Physique de la Matière et du Rayonnement (PMR), Facultés Universitaires Notre-Dame de la Paix (FUNDP) (BE).

The concept of stratified medium is introduced to describe optical systems that take the form of layered structures with arbitrary lateral periodicity in the layers.The 3D transfer matrix method is presented and applied to the modelling of the photonic response of these complex systems. [2357]

11:00/11:15-11:30/12:00 Coffee break

11:30-13:00

DIODE AND SOLID STATE LASERS

CHAIR: EDIK RAFAILOV, University of Dundee (UK)

11:30-12:00 Invited talk

Red and NIR emitting highly brilliant laser sources based on semiconductor diode lasers

B. Sumpf, H. Wenzel, G. Erbert; Ferdinand-Braun-Institut für Höchstfrequenztechnik, Optoelectronics Department (DE).

High power, high brightness diode lasers with narrow vertical far fields and optimized lateral designs in the red and NIR spectral ranges will be presented. The lasers emit output powers up to 12 W with a brightness up to 1 GW·cm^{-2}·sr^{-1}. Their application as pump sources for non-linear frequency conversion will be demonstrated. [2135]

11:30-13:00

OPTICAL SOURCES

11:30-12:00 Invited talk

Quantum cascade lasers linked to optical frequency comb synthesizers: a new IR metrological tool

S. Bartalini, S. Borri, P. Cancio, I. Galli, G. Giusfredi, D. Mazzotti, P. De Natale; Istituto Nazionale di Ottica Applicata – CNR and LENS (IT).

The work reports on the progresses towards the characterization and exploitation of the intrinsic properties of mid-IR quantum cascade lasers, in terms of linewidth and frequency stability. The results here discussed pave the way to a wide range of metrological applications of these innovative laser devices. [2262]

Hotel la Residenza

LASERS

12:00-12:30 **Invited talk**

Diode pumped Er- and Pr- lasers in the visible spectral region

N.-O. Hansen, T. Gün, F. Moglia, G. Huber; Universität Hamburg, Institut für Laser-Physik (DE).

We review laser performance and basic spectroscopic properties of fluoride materials doped with Pr^{3+} or Er^{3+} ions. Recent advances on diode pumped lasing in the visible as well as intracavity frequency doubling to the UV spectral region are reported. [2346]

12:30-12:45

A Chirped Volume Bragg Grating Tuned Passively Q-Switched Nd:YVO_4 Laser

K. Seger, P. Jelger, B. Jacobsson, V. Pasiskevicius, F. Laurell; Laser Physics, KTH - Royal Institute of Technology (SE).

A chirped volume Bragg grating was used to frequency lock a Cr^{4+}:YAG passively Q-switched Nd:YVO_4 laser. 17ns pulses with an energy of 8μJ were obtained. By grating translation tuning was performed from 1063nm to 1065nm with 4W maximum output power. [2296]

Sala Auditorium, Palazzo dei Congressi

OMS I

12:00-12:15

Tailored light emission from OLEDs

D. Michaelis, N. Danz, M. Flämmich, C. Wächter, P. Dannberg, A. Bräuer; Fraunhofer Institute for Applied Optics and Precision Engineering (DE).

Due to the combination of light recycling, distorted and arrayed Fourier imaging as well as potential substrate-mode-outcoupling the efficient tailoring of the light emission of large area OLEDs is demonstrated using flat microoptical arrays where each channel consists of a half ball lens and a proper reflective/absorptive aperture. [2343]

12:15-12:30

LED-based microoptical illumination systems

A. Bräuer, P. Schreiber, P. Dannberg, F. Wippermann; Department Microoptical Systems, Fraunhofer Institute Angewandte Optik und Feinmechanik (IOF) (DE).

Highly efficient microoptical systems for homogeneous spot, line focus and spot arrays are described. For these applications new types of microlens arrays like condenser arrays and spatial filter arrays with buried apertures have been developed and are described as well. The comparison between laser and LED illumination modules is discussed. [2341]

12:30-12:45

Light-emitting micro and nano-structures based on colour-centres in lithium fluoride thin films

R.M. Montereali[1], S. Almaviva[1], F. Bonfigli[1], A. Faenov[2], F. Flora[1], I. Franzini[1], A. Gerardino[3], L. Mezi[1], E. Nichelatti[4], T. Pikuz[2], M.A. Vincenti[1]; [1]ENEA, Physical Technologies and New Materials Dept., C.R. Frascati (IT), [2]Kansai Photon Science Institute (JP) and Joint Institute for High Temperatures Russian Academy of Sciences (RU), [3]Istituto Fotonica e Nanotecnologie - CNR (IT), [4]ENEA, Physical Technologies and New Materials Dept., C.R. Casaccia (IT).

Broad-band, efficient visible light-emission from low-dimensional regular patterns of active colour centres were realised in lithium fluoride thin films thermally evaporated on different substrates by masking the EUV radiation emitted from a laser-plasma source with metallic masks of decreasing spatial periodicity. [2153]

Sala Azzurra, Palazzo dei Congressi

OMS II

12:00-13:00

BIOSENSORS AND BIOPHOTONICS (continued)

12:00-12:15

Immunosensors based on the surface plasmon resonance for human fibrinogen, soluble fibrin and D-dimer monitoring

K.V. Kostyukevych[1], S.A. Kostyukevych[1], E.V. Lugovskoy[2], P.G. Gritsenko[2], I.N. Kolesnikova[2], N.E. Lugovskaya[2], S.V. Komisarenko[2]; [1]V. Lashkaryov Institute of Semiconductor Physics, NAS of Ukraine (UA), [2]Palladin Inst. of Biochemistry, NAS of Ukraine (UA).

Immunosensors based on the surface plasmon resonance effect for human fibrinogen, soluble fibrin and D-dimer quantification have been elaborated. In these sensors, fibrin-specific and D-dimer-specific monoclonal antibodies immobilized on the aminopentacyanoferrate film ($Cu_3[Fe(CN)_5NH_3]_2$) have been used. [2192]

12:15-12:30

A polymer-modified porous-silicon sensor for biochemical applications.

E. De Tommasi[1], G. Maglio[2], R. Palumbo[2], I. Rea[1], L. De Stefano[1]; [1]National Council for Research, Institute for Microelectronics and Microsystems, Department of Naples (IT), [2]Department of Chemistry, University of Naples "Federico II" (IT).

Porous silicon based micro-cavities have been infiltrated with a new biocompatible polymer, an amino-functionalized poly(e-caprolactone) (PCL-NH_2), and their sensing properties have been characterized. The entrapped polymer adds strong chemical stability to the nano-crystalline matrix and the presence of the $-NH_2$ functional groups allows the use of such modified structures in biosensing and biochemical applications. [2367]

12:30-12:45

Towards biosensing with suspended core photonic crystal fiber

E. Coscelli[1], M. Sozzi[1], F. Poli[1], D. Passaro[1], A. Cucinotta[1], S. Selleri[1], R. Corradini[2], R. Marchelli[2]; [1]University of Parma, Information Engineering Department (IT), [2]University of Parma, Dep. of Organic and Industrial Chemistry (IT).

A study of the feasibility of a biosensor based on suspended-core photonic crystal fiber is reported, accounting for both numerical simulations and experimental results of silanization of the fiber surfaces. [2270]

Hotel la Residenza

LASERS

12:45-13:00

Efficient low threshold Raman laser

V.A. Lisinetskii[1], H. Rhee[2], H.J. Eichler[2], S. Schrader[1], V.A. Orlovich[3]; [1]University of Applied Sciences Wildau, Engineering Physics (DE); [2]TU Berlin - Institut für Optik und Atomare Physik (DE); [3]B.I. Stepanov Institute of Physics, NAS of Belarus (BY).

A highly efficient operation of a low threshold (the lowest threshold energy was 70 µJ) barium nitrate Raman laser pumped at a wavelength of 1.064 µm was obtained. Generation of four Stokes lines was observed with quantum efficiency of conversion to a separate component up to 70 % and to all components up to 85 %. [2306]

16:00-17:00

WAVEGUIDE AND SOLID STATE LASERS

CHAIR: WOLFGANG SOHLER, University of Paderborn (DE)

16:00-16:15

Nd-complex-doped polymer channel waveguide laser

J. Yang[1], C. Grivas[1,2], M.B.J. Diemeer[1], A. Driessen[1], M. Pollnau[1]; [1]University of Twente, MESA+ Institute for Nanotechnology, Integrated Optical Micro Systems (NL), [2]On leave from Optoelectronics Research Centre, University of Southampton (UK).

Laser operation at 1060 nm with slope efficiency of 0.95% and 440 µW output power for 2% outcoupling was demonstrated in Nd-complex-doped FDA/epoxy channel waveguides, in what to our knowledge is the first report of a rare-earth-ion-doped polymer waveguide laser. The threshold was 45 mW of absorbed pump power. [2175]

Sala Auditorium, Palazzo dei Congressi

OMS I

12:45-13:00

Imaging the Light Emission Enhancement from a Hybrid Organic-Inorganic L3 Photonic Crystal Nano-Cavity

M.M. Murshidy[1], A.M. Adawi[1], P.W. Fry[2], D.G. Lidzey[1]; [1]Department of Physics and Astronomy, The University of Sheffield (UK), [2]Nanoscience and Technology Centre, University of Sheffield (UK).

We report the spatial and spectral properties of hybrid organic-inorganic L3 nanocavities. The cavities were characterised by several optical modes with quality factors in the range 450 to 1000. Real space fluorescence images measured at the optical mode wavelengths revealed localised enhancements of emission in the cavity region by around 1.6 to 2 times. [2148]

16:00-17:30

PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS

16:00-16:30 **Invited talk**

Nano-optics for photonics: from optical field mapping to integrated spectroscopy and light condensing

G. Lérondel, S. Blaize, A. Bruyant; [1]Laboratoire de Nanotechnologies et d'Instrumentation Optique, ICD, CNRS (FRE2848), Université de Technologie de Troyes (FR).

Starting from scanning near field optical imaging, we intend in this paper to review different aspects of modern near field optics in the frame of photonics. The first aspect concerns quantitative analysis of silicon on insulator waveguiding structures focusing on signal amplification and millimeter scale i.e. chip-scale mapping. The second aspect lies in the near field detection of confined interferograms for highly integrated optical spectroscopy . Finally, we will illustrate the realization of a planar near field integrated optical components such as a light condenser based on plasmonic Fabry-Perot cavity.

Sala Azzurra, Palazzo dei Congressi

OMS II

12:45-13:00

Compact microsystem based diode laser systems for mobile Raman sensors for in situ food quality control

B. Sumpf[1], H. Schmidt[2], M. Maiwald[1], H.-D. Kronfeldt[2], G. Erbert[1]; [1]Ferdinand-Braun-Institut für Höchstfrequenztechnik, Optoelectronics Department (DE), [2]Technische Universität Berlin, Institut für Optik und Atomare Physik (DE).

A compact microsystem based external cavity diode laser at 671 nm for a mobile Raman sensor system for the in situ control of meat was realized. The laser meet the demands for Raman measurements of porcine musculus longissimus dorsi and the integration into a handheld laser scanner for food control. [2136]

13:00-15:30/15:45/16:00 Lunch break

15:45-17:30

MICRO AND NANOSTRUCTURE FABRICATION

15:45-16:15 **Invited talk**

Toward complete control of localized light

Jim Schuck, The Molecular Foundry, Lawrence Berkeley National Laboratory (US).

A principle theme in our "nano-optics" lab is the control and manipulation of light on the nanoscale. In this talk, I will discuss the manifestation of this theme in two contexts - sub-diffraction-limited concentration and manipulation of plasmonic near-fields, and far-field investigations of nano-scale structures - describing in detail an example of each: Plasmonic Color Nanosorter (PCoN) - A central goal of plasmonics is complete control over optical signals at deeply sub-wavelength scales.
[2364]

Hotel la Residenza

LASERS

16:15-16:30
Highly efficient Gd, Lu co-doped $KY(WO_4)_2$:Yb^{3+} planar waveguide laser
Dimitri Geskus,[1] Shanmugam Aravazhi,[1] Edward Bernhardi,[1] Christos Grivas,[1,2], Kerstin Wörhoff,[1] and Markus Pollnau[1]; [1]University of Twente, MESA+ Institute for Nanotechnology, Integrated Optical Micro-Systems Group (NL); [2]On leave from Optoelectronics Research Centre, University of Southampton (UK).
Laser operation at 1025 nm with 82.3% slope efficiency and 195 mW output power for 23% outcoupling is reported for KY $(WO_4)_2$:Yb^{3+} planar waveguides, co-doped with optically inert Gd^{3+} and Lu^{3+} ions. Codoping enhances the refractive index contrast, improves light confinement, and reduces the threshold to 18 mW (1.7% outcoupling). [2172]

16:30-16:45
High efficient generation and manipulation of light beam shapes by using a birefringent plate with unit topological charge
E. Karimi , B. Piccirillo, L. Marrucci, E. Santamato; Dipartimento di Scienze Fisiche Universita' degli Studi di Napoli "Federico II" Complesso MSA (IT).
We present a novel method to generate and control laser beam shapes by controlling the input beam polarization in a birefringent plate with topological charge (named "q-plate"). Furthermore, some recent applications of q-plate on the quantum and classical regime in optics will be the subject of our presentation. [2246]

16:45-17:00
Investigation of broadband modulation in CCIG lasers
M. Vallone, P. Bardella, I. Montrosset; Politecnico di Torino, Dipartimento di Elettronica (IT).
We investigated the behavior of a three-section Coupled Cavity Injection Grating (CCIG) laser with both a static and a finite-difference time-domain (FDTD) model, showing the role of photon-photon resonance (PPR) on the modulation bandwidth. [2210]

17:00-17:30 Coffee break

Sala Auditorium, Palazzo dei Congressi

OMS I

16:30-16:45
Magnetic modulation of surface plasmon polaritons in Au/ferromagnetic/Au multilayer films
D. Martín-Becerra[1], M.U. González[1], V.V. Temnov[2], A. García-Martín[1], A. Cebollada[1], J.M. García-Martín[1], T. Thomay[3], A. Leitenstorfer[3], R. Bratschitsch[3], U. Woggon[4], D. Guzatov[5], G. Armelles[1]; [1]Instituto de Microelectrónica de Madrid, IMM (CNM-CSIC) (ES), [2]Department of Chemistry, Massachusetts Institute of Technology (US), [3]Department of Physics and Center for Applied Photonics, University of Konstanz (DE), [4]Institut für Optik und Atomare Physik, TU Berlin (DE), [5]Research Center of the Resource Saving Problems, NAS Belarus (BY).
We analyze in this work, by means of a tilted slit-groove microinterferometer, the magnetic-field induced modulation of the wavevector of surface plasmon polaritons propagating on the surface of gold/cobalt/gold multilayer films. [2171]

16:45-17:00 **Post-deadline talk**
Investigation of interaction surface plasmons coupled with Bacteriorhodopsin
A.I. Milanich, Ya.V. Lesnichiy, V.A. Zenin; MIPT - IOF RAN-Russian Academy of Science (RU).
We report on the experimental observation of surface plasmon resonance characteristics in Ag fabricated by evaporation on a glass. The Kretschmann's configuration for excitation of surface plasmon by He-Ne laser as a source of polarized light was used. But some modified optical schemes for excitation plasmons in plates investigated too. Also, it was preliminary investigated well known interaction of surface plasmons coupled with Bacteriorhodopsin. [2380]

Sala Azzurra, Palazzo dei Congressi

OMS II

16:15-16:30
Imprinting of waveguides based on UV-curable polymers
J. Hiltunen, M. Hiltunen, P. Karioja; VTT Technical Research Centre of Finland (FI).
Polymer waveguide fabrication by UV-imprinting method was evaluated in this work. Waveguides were characterized by examining the output intensity level and its distribution. Results suggested proper waveguide operation and potential applicability of UV-imprinting to fabricate integrated photonics micro-systems based on optical polymers. [2154]

16:30-16:45
Fabrication of subwavelength structured surfaces via electrospray deposition of nanoparticles
M. Heilmann[1], M. Pfeffer[1], Y. Yamagata[2], S. Morita[2]; [1]University of Applied Science Ravensburg-Weingarten, Physical Engineering (DE), [2]RIKEN Laboratories, VCAD Applied Fabrication Team (JP).
The usability of electrospray deposition (ESD) to form subwavelengthstructured surfaces (SWS) was studied experimentally. SWS surfaces were produced by depositing nanoparticles onto glass substrates by what the reflectance could be considerably lessend. [2143]

16:45-17:00
A direct laser writing system for the efficient fabrication of diffractive structures on aspheric surfaces
M. Häfner, R. Reichle, C. Pruss, W. Osten; Universität Stuttgart, Institut für Technische Optik (DE).
We present a novel direct laser writing system for the fabrication of high resolution, high accuracy structures on aspheric surfaces. In addition to the system design we will present first structures that have been produced with our novel system and deliver insight into our future investigations, implementations and applications. [2156]

Hotel la Residenza

LASERS

17:30-19:00

FIBRE LASERS

CHAIR: BJÖRN JACOBSSON,
KTH - Royal Institute of Technology (SE)

17:30-18:00 **Invited talk**

High power two-micron fibre sources: Recent progress and future prospects

W. A. Clarkson, L. Pearson, Z. Zhang, J. W. Kim, D. Shen, A. J. Boyland, J. K. Sahu and M. Ibsen; Optoelectronics Research Centre, University of Southampton (UK).

Over the last decade there has been rapid progress in scaling output power and brightness from cladding-pumped fibre lasers and amplifiers. To date most of the attention has focussed on Yb-doped silica fibre sources operating in the ~ 1 μm wavelength regime, which benefit from a low quantum defect pumping cycle as well as a broad pump absorption band extending from ~910 – 980 nm that coincides with the emission wavelengths available from commercial high-power laser diode pump sources.

Sala Auditorium, Palazzo dei Congressi

OMS I

17:00-17:15

Experimental investigation of photonic crystal based quasi-zero average refractive index materials at IR frequencies

Vito Mocella[1], Principia Dardano[1],Stefano Cabrini[2], Allan. S. Chang[2], Ivo Rendina[1], Deindre Olynick[2], Bruce Harteneck[2], Scott Dhuey[2]; [1]CNR-IMM Unità di Napoli (IT), [2]Molecular Foundry, Lawrence Berkeley National Laboratory (US).

In this work the experimental results show near-infrared light propagation through large area (2 x 2 mm) nanopatterned material with refractive index quasi-zero on the average. This quasi- zero refractive index is obtained alternating photonic crystals strips with effective refractive index $n_{eff} = -1$ and air strips ($n = 1$). By varying the wavelength around the work wavelength ($\lambda = 1.55$ μm), the propagation length decrease. This result confirm the theoretical prediction about the existence of a band gap in approaching the zero average condition. [2313]

17:15-17:30

Theoretical analysis of a biased photonic crystal fiber infiltrated with a negative dielectric anisotropy liquid crystal

J. Weirich[1], L. Wei[1], J.Laegsgaard[1], T. T. Alkeskjold [2], A. Bjarklev[1]; [1]DTU Fotonik, Department of Photonics Engineering (DK), [2]Crystal Fibre A/S (DK).

We simulate the photonic bandgap mode of a biased photonic crystal fiber infiltrated with a liquid crystal with negative dielectric anisotropy. We analyse the voltage induced change of the transmission spectrum, dispersion and losses and compare it to the experimental values. [2187]

17:30-17:45 Coffee break

17:45-18:45

PLASMONICS, PHOTONIC CRYSTALS AND METAMATERIALS (continued)

17:45-18:15 **Invited talk**

Applied plasmonics: Surface waves for sensing, switching and energy harvesting

Domenico Pacifici, Brown University, Division of Engineering (US).

In this talk, I will present effective approaches to the generation and manipulation of surface plasmon polaritons (SPPs) with application in various devices ranging from all-optical modulators to solar cells and bio-chemical sensors. [2275]

Sala Azzurra, Palazzo dei Congressi

OMS II

17:00-17:15

Techniques for photonic nanostructures fabrication

Dana Cristea[1], Paula Obreja[1], A. Dinescu[1], G.Konstantinidis[2]; [1]National Institute for R&D in Microtechnologies (IMT-Bucharest) (RO), [2]FORTH IESL Heraklion (GR).

The paper presents techniques for fabrication of polymeric or metallic nanostructures with application in photonics: AR layers, photonic crystals, plasmonics, sub-micron diffractive optics. The techniques combine 2D and 3D electron beam lithography in a PMMA bi-layer, lift-off, and replication processes. [2142]

17:15-17:30

Microlens quality assessment using the Extended Nijboer-Zernike diffraction theory

J.J.M. Braat, S. van Haver, S.F. Pereira; Delft University of Technology, Department of Imaging Science and Technology, Optics Research Group (NL).

The quality of microlenses is measured by using a phase retrieval method based on the Extended Nijboer-Zernike theory of diffraction (ENZ). It is demonstrated that in the case of a small imaging aperture in the measurement set-up, the Debye integral is not adequate and should be replaced by the Rayleigh diffraction integral or a simplified version of it. We show the influence of the chosen optical diffraction model on the measured pupil map of a small-size microlens. [2273]

17:45-18:45

MICRO AND NANOSTRUCTURE FABRICATION (continued)

17:45-18:00

Influence of visible-IR lasers on optical properties and surface morphology of polycarbonate surface

S. Saghafi[1, 2], A. H. Ehsani [2], M. Ghorannevis[2], H. Hosseini[1], M.R Hantezadeh[2], D. Dorranian[2], H. U. Dodt[1]; [1]Technical University of Vienna, Institute of solid state, Department of Bioelectronics (AT), [2]Islamic Azad University, Research Science Campus, Plasma-Physics Research Center Biophotonics Laboratory (IR).

The effects of coherent visible beams on the thin curved surfaces of polycarbonate that are employed by optical industry are investigated. Axicon lens is one of the optical elements that are used here. We have shown that morphological changes and optical transmission of these elements are affected by laser beams. [2169]

Hotel la Residenza	Sala Auditorium, Palazzo dei Congressi	Sala Azzurra, Palazzo dei Congressi
LASERS	**OMS I**	**OMS II**
18:00-18:15 **Phase and amplitude control of a multimode LMA fiber beam by use of digital holography** *M. Paurisse[1], M. Hanna[1], F. Druon[1], P. Georges[1], C. Bellanger[2], A. Brignon[2], J.P. Huignard[2]; [1]Laboratoire Charles Fabry de l'Institut d'Optique (FR), [2]Thales Research and Technology (FR).* Amplitude and phase control of the output beam of a multimode LMA fiber supporting 4 modes is demonstrated by digital holography in both continuous and ns pulsed regimes at 1064 nm. [2116]		18:00-18:15 **Tuning of Elastomer Diffraction Gratings by Swelling in Solvents** *W. Mönch, C. Schägl, Y. Sun, H. Zappe; University of Freiburg, Department of Microsystems Engineering, Laboratory for Micro-Optics (DE).* We fabricated two-dimensional diffraction gratings from silicone elastomers by laser interference lithography and subsequent replication. These gratings swell in an atmosphere containing solvents. As a function of solvent concentration, fully reversible tuning of the grating period by ≈ 20% is demonstrated and discussed. [2226]
18:15-18:30 **Regenerative amplification of a 40 ps gain-switched laser diode in an all-fiber setup** *S. Kanzelmeyer, M. Hildebrandt, T. Theeg, M. Frede, D. Kracht, J. Neumann; Laser Zentrum Hannover e.V. (DE).* Regenerative amplification of 40 ps pulses from a gain-switched laser diode in an allfiber setup consisting of a single clad highly Ytterbium doped fiber as gain medium and an acousto-optic modulator (AOM) as pulse-picking element is demonstrated. [2298]	18:15-18:30 **Magneto-Optical activity emerging from Plasmonic Gold Nanodisks** *J.B. González-Díaz[1], B. Sepúlveda[2], L. Lechuga[2], A. García-Martín[1], G. Armelles[1]; [1]Instituto de Microelectrónica de Madrid, Consejo Superior de Investigaciones Científicas (ES), [2]Centro de Investigación en Nanociencia y Nanotecnología (CIN2) ICN-CSIC, Facultat de Ciencies (ES).* In this work we analyze the magneto-optical MO response of pure gold disks fabricated by colloidal lithography. This is possible due to the excitation of a localized surface plasmon which allows the MO effect to be observable at low fields. [2170]	18:15-18:30 **Design and characterization of optical single-mode waveguide coupler** *M. Hiltunen, J. Hiltunen, M. Kapulainen, P. Karioja; VTT Technical Research Centre of Finland (FI).* Optical single-mode waveguide couplers based on UV-curable polymer were designed, fabricated and characterized. Separation of the waveguides in coupler part varied from 0.5 m to 1.5 m. Measured high throughput up to 85% suggests the usability of the couplers for example in power splitters and resonators. [2152]
18:30-18:45 **High modulation depth SESAM for high power dissipative soliton in a single-mode Er-doped fiber laser** *Amélie Cabasse[1], Gilles Martel[1], Jean-Louis Oudar[2]; [1]CORIA, UMR 6614 (FR), [2]LPN, UPR 20 (FR).* We report on the realization of an erbium-doped fiber laser cavity passively mode-locked using a saturable absorber mirror with a high modulation depth. The set-up produces chirped pulses with energy of 2 nJ (71 mW average power) which have been dechirped down to 264 fs. [2186]	18:30-18:45 **Actual cloaking devices operating at optical frequencies** *S. Tricarico, F. Bilotti, L. Vegni; Department of Applied Electronics – University "Roma Tre" (IT).* In this contribution, we present the implementation of electromagnetic cloaking devices operating at optical frequencies based on the employment of the scattering cancellation approach. Different scattering cancellation mechanisms are reviewed, exploiting both layered metamaterials and proper arrangements of satellite plasmonic scatterers. The validity of the proposed designs is confirmed through proper full-wave simulations. [2157]	18:30-18:45 **Noncrystaline AsxS1-x planar waveguide with reduced optical losses** *A. Popescu, M. Ciobanu, D. Savastru, S. Miclos; National Institute of R&D for Optoelectronics (RO).* The calculation of propagation constant variations in planar wave guides shows a high sensitivity and therefore high optical losses for thickness or refractive index close to cut-up conditions. Experimental characterization of optical losses shows a diminution to less 0,1 dB/cm for AsxS1-x multilayer planar wave guide. [2240]
18:45-19:00 **Active fibres fabricated with the help of plasma CVD (a review)** *K. M. Golant, Yu. K. Chamorovskii, S. A. Nikitov; Kotel'nikov Institute of Radio-Engineering and Electronics of RAS (RU).* Recent advance in the application of microwave-induced plasma CVD processes to the fabrication of rare-earth and bismuth doped silica core optical fibres is considered. Specific features of plasma-chemical synthesis, which are responsible for superior quality of active glass in fiber core are discussed. [2110]		

20:30 **Gala dinner**
Da Paolino" - Via Palazzo da Mare 11, 80073 Capri

Hotel la Residenza

LASERS

09:00-11:00

DIODE AND DISC LASERS

CHAIR: BERND SUMPF, Ferdinand-Braun-Institut für öchstfrequenztechnik (DE)

09:00-9:30 **Invited talk**

Power scalable frequency converted and mode-locked semiconductor disk lasers (VECSELs)

Oleg G. Okhotnikov, Optoelectronics Research Centre, Tampere University of Technology (FI).

We review achievements in an optically-pumped semiconductor disk lasers and demonstrate the high potential of wafer fusing technique for power scaling of short pulse SDLs as compared with monolithically grown structures. Intracavity frequency conversion, mode-locking and multiple-chip design will be presented.

09:30-9:45

Single-Frequency Broadly-Tunable Compact Extended-Cavity Disc Laser at High Power Level

A. Laurain, A. Garnache, M. Myara, L. Cerutti, J.-P. Perez, P. Signoret; Institut d'Electronique du Sud, CNRS UMR5214 (FR). M. Triki, P. Cermak, D. Romanini; Laboratoire de Spectrométrie Physique, CNRS UMR5588 (FR). I. Sagnes, G. Beaudoin; Laboratoire de Photonique et Nanostructures, CNRS UPR20 (FR).

We demonstrate high power high efficiency low noise single frequency operation of a compact extended-cavity surface-emitting-semiconductor-laser with wide continuous tunability and high beam quality. These lasers work in continuous wave at room temperature at wavelengths of 1µm and 2.3µm based on GaAs and Sb technologies. [2185]

09:45-10:00

1.2 µm Quantum Dot Semiconductor Disk Laser with 0.5 W of Output Power

J. Rautiainen[1], M. Butkus[2], S. S. Mikhrin[3], I. L. Krestnikov[3], E. U. Rafailov[2], O. G. Okhotnikov[1]; [1]Tampere University of Technology, Optoelectronics Research Centre (FI), [2]University of Dundee, School of Engineering, Physics and Mathematics (UK). [3]Innolume GmbH (DE).

We demonstrate up to 500 mW CW output power from an optically-pumped InGaAs/GaAs quantum dot substrate-free semiconductor disk laser with centre wavelength at 1185 nm. The tunability of the device has been investigated. [2232]

Sala Auditorium, Palazzo dei Congressi

OMS I

KEYNOTE TALK 09:10-09:40 Sala Auditorium, Palazzo dei Congressi

Imaging Interferometric Microscopy - Resolution to the Linear Systems Limits

S.R.J. Brueck, Center for High Technology Materials and Departments of Physics and Electrical Engineering, University of New Mexico (US).

Imaging interferometric microscopy resolution to $\lambda/2(nsub+1)$ (nsub = substrate refractive index) is demonstrated using evanescent-wave illumination. Resolution to 150 nm ($\lambda/4.2$) is achieved using a 633 nm source and a 0.4 NA lens. [2274]

09:45-11:15

SENSING AND METROLOGY

09:45-10:15 **Invited talk**

Digital holography in opto-fluidic measurements

George Barbastathis; Massachusetts Institute of Technology (US).

Sala Azzurra, Palazzo dei Congressi

OMS II

09:45-11:15

PHOTOREFRACTIVE MATERIALS

09:45-10:00

Coherent solitonic interactions with photorefractive Fe:InP for high speed optical routing devices

M. Alonzo[1,2], C. Dan[2], D. Wolfersberger[2], E. Fazio[1]; [1]University La Sapienza, Department of energetic (IT), [2]LMOPS CNRS UMR 7132 – Unité de Recherche commune à l'Université Paul Verlaine et SUPELEC (FR).

Experimental measurements about photorefractive (PR) collisions between self-trapped beams in iron doped Indium phosphide (Fe:InP) are reported. Fusion and repulsion between two copropagating parallel beams with λ=1064nm will be analysed taking into account the effects of temperature, light intensity and external electric field on the trapping processes. [2314]

Hotel la Residenza

LASERS

10:00-10:15
Tuning range enhancement in external-cavity InAs/GaAs quantum-dot lasers: temperature, bias and cavity loss dependence
K. A. Fedorova[1], M. A. Cataluna[1], I. Krestnikov[2], D. Livshits[2], E. U. Rafailov[1]; [1]University of Dundee, School of Engineering, Physics and Mathematics (UK), [2]Innolume GmbH (DE).
We exploit a number of strategies for enhancing the tuning range of external-cavity quantum-dot lasers. Reducing the temperature and increasing the pump current can increase the tuning range to the shorter wavelength side, whereas reducing cavity losses additionally extends the tunability range to the red side of the spectrum. [2194]

10:15-10:30
Investigation of the pulse dynamics in a mode-locked quantum-dot laser, involving the ground/excited state transitions
D. I. Nikitichev[1], M. A. Cataluna[1], I. Krestnikov[2], D. Livshits[2], E. U. Rafailov[1]
[1]University of Dundee, School of Engineering, Physics and Mathematics (UK); [2]Innolume GmbH (DE).
We investigate the generation of ultrashort pulses in an InAs/GaAs multi-section quantum-dot laser involving the excited or ground state transitions. We demonstrate that the dependence of pulse duration with the bias conditions is different for pulses generated via ground or excited states. [2243]

10:30-10:45
Volume Bragg grating external-cavity designs for coherent emission of an array of tapered diode lasers
David Paboeuf[1], Gaëlle Lucas-Leclin[1], Nicolas Michel[2], Michel Calligaro[2], Michel Krakowski[2], Patrick Georges[1]; [1]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Univ Paris-Sud (FR); [2]Alcatel-Thales III-V Lab (FR).
We report spatial brightness improvement of diode laser arrays in different extended-cavity setups, which take benefit of the narrow spectral bandwidth of volume Bragg gratings to lock the emission spectrum. [2177]

Sala Auditorium, Palazzo dei Congressi

OMS I

10:15-10:30
Tunable filter based on sapphire microspheres
G. Gilardi[1], D. Donisi[1], R. Beccherelli[1], A. Serpengüzel[2]; [1]Consiglio Nazionale delle Ricerche - Istituto per la Microelettronica e Microsistemi (IT), [2]Koç University, Microphotonics Research Laboratory, Department of Physics (TR).
We present an integrated optoelectronic device based on the whispering gallery modes of a sapphire microsphere integrated and on a diffused waveguide in a glass substrate with a liquid crystal electrically tunable medium. [2320]

10:30-10:45
Optical resonators for evanescent-wave chemical sensing
G. Gagliardi[1], M. Salza[1], J. A. Barnes[2], H. P. Loock[2], P. De Natale[1]; [1]CNR-Istituto Nazionale di Ottica Applicata (INOA), Comprensorio Olivetti (IT), [2]Dept. of Chemistry, Queen's University (CA).
We report on chemical sensing by high-Q silica microspheres and optical fiber-ring resonators. Cavity-enhanced and ring-down spectroscopy are implemented to detect gas or liquid species and determine their concentration from the optical loss as well as changes in external refractive index from the wavelength shift. [2179]

Sala Azzurra, Palazzo dei Congressi

OMS II

10:00-10:15
Three dimensional time dependent model with two photoactive centres for photorefractive spatial solitons in $LiNbO_3$
Fabrice Devaux, Mathieu Chauvet, Jassem Safioui, R. Passier; Département d'Optique P.M. Duffieux, Institut Femto-ST, Université de Franche-Comté (FR).
We present a new 3D time dependent model for photorefractive beam self focusing in undoped biased $LiNbO_3$ where iron impurities and Nb_{Li} polarons are considered as two photoactive centres. Focusing or defocusing regimes are exhibited with respect to beam intensity and bias voltage in good agreement with experiments. [2128]

10:15-10:30
Non-periodic 1D photorefractive photonic lattices optically induced in bulk lithium niobate and planar waveguides
K. Shandarova[1,2], V. Shandarov[1], C. Rüter[2], D. Kip[2], Y. Tan[3], F. Chen[3], [1]State University of Control Systems and Radioelectronics (RU), [2]Institute of Physics and Physical Technologies, Clausthal University of Technology (DE), [3]School of Physics, Shandong University (CN).
Non-periodic 1D photonic lattices are formed in bulk lithium niobate samples and in planar waveguides on this material, using optical projection scheme. The effects of linear and nonlinear discrete diffraction of light within these structures are investigated. [2249]

10:30-10:45
Correlation between lattice deformation and reduction degree in lithium niobate crystals doped with iron by thermal diffusion
A.M. Zaltron, M.V. Ciampolillo, N. Argiolas, M. Bazzan, C. Sada; Department of Physics and CNISM,University of Padova (IT).
A systematic investigation on the structural properties and the reduction degree of iron doped lithium niobate crystals was performed, showing a linear relation between the strain at the surface and the absolute concentrations of Fe^{2+} and Fe^{3+} in the samples. [2245]

Hotel la Residenza

LASERS

10:45-11:00

A time-domain travelling-wave model including multi-population rate-equations for passively mode-locked quantum-dot lasers

M. Rossetti, P. Bardella, I. Montrosset; Politecnico di Torino, DELEN (IT).

We developed a time-domain travelling-wave model including multi-population rate equations to describe the in-homogeneously broadened gain and absorption dynamics and the related refractive index changes in self assembled quantum dots (QDs). Simulations of passive mode-locking (ML) in QD lasers are shown. [2211]

Sala Auditorium, Palazzo dei Congressi

OMS I

10:45-11:00

Laser probe for high frequency and DC measurements of CMUTs

Helge E. Engan[1], Hanne Martinussen[2] and Astrid Aksnes[1]; [1]Department of Electronics and Telecommunications Norwegian University of Science and Technology (NO, [2] Optoplan AS (NO).

An interferometric laser probe setup has been developed that measures simultaneously vibrations up to 1 GHz and static profiles. Description of the probe as well as results from development of a CMUT (capacitive micromachined ultrasonic transducer) array is given. The CMUTs are operated in the conventional as well as the collapsed regime. [2283]

11:00-11:15

Dynamic strain measurement at randomly addressed optical fiber positions using stimulated Brillouin scattering

R. Bernini[1], A. Minardo[2], G. Testa[1], L. Zeni[2]; [1]Consiglio Nazionale delle Ricerche, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (IT), [2] Seconda Università di Napoli, Dipartimento di Ingegneria per l'Informazione (IT).

A novel technique for dynamic strain measurements in optical fibers is presented, based on stimulated Brillouin scattering. The technique permits to address dynamically and randomly the position at which vibration is measured. Experimental results, carried out with a perturbation frequency up to 98 Hz, demonstrated the validity of the technique. [2228]

Sala Azzurra, Palazzo dei Congressi

OMS II

10:45-11:00

Decoy State Quantum Key Distribution Using Homodyne Detection

S. H. Shams Mousavi[1], P. Gallion[2]; [1]Ecole Supérieure d'Électricité (Supélec), Photonic Communication Systems Dept. (FR), [2]TELECOM ParisTech, Ecole Nationale Supérieure des Télécommunications, CNRS LTCI UMR 5141 (FR).

Photon number splitting (PNS) is a powerful attack against the quantum key distribution (QKD) systems. This attack significantly limits the secure transmission range of the QKD systems. In this article, we show how we can improve the transmission range of the QKD systems based on balanced homodyne detection (BHD) using the decoy-state technique. [2278]

11:00-11:15 **Post-deadline talk**

Photorefractive surface soliton waveguide in lithium niobate for sensor applications

E. Fazio[1], J. Safioui[2], M. Chauvet[2], F. Devaux[2], M. Bazzan[3], C. Sada[3]; [1]Università La Sapienza, Dipartimento di Energetica (IT), [2]University Franche-Comté, FEMTO-ST Inst., Optics Dept. (FR), [3]Università di Padova, Dipartimento di Fisica G. Galilei (IT).

We present for the first time the formation of photorefractive pyrolitons at the surface of lithium niobate single crystals. Pyrolitons, i.e. spatial solitons excited by the pyroelectric effects, leave after their generation channels waveguides which can be further used for sensoring applications. [2389]

11:00/11:15-11:30 Coffee break

11:30-12:15

POST-DEADLINE SESSION

CHAIR: FREDRIK LAURELL,
KTH - Royal Institute of Technology (SE)

11:30-11:45 **Post-deadline talk**

Optimally-Output-Coupled, 17.5 W, Yb-Fiber-laser-Pumped Continuous-Wave Optical Parametric Oscillator

S. Chaitanya Kumar[1], Ritwick Das[1], G. K. Samanta[1], M. Ebrahim-Zadeh[1,2]; [1]ICFO-Institut de Ciencies Fotoniques (ES), [2]Institucio Catalana de Recerca i Estudis Avancats (ES).

We report a compact, practical, fiber-laser-pumped, cw optical parametric oscillator based on MgO:PPLN, capable of delivering as much as 17.5 W of infrared output power at 61% extraction efficiency, with a pk-pk idler power stability of 5% over 14 hours and TEM_{00} spatial beam quality with M^2<1.24 (idler), M^2<1.39 (signal). [2382]

11:30-12:45

POST-DEADLINE SESSION

11:30-11:45 **Post-deadline talk**

Ice detection on high voltage power lines by means of a laser based scanning system

E. Golinelli, S. Musazzi, U. Perini, G. Pirovano; ERSE (IT).

We present a laser based scanning system capable of monitoring the ice accretion process on conductors of overhead electric power lines. The paper will report the description of the system as well as preliminary results relevant to laboratory tests performed under controlled conditions. [2390]

11:30-12:30

OPTOELECTRONIC TECHNIQUES AND METHODS

11:30-11:45

Use of integrated optical waveguide probes as an alternative to fiber probes for sensing of light backscattered from small volumes

N. Ismail, F. Sun, F. Civitci, K. Wörhoff, R.M. de Ridder, M. Pollnau, A. Driessen; University of Twente, MESA+ Institute for Nanotechnology (NL).

We show that for light collection from thin samples, integrated probes can present a higher efficiency than conventional fiber probes, despite having a smaller collection area. Simulation results are validated by experiments. [2158]

Hotel la Residenza

LASERS

11:45-12:00 Post-deadline talk

750 W highly efficient tapered ytterbium fiber laser

Juho Kerttula[1], Valery Filippov[1], Yuri Chamorovskii[2], Konstantin Golant[2], Oleg G. Okhotnikov[1]; [1]Optoelectronics Research Centre, Tampere University of Technology (FI), [2]Institute of Radio and Electronics of the Russian Academy of Sciences (RU).

We report a highly efficient, power-scalable Yb double-clad tapered fiber laser with 750 W output power at 1085 nm, 80% of slope efficiency and nearly diffraction-limited beam (M2=1.7), pumped by a low-brightness 915 nm diode bar module. [2383]

12:00-12:15 Post-deadline talk

Compact and efficient continuous-wave single mode DPSS Laser at 594 nm generating > 100 mW for bio-medical applications

J. A. Hellström, G. Elgcrona, E. Illy, H. Karlsson; Cobolt AB (SE).

We present a compact and efficient DPSS laser producing 130 mW of low RMS noise continuous wave radiation at 594 nm. The laser is single-longitudinal mode and the hermetical sealed package containing the laser is only 50x50 mm^2, including beam shaping optics. The conversion efficiency is 35% from signal field to SFG field. [2377]

END OF TOPICAL MEETING ON LASERS

NOTES + NOTES + NOTES + NOTES + NOTES

Sala Auditorium, Palazzo dei Congressi

OMS I

11:45-12:00 Post-deadline talk

Second harmonic generation from an oriented bacteriorhodopsin (BR) protein film

M.C.Larciprete[1], A.Belardini[1], C.Sibilia[1], M. Bertolotti[1], C.Gergely[2]; [1]Dipartimento di Energetica, Università La Sapienza (IT), [2]Groupe d'Etude des Semiconducteurs, Univ. de Montpellier II (FR).

We experimentally investigated second harmonic generation from a film of *bacteriorhodopsin (BR) protein,* deposited in an oriented way onto a charged ITO surfaces. [2385]

12:00-12:15 Post-deadline talk

Glucose sensor based on time resolved fluorescence spectroscopy

C. Altucci[1], B. Della Ventura[2], R. Esposito[1], M. Lepore[2], R. Velotta[1], S. De Nicola[3]; [1]CNISM-Dipartimento di Scienze Fisiche, Università di Napoli "Federico II" (IT); [2]CNISM-Seconda Università di Napoli (IT), [3]CNR-Istituto di Cibernetica "Eduardo Caianiello" (IT).

We have analysed the time-resolved fluorescence spectroscopy of Glucose oxidase (GOX) that catalyzes the oxidation of β-D-glucose to D-glucono-δ-lactone and hydrogen peroxide. Our preliminary results show that this system can be used as a biosensor since it allows the determination of free glucose concentration. [2384]

12:15-12:30 Post-deadline talk

3D-measurement with the stereo scanning electron microscope

T. Vynnyk, T.Schultheis, T. Fahlbusch, E. Reithmeier; Institute of Measurement and Automatic Control, University Hannover (DE).

In this paper the photometric or the so called "Shape From Shading" method is presented. In comparison to existing methods the efficiency of the detector system was considered and the requirements of the cosine Lambert's law for the angle distribution of the emitted electrons are suppressed. [2375]

Sala Azzurra, Palazzo dei Congressi

OMS II

11:45-12:00

METATOYs: pixellated windows that refract as generally as possible

Alasdair C. Hamilton, Johannes Courtial; Department of Physics & Astronomy, University of Glasgow (UK).

We investigate structured windows that perform mappings between incident and outgoing light-ray directions that are traditionally forbidden by wave optics. These so-called METATOYs (metamaterials for rays) can achieve this because they are essentially pixellated. Nevertheless, the appearance from a suitable distance is that of homogeneous windows with very unusual properties. Here we describe our recent work concerned with realizing METATOYs that perform completely general light-ray-direction mappings. [2205]

12:00-12:15

Fourier projection method for measuring the two-point correlation of optical vortex beams

S. De Nicola[1], G. Zito[1], R. Meucci[2], K. Al Naimee[2], P. K. Buah-Bassuah[3]; [1]Istituto di Cibernetica "E. Caianiello" del Consiglio Nazionale delle Ricerche (IT), [2]Istituto Nazionale di Ottica Applicata (IT), [3]Physics Department, University of Cape Coast, Cape Coat Ghana (GH).

In this work, we describe an interferometric technique based on a Fourier projection algorithm and the angular spectrum of plane waves technique to measure the two-point correlation function of a Laguerre-Gaussian optical vortex.

12:15-12:30

Micro integration of optical systems for the fabrication of active optical cables

F. Merchán, D. Wohlfeld, K.-H. Brenner; ziti, Universität Heidelberg, Lehrstuhl für Optoelektronik (DE).

Integrated optoelectronic systems have become very interesting for data transfer. We examine a new concept for integration and miniaturization of these systems based on recent experiments. The application of these designs is the active optical cable. The advantages of this concept and the employed technologies are presented. [2286]

END OF OMS II

Sala Auditorium, Palazzo dei Congressi

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OMS I

12:30-12:45 **Post-deadline talk**

Enhanced stereo SEM measurement of sub-micrometer structures

T.Schultheis, T. Vynnyk, T. Fahlbusch, E. Reithmeier; Institute of Measurement and Automatic Control, Leibniz Universität Hannover (DE).

In this paper results of a modified photometric 3D-reconstruction method of scanning electron microscope (SEM) images are presented. It retrieves more accurate data of sub-micrometer substructures like diffractive optical elements (DOE) due to an increased lateral resolution and works more efficiently than common techniques. [2374]

END OF TOPICAL MEETING ON OμS'09

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19:15 - The patio of the Hotel la Residenza

1st EOS Topical Meeting on Lasers

TML 2124
2-, 3- and 4-Pass Ytterbium-Doped Fiber Amplifier
K. Regelskis, N. Gavrilinas, G. Raciukaitis; Institute of Physics (LT).
We present an implementation of 2-, 3- or 4-pass fiber amplifiers, where each pass of the amplified pulse through the polarization maintaining fiber amplifier is realized in the orthogonal polarization states and alternating propagating directions.

TML 2134
Tunable picosecond source for CARS microscopy
M. Grishin[1,2], R. Antanavičius[1,2], J. Butkus[2], J. Verseckas[2]; [1]Institute of Physics (LT), [2]EKSPLA uab (LT).
A new optical parametric generator pumped by the second harmonic of the modelocked laser operating in the cavity dumping regime is presented. The tuning range covering 860 nm to 1040 nm was obtained at repetition frequency of 1 MHz.

TML 2137
Stabilization of Bidirectional Operation of Intracavity Synchronously Pumped OPO
A. Zavadilová[1], V. Kubeček[1], A. Velten[2], J-C Diels[2]; [1]Czech Technical University in Prague, FNSPE (CZ), [2]University of New Mexico, CHTM (US).
Intracavity synchronously pumped optical parametric oscillator (OPO) for precise phase-difference detection was developed. Experiments and simulation show that the instabilities observed in the inner structure of generated dual pulse trains can be stabilized by introducing of nonlinear losses inside the signal cavity.

TML 2138
Developing a long cavity Ti:sapphire oscillator in the negative dispersion regime for intracavity EUV generation
E. Seres, Ch. Spielmann; Friedrich Schiller Universität, Institut für Optik und Quantenelektronik (DE).
Sources with high repetition rate in the extreme ultraviolet (EUV) regime are of great interest for time resolved spectroscopy and imaging. Here we present a long cavity Ti:sapphire oscillator in the near-zero dispersion regime which is suitable for direct intracavity EUV generation in the MHz range.

TML 2147
InGaP Quantum-Dot saturable absorber for self-starting mode-locked operation of a Ti:sapphire laser
V.G. Savitski[1], J.E. Hastie[1], D. Burns[1], M. Dawson[1], S. Calvez[1], A.B. Krysa[2], J.S. Roberts[2]; [1]Institute of Photonics, University of Strathclyde (UK), [2]EPSRC National Centre for III-V Semiconductors, University of Sheffield (UK).
We demonstrate the use of a novel InGaP quantum-dot (QDs) saturable absorber (SA) to induce passively mode-locked operation of a Ti:sapphire laser. Pulses as short as 518fs are obtained at 752nm with an average output power of up to 190 mW for 2.3W of absorbed 532nm pump power.

TML 2162
SHG with partially coherent semiconductor laser radiation
R. Güther, M.Uebernickel, G.Blume, K.Paschke, G.Erbert; Ferdinand-Braun-Institut für Höchstfrequenztechnik, Department of Optoelectronics (DE).
Using a generalization of Agrawals nonlinear propagation kernel a theory of partially coherent sources is given containing the usual experimental parameters of the nonlinear medium and of the semiconductor lasers only, including elliptical astigmatic radiation characteristics and M2-values and a comparison with experiment.

TML 2165
Photonic Crystal Fiber Lasers for the Scribing of Photovoltaic Modules
S. Selleri, A. Cucinotta, F. Poli, D. Passaro; University of Parma, Information Engineering Department (IT).
The activity related to the development of novel fiber laser systems for the scribing of photovoltaic modules realized by using thin film technology is presented.

TML 2173
Tuning and locking of a Yb:KYW laser with a transversally chirped volume Bragg grating
K. Seger, B. Jacobsson, V. Pasiskevicius, F. Laurell; Laser Physics, KTH - Royal Institute of Technology (SE).
An Yb:KYW laser was locked using a transversely chirped volume-Bragggrating. Translating the grating, the laser tuned from 997 nm to 1016 nm, with spectral bandwidth of 13 GHz and power up to 3.3 W.

TML 2184
Simultaneous pulse compression and amplification in Yb-doped double-clad fiber amplifier for the generation of high peak power
M. Laroche[1], C. Bartolacci[1], B. Cadier[2], H. Gilles[1], S. Girard[1], T. Robin[2]; [1]Centre de recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen (FR), [2]iXFiber (FR).
A spectrally narrowed external-cavity Fabry-Perot laser diode emitting at 1045 nm was gain-switched and the output pulses were amplified in a double-clad Yb-doped fiber. Nanosecond pulses with maximum peak power of 20 kW were achieved in a singlemode core thanks to the combination of high gain and SBS pulse compression.

19:15 - The patio of the Hotel la Residenza

1st EOS Topical Meeting on Lasers

TML 2190
Effects of conical refraction on propagation and conversion of laser beams
V. Peet; Institute of Physics, University of Tartu (EE).
Linear and nonlinear transformation of laser beams under the effect of conical refraction in biaxial crystals is studied and compared with predictions of theory.

TML 2219
Increased spectral density in an Yb-doped fiber laser using two identical volume Bragg gratings
Pär Jelger, Valdas Pasiskevicius, Fredrik Laurell; Royal Institute of Technology (KTH), Applied Physics (SE).
Two identical highly reflective volume Bragg gratings are use in tandem to lock an ytterbium doped fiber laser. A narrow linewidth (<2GHz) and high efficiency (>70%) is achieved with output powers above 7W.

TML 2227
Quantum dot semiconductor disk laser operating at 1270 nm
M. Butkus[1], J. Rautiainen[2], O. G. Okhotnikov[2], S.S. Mikhrin[3], I.L. Krestnikov[3], E. U. Rafailov[1]; [1]University of Dundee, School of Engineering, Physics and Mathematics (UK), [2]Tampere University of Technology, Optoelectronics Research Centre (FI), [3]Innolume GmbH (DE).
We demonstrate up to 55 mW continuous wave output power from an optically-pumped InGaAs/GaAs quantum dot semiconductor disk laser with centre wavelength at 1270. High temperature resilience in terms of output power has been demonstrated.

TML 2229
Analysis of the modes discrimination and output power of 1300nm AlGaInAs/InP Photonic Crystal VCSELs
T. Czyszanowski1, R. P. Sarzała1, Ł. Piskorski1, M. Dems1, M. Wasiak1, W. Nakwaski1, K. Panajotov2; 1Laboratory of Computer Physics, Institute of Physics, Technical University of Lodz (PL), 2Department of Applied Physics and Photonics, Vrije Universiteit Brussels (BE).
Self-consistent modeling of of an InP-based 1300-nm AlInGaAs photonic-crystal vertical-cavity surface-emitting diode laser is presented. We determine the photonic-crystal parameters assuring strong modes discrimination and low threshold. We present the influence of the photnic crystal etching depth on slope efficiency.

TML 2231
Thermal lensing in Ng- and b-cut diode-pumped Nd:KGd(WO4)2 laser crystals
V.G. Savitski[1], S. Calvez[1], P.A. Loiko[2], K.V. Yumashev[2], N.V. Kuleshov[2], A.A. Pavlyuk[3], D. Burns[1];[1]Institute of Photonics, University of Strathclyde (UK), [2]Institute for Optical Materials and Technologies BNTU (BY), [3]Institute of Inorganic Chemistry, Siberian Branch of Russian Academy of Sciences (RU).
Thermal lensing in N_g-cut Nd:KGd$(WO_4)_2$ (Nd:KGW) is compared with a standard b-cut crystal. The thermal lens sensitivity factor is found to be ~3 times lower in the plane of polarization (along N_m axes) and ~4 times lower the perpendicular plane for the N_g-cut Nd:KGW in comparison with the b-cut crystal.

TML 2234
Gain modified mode competition in a fiber amplifier
A.P. Napartovich, N.N. Elkin, D.V. Vysotsky; SRC RF Troitsk Institute for Innovation and Thermonuclear Research (RU).
It is shown by numerical simulations that gain spatial non-uniformity leads to fiber optical modes coupling, which is ignored in traditional approaches to fiber amplifier modeling. This coupling mechanism results in strong changes in a mode competition effect in fiber amplifiers with two-wavelength input signal composed of a few modes.

TML 2244
Thermal Properties of a Vertical-External-Cavity Surface-Emitting Laser in Pulsed-Mode Operation
Michał Wasiak, Robert P. Sarzała; Institute of Physics, Technical University of Lódź (PL).
In this paper we present the impact of the heat spreader placed on the top of a Vertical-External-Cavity Surface-Emitting Laser on the temperature evolution in the pulsed-mode pumping. The heat spreader improves drastically the heat transport, which without it is initially an inefficient 1-dimensional process.

TML 2247
Photo-induced periodic structures based on laser-active colour centres in lithium fluoride crystals and thin layers
R. M. Montereali[1], S. Almaviva[1], F. Bonfigli[1], *H. J. Kalinowski[2,4], E. Nichelatti[3], R. Nogueira[4], M. A. Vincenti[1]; [1]ENEA, Physical Technologies and New Materials Dept., C.R. Frascati (IT), [2]Federal University of Technology-Paraná (BR), [3]ENEA, Physical Technologies and New Materials Dept., C.R. Casaccia (IT), [4]Institute of Telecommunications & Department of Physics, University of Aveiro (PT).*
Permanent periodic sub-micrometric visible-emitting gratings based on F3 + and F2 laser-active colour centres were successfully obtained in irradiated lithium fluoride crystals and films. A selective photo-bleaching process is responsible for the recording of the interference patterns by a low-power continuous laser at 244 nm.

TML 2248
Numerical modeling of the thermal lens induced in a grazing-incidence diode-pumped Nd:YVO_4 laser amplifier
Ş. A. Amarande; National Institute for Laser, Plasma and Radiation Physics, Laser Section (RO).
Thermal lens of a diode-pumped Nd:YVO_4 bounce laser amplifier was investigated numerically. Temperature increase is more than 50% higher in the case without laser emission than in the case with laser effect. The deformation of the pumped face leads to an optical path difference (OPD) that contributes about 70 at% to dioptric power of effective thermal lens. The rest is due to thermal gradient of refractive index.

TML 2282
Analysis of near-field diffraction pattern at domain boundary for low internal field lithium niobate crystals
Nan Ei Yu[1], Jung Hoon Ro[2]; [1]Advanced Photonics Research Institute, GIST (KR), [2]Dep.t of Biomedical Engineering, Pusan Nat'l Uni. (KR).
In-situ monitoring method of anti-parallel domain walls in stoichiometric lithium niobate crystals by an optical contrast enhancement technique was described in theoretically and experimentally. Diffraction patterns were obtained by electrooptic effect at the domain boundary with probe beam.

19:15 - The patio of the Hotel la Residenza

1st EOS Topical Meeting on Lasers

TML 2297
Two diffraction limited 300W output power Diode Pumped Nd:Yag Laser
I.V. Glukhikh[1], S.A. Dimakov[2], S.S. Polikarpov[1], S.V. Frolov[1]; [1]D.V.Efremov Institute (NIIEFA) (RU), [2]Institute for Laser Physics, Scientific Center S.I.Vavilov State Optics Institute (RU).
The original unstable resonator for diode pumped CW Nd-Yag laser is presented. Two diffraction limited laser beam divergence was achieved. The output power of laser beam is 300W.

TML 2321
Exact analytic solutions and conformal profiles for performance scaling of ultrabroadband OPCPA
J. Moses, S.-W. Huang, A. M. Siddiqui, F. X. Kärtner; Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics (US).
Closed-form solutions for parametric amplification, in the context of OPCPA, allow analytic treatment of ultrabroadband gain in the pump depletion regime. We derive these solutions, and, through their use, introduce new methods for extending the efficiency and bandwidth capability of OPCPA.

TML 2386 Post-deadline
Adiabatic bend transitions in large mode area fibres
Stefan Grünsteidl[1,2], J.M. Sousa[2], Ger O'Connor[1], Thomas J. Glynn[1]; [1]National Centre for Laser Applications, NUI Galway (IE), [2] Multiwave Photonics (PT).
Adiabatic bend transitions in large mode area fibres were investigated with the beam propagation method. Simulation methods for minimised bend-induced mode coupling, as well as designs for advanced higher order mode filtering, are presented.

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19:15 - The patio of the Hotel la Residenza

3rd EOS Topical Meeting on Optical Microsystems

TM OMS 2130
Photochemical Properties of Porphyrin Films Covering Surfaces of Tapered Optical Fibers

A. Veselov[1], C. Thür[2], V. Chukharev[1], M. Guina[2], H. Lemmetyinen[1], N. Tkachenko[1]; [1]Tampere University of Technology, Department of Chemistry and Bioengineering (FI), [2]Tampere University of Technology, Optoelectronics Research Centre (FI).

We report the fabrication and characterization of tapered fibers covered with porphyrin monolayer films prepared by Langmuir-Blodgett (LB) deposition method. Such photoactive materials hold much promise for the development of chemical sensors and efficient light harvesting devices.

TM OMS 2131
Raising accuracy in quartz gravimeters using optics-information technologies

I.L. Livshits, I.G. Bronchtein; Saint Petersburg State University of Information Technologies, Mechanics and Optics, Lab of Special Optical and TV devices (RU).

Application of optics-information technologies (receiving and processing information) into geophysics brings essential increase of the accuracy of quartz gravimeters. Using specialized optical system in quartz gravimeters allows to minimize size and weight of the whole device. Examples for aeromarine and ground applications are given.

TM OMS 2132
A novel artificial compound eye optical system

Hongxin Zhang, Zhenwu Lu, Hua Liu; Optical Technology R&D Center, Changchun Institute of Optics and Fine Mechanics and Physics, Chinese Academy of Sciences (CN).

By introducing a field lens into an artificial compound eye optical system composed of curved microlens , the curved image plane is turned into planar. The principle of this kind of structure is discussed. An artificial compound eye optical system with field lens, in which , the volume is 22mm×22mm ×3.12mm, the field of view is 12.6 o, the NA of the microlens is 0.03, the focal lens of the microlens is 1.83mm, is designed and fabricated. The spot of the system is tested; a grating with a period of 18μm is imaged by this system.

TM OMS 2140
Investigating the effects of flat-top laser beams (532 and 660 nm) in annihilation of pistachio mold fungus using spectrophotometry analysis

S .Saghafi[1,2], R.Penjweini[2,3], M. Ghoranneviss[2], H. U. Dodt[1]; [1]Department of Bioelectronics, Institute of solid state Electronics, Technical University of Vienna (AT), [2]Biophotonics Group, Plasma-Physics Research Center, Research and Science Branch, IAU (IR), [3]Biophysics Group, Physics Department, University of Vienna (AT).

In this paper, we present the results of our research in annihilation of pistachio mold fungus (Aspergillus.flavus). Our moldy samples are illuminated by the second harmonics of Nd:YAG laser emitting 532 nm beam (100 mw) and a diode laser emitting 660 nm beam (120 mw), individually and in combination. The output powers of these sources are different but through our experimental processes, the energy densities have been kept identical.

TM OMS 2149
UV holographic exposure system for a constant-period pattern on a curved surface

Akio Mizutani, Syunpei Takahira, Hisao Kikuta; Osaka Prefecture University (JP).

Interference of two spherical waves makes a fringe pattern with a constant period on a curved surface. This interferometer will be used to fabricate a mold of an antireflective lens with subwavelength structured surfaces. An ultraviolet exposure system based on the spherical-wave interferometer has been described.

TM OMS 2167
Interaction between LSP and SPP in magnetoplasmonic structures

J. F. Torrado[1], J. B. González-Díaz[1], A. García-Martín[1], M. U. González[1,2], J. M. García-Martín[1], A. Cebollada[1], S. Acimovic[2], J. Cesario[2], R. Quidant[2], G. Badenes[2], G. Armelles[1]; [1]Instituto de Microelectrónica de Madrid, CSIC Tres Cantos (ES), [2]ICFO-The Institute of Photonic Sciences (ES).

In this work we study the effect of localized plasmon excitation on the response of a magneto-optically active system that also supports extended plasmons (magnetoplasmonic thin film). It is carried out using two different configurations for the applied magnetic field, and its influence on both kind of plasmons is also analyzed.

TM OMS 2181
Optical feedback on Erbium doped fibre laser for Heterodyne SNOM imaging near 1.54μm

S. Girard[1], H. Gilles[1], M. Laroche[1], F. Gourbilleau[2], Richard Rizk[2]; [1]LIOA Lasers, Instrumentation Optique et Applications (FR), [2]NIMPH Nanostructures Intégrées pour la Microélectronique et la Photonique, Centre de recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen (FR).

Heterodyne optical feedback on Er-doped DFB fiber laser is shown as an interesting approach for enhancing the detection sensitivity in Scanning Near field Optical Microscopy. The technique is illustrated by imaging the propagating modes into a Si-rich silica rib waveguide and compares the results with BPM simulations.

TM OMS 2193
Surface Plasmon Resonance Imaging Gas Sensor Based on Calixarene Array for Identification of some Alcohol Molecules

K.V. Kostyukevych[1], R.V. Khristosenko[1], V.Y. Khoruzhenko[1], Yu.M. Shirshov[1], S.A. Kostyukevych[1], A.V. Samoylov[1], I.A. Samoylova[1], V.I. Kalchenko[2]; [1]Institute of Semiconductor Physics, National Academy of Sciences of Ukraine (UA), [2]Institute of Organic Chemistry, National Academy of Sciences of Ukraine (UA).

The surface plasmon resonance (SPR) multielement gas sensor for the recognition of some alcohol molecules (ethanol, isopropanol, penthanol) was developed. As a sensitive layers, the thin films of calixarens (tret-butyl-calix[4,6,8]arenes (C[4]A, C[6]A, C[8]A), tetra-amyl-calix[4] resorchinolaren (C[4]Re) were investigated.

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TM OMS 2196
An Optical Fiber – Capillary System for Microfluidic Analysis with Axial Laser–Induced Fluorescence Detection

M. Stjernström[1], T. Khan[1], P. Jelger[1], W. Margulis[1,2], V. Pasiskevicius[1], F. Laurell[1]; [1]Royal Institute of Technology, Department of Applied Physics (SE), [2]Acreo AB (SE).

An analysis system based on a spliced optical fiber, two-hole fiber, capillary assembly is presented. It enables pressure- and electrokinetically driven microfluid flows and sensitive laser-induced fluorescence detection. An analysis system based on a spliced optical fiber, two-hole fiber, capillary assembly is presented. It enables pressure- and electrokinetically driven microfluid flows and sensitive laser-induced fluorescence detection.

TM OMS 2197
Electro-optical modulating multistack device based on the CMOS-compatible technology of amorphous silicon

Sandro Rao[1], Francesco G. Della Corte[1], Caterina Summonte[2]; [1]Department of Information Science, Mathematics, Electronics and Transportations (DIMET) "Mediterranea" University (IT), [2]Institute for Microelectronics and Microsystems, Consiglio Nazionale delle Ricerche - Unit of Bologna (IT).

Electro-optical absorption in hydrogenated amorphous silicon (*a*-Si:H) / amorphous silicon carbonitride (*a*-SiCN) multilayer has been studied in a multistack waveguide realized by PECVD technology. The device exploits the free carrier optical absorption electrically induced in the semiconductor core waveguide.

TM OMS 2201
Reflectance measurement of micro-component

H. Piombini[1], Ph. Voarino[2], D. Breider[3]; [1]CEA, DAM, LE RIPAULT (FR), [2]QOL (FR), [3]Institut de Recherches R. Bosch (CH).

The optical micro-components are more and more used in laser optical systems because of theirs new and many industrial applications. These components are coated in order to increase theirs optical performances but it is difficult to check theirs optical responses. A new means developed by CEA can solve this difficulty.

TM OMS 2204
Stretching ray-optical imaging with METATOYs

Alasdair C. Hamilton, Johannes Courtial; Department of Physics & Astronomy, University of Glasgow (UK).

At a transmitting surface, wave optics permits only limited mappings between incoming and outgoing light-ray directions. This limits the possibilities of imaging. Recently, we started to investigate METATOYs: structured optical sheets that allow ray-direction mappings forbidden" by wave optics at the cost of introducing wave-optical discontinuities. Here we examine imaging with METATOYs."

TM OMS 2218
Identification of polar liquids by laser pulse sounding method

R.M. Kasimov, I.U. Ibadzadeh; Institute of Chemical Problems of NAS of Azerbaijan (AZ).

A number of new methods of definition of dielectric properties of polar liquids are developed , including methods for strong and weak-absorbing substances with creation of their algorithmic and program software. Using the algorithm of identification of polar liquids by laser pulse sounding method describedin thearticleallows designing high precision and sensitive laser sensors for identification of various types of substances, creating of non-reflective coatings.

TM OMS 2230
Cavity-enhanced two-photon optical pumping of organic microcavity lasers

M. Teich, M. Langner, M. Sudzius, V.G. Lyssenko, H. Fröb, K. Leo; Institut für Angewandte Photophysik, Technische Universität Dresden (DE).

We report on two-photon optical pumping of organic microcavities and discuss it against other pumping regimes. A specially designed organic microcavity is suggested, where two-photon excitation takes place through a dedicated cavity mode and is strongly enhanced due to a coherent accumulation of the incident field in the active layer.

TM OMS 2237
Low-loss amorphous silicon waveguides grown by PECVD on indium tin oxide

Sandro Rao[1], Francesco G. Della Corte[1], Caterina Summonte[2]; [1]Department of Information Science, Mathematics, Electronics and Transportations (DIMET) "Mediterranea" University (IT), [2]Institute for Microelectronics and Microsystems, Consiglio Nazionale delle Ricerche - Unit of Bologna (IT).

We report the fabrication and accurate measurement of low propagation losses in hydrogenated amorphous silicon (*a*-Si:H) planar waveguides fabricated, by PECVD technology, on a conductive electrode of indium tin oxide (ITO).

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TM OMS 2239
Modeling of wide range tunable photonic crystals based on ferroelectric materials
M. Ciobanu[1], L. Preda[2], A. Popescu[1], D. Savastru[1], S. Miclos[1]; [1]National Institute of R&D for Optoelectronics (RO), [2]POLITECHNICA University, Bucharest (RO).
Full gap 3D photonic crystal with ferroelectric spheres in diamond configuration is designed using computer simulations. The band gap position moves from 3 to15 GHz when the dielectric permittivity is varied from 15 to 200. Electric fields about 30 kV/cm are needed in order to obtain the above mentioned tuning.

TM OMS 2241
Volumetric multiple optical traps produced by Devil's lenses
W.D. Furlan[1], F. Giménez[2], A. Calatayud[3], J. A. Monsoriu[3]; [1]Departamento de Óptica, Universidad de Valencia (ES), [2]Depto. de Matemática Aplicada, Univ. Politécnica de Valencia (ES), [3]Ctro. de Tecnologías Físicas, Univ. Politécnica de Valencia (ES).
We propose the use of a new diffractive optical element to produce optical tweezers. We show that when combined with a helical vortex phase mask it is also capable to generate a sequence of focused vortices. The focusing properties of these elements are studied.

TM OMS 2250
Planar-integrated write-read-head architectures for page-oriented volume holographic data storage
M. Gruber, M. Söllner, University of Hagen, Dept. of Mathematics and Computer Science, Optical Microsystems Group (DE).
The construction of write-read-heads for volume holographic data storage on the basis of planar-integrated free-space optics is discussed. Two particular page-oriented write-once-read-many(WORM)-type architectures are presented.

TM OMS 2265
Optical limiting response by embedding copper phthalocyanine into polymer host
Ulaş Kürüm[1],Tanju Ceyhan[2],Ayhan Elmalı[1], Özer Bekaroğlu[3]; [1]Department of Engineering Physics, Faculty of Engineering, Ankara, University, Ankara (TR), [2]Department of Biochemistry, Division of Organic Chemistry, Gülhane Medical Academy, (GATA) (TR), [3]Department of Chemistry, Technical University of Istanbul (TR).
The multilayer film of PMMA containing mononuclear octakis (mercaptopropylisobutyl-POSS) substituted phthalocyaninato-copper (CuPc) was obtained by spin-coating on quartz substrate. The nonlinear absorption and optical limiting (OL) performance of CuPc have been described using the open-aperture Z-scan technique. The measurements were performed using collimated 4 ns pulses generated from a frequencydoubled Nd:YAG laser at 532 nm wavelength.

TM OMS 2271
Good optical limiting performance of indium and gallium phthalocyanines in a solution and co-polymer host
Mustafa Yüksek[1], Ayhan Elmali[1], Mahmut Durmus[2], H. Gül Yağlıoğlu[1], Hüseyin Ünver[3], Tebello Nyokong[4]; [1]Ankara University, Department of Engineering Physics, Besevler Ankara (TR), [2]Gebze Institute of Technology, Department of Chemistry (TR), [3]Ankara University, Department of Physics (TR), [4]Rhodes University, Department of Chemistry (ZA).
The optical limiting characteristics of tetra- and octa-substituted gallium and indium phthalocyanine complexes have been studied in the form of solution and PCs-PMMA composite films. Although all phthalocyanines studied are good candidates for optical limiting applications, films show better properties than that of solutions.

TM OMS 2287
High-resolution Hole Patterning with Frequency-doubled IR Ultrashort Laser Pulses
G. Mínguez-Vega[1], O. Mendoza-Yero[1], J. Lancis[1], P. Andrés[2]; [1]GROC·UJI, Departament de Física, Universitat Jaume I (ES), [2]Departament d'Òptica, Universitat de València (ES).
The feasibility for diffraction-driven, high-precission microstructuring of materials with femtosecond pulses of high bandwidth is demonstrated through a dispersion compensating module. The system was tested for the second harmonic of IR pulses.

TM OMS 2288
Self-patterning of PDMS microlens arrays on functionalized crystals and characterization by digital holography
F. Merola[1,2], M. Paturzo[1], S. Coppola[1], V. Vespini[1], P. Ferraro[1]; [1]Istituto Nazionale di Ottica Applicata (CNR-INOA) (IT), [2]Università degli Studi di Napoli "Federico II", Dipartimento di Scienze Fisiche (IT).
We show how an array of PDMS microlenses can be formed on a lithium niobate substrate exploiting the pyroelectric effect. Moreover, an accurate characterization of the micro-lenses curvature is performed by a digital holographic technique.

TM OMS 2291
Multiplexing and de-multiplexing of digital holograms recorded in microscopic configuration
M. Paturzo[1],P. Memmolo[1,2], A. Tulino[2], A. Finizio[1], L. Miccio[1], P. Ferraro[1]; [1]CNR- Istituto Nazionale di Ottica Applicata (INOA) (IT), [2]DIET, Università di Napoli "Federico II" (IT).
We investigate the possibility to multiplexing and de-multiplexing numerically digital holograms recorded by means of a Mach–Zehnder interferometric microscope.
Two kind of multiplexing techniques are investigated. The first one allows to multiplex up to hundreds of digital holograms retrieving correctly their amplitude and phase maps. This technique can be used to optimize the storage and transmission process. The second method consists in the angular multiplexing and de-multiplexing of digital holograms, rotating numerically one hologram at different angles and adding the rotated holograms to obtain a synthetic digital hologram. The distortions caused by the proposed procedures has been evaluated.

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TM OMS 2293
Design of Optical Nano-Antenna Reflectors through Dielectric Structures with Extreme-valued Constitutive Parameters

Luca Scorrano, Simone Tricarico, Filiberto Bilotti, Lucio Vegni; University "Roma Tre", Department of Applied Electronics (IT).

In this contribution, the role of metamaterials in the design of artificial magnetic conductors (AMC) at the visible regime is discussed through a theoretical analysis based on the equivalent transmission line representation. Finally, a practical implementation of an effective optical directive radiating system, made of a plasmonic nanoantenna placed on a Silica-Ag multilayer slab, is presented.

TM OMS 2299
Optical interference filters for Space mini-spectrometers

Angela Piegari[1], Anna K. Sytchkova[1], Michele Dami[2]; [1]ENEA (Ente Nuove tecnologie, Energia, Ambiente), Optical Coatings Group (IT), [2]Galileo Avionica (IT).

Small-dimension spectrometers without moving parts are of interest for Earth observation from Space. To reduce the instrument dimension and weight, traditional optical components could be substituted by properly designed miniaturized optical filters. These filters combined with array detectors, give compact optical sensors to be integrated in the imaging optical system.

TM OMS 2305
Characterization of the photorefractive bright soliton formation process in a lithium niobate crystal by digital holography

F. Merola[1,2], L.Miccio[1], M.Paturzo[1], S. De Nicola[3], P. Ferraro[1]; [1]Istituto Nazionale di Ottica Applicata (CNR-INOA) (IT), [2]Università degli Studi di Napoli "Federico II", Dipartimento di Scienze Fisiche (IT), [3]Istituto di Cibernetica del CNR "E. Caianiello" (IT).

A full characterization of the photorefractive soliton writing process is presented. For this purpose a digital holographic technique has been used, allowing us to monitor the temporal evolution of both amplitude and phase profile ofthe writing beam.

TM OMS 2308
Principle and Characteristics of Underwater Target Detection by Inhomogeneous Illumination

Bing Zheng[1]; Bo Liu[1], Hua Jiang[2]; [1]Department of Electrical Engineering, Ocean University of China (CN), [2]Yantai Vocational College (CN).

The main problems in underwater image detection are light attenuation and scattering. Attenuation causes decrease of the energy visibility, while scattering causes the strong background in image. Both cause the decrease of valid working distance and image quality. For underwater target detection, it is required to overcome the scattering problem to improve the image contrast as the energy visibility is hold the same time. This paper present a principle of underwater target detection based on inhomogeneous Illumination field. By generating a rational distribution of illumination energy, both the energy visibility and the image contrast can be improved. The signal-to-noise ratios at different distances detected by the receiver have small difference. So the working distance of the system and the image quality are enhanced. The working distance of the system can be up to the level of watts-scale laser scanning imaging system.

TM OMS 2315
Mechanically Written Long Period Gratings in Microstructured Fibers

I. Cacciari, M. Brenci, R. Falciai, G. C. Righini; IFAC-CNR / MDF-LAB (IT).

We compare simulated results with experimental data obtained with LPFGs written in an index guiding photonic crystal fiber. We show how the field amplitude distribution of different cladding modes can influence the sensitivity of refractive index sensors based on LPFGs.

TM OMS 2316
Diffraction gratings with rough strips

F. J. Torcal-Milla, L. M. Sanchez-Brea, E. Bernabeu; Applied Optics Complutense Group, Universidad Complutense de Madrid, Optics Department (ES).

Diffraction gratings can modulate the amplitude, phase, and polarization of the incident beam. In this work we analyze a new kind of diffraction grating based on strips with different micro-topographic properties. When the grating moves along the direction of the strips, it periodically modifies the coherence properties of the incident beam. The intensity distributions in the near and far field are analyzed, showing the similarities and differences with other kinds of diffraction gratings.

TM OMS 2324
Self-images of 2D pseudo-random amplitude Ronchi gratings

F. J. Torcal-Milla, L. M. Sanchez-Brea, F. J. Salgado-Remacha; Universidad Complutense de Madrid, Optics Department (ES).

We analyze the self-imaging phenomenon in the near field produced by two-dimensional Ronchi gratings, which present some fabrication errors, such as random location of the structure. We show that the effect of the randomness decreases with the number of self-image, even correcting the periodicity.

TM OMS 2371
An optical microsystem for cellS monitoring

E. Orabona[1,2], F. Menolascina[3], L. De Stefano[1], D. Di Bernardo[3,4]; [1]Institute for Microelectronics and Microsystems - Dept. of Naples, National Council of Research (IT), [2]Dept. of Physics - "Federico II" University of Naples (IT), [3]Telethon Institute of Genetics and Medicine (IT), [4]Dept. of Computer and Systems Engineering - "Federico II" University of Naples (IT).

We propose an optical microfluidic platform for cells controlled culture. A complex biochip for cells growth and liquids feeding has been realized by soft lithography techniques. Evaluation of cells' response to specific substances can be monitored by using an inverted fluorescence microscope.

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TM OMS 2373 Post-deadline

A microfluidic device for single molecule detection based on Electro-Optical Tweezers

G. Pesce[1], L. De Stefano[2], M. Casalino[2], E. Orabona[2], G. Rusciano[1], A. Sasso[1]; [1]University of Naples Federico II, Dept. of Physics (IT), [2]National Research Council-Institute for Microelectronics and Microsystems (IT).

We propose a new device for single molecule detection. It is based on a combination of an optical tweezers system and an electric field. Monitoring the oscillations, induced by an AC electric field on a trapped particle it is possible to measure with a great accuracy and sensitivity the particle charge. Charge modifications due to chemical interactions with surrounding molecules could be detected monitoring the particle oscillations.

TM OMS 2372 Post-deadline

Enhanced Stimulated Raman scattering in silicon nanocomposites

L. Sirleto[1], M. A. Ferrara[1] G. Nicotra[2] C. Spinella[2], I. Rendina[1]; [1]National Research Council-Institute for Microelectronics and Microsystems (IT), [2]National Research Council-Institute for Microelectronics and Microsystems (IT).

A preliminary valuation of approximately a fivefold enhancement of the gain coefficient in Raman amplifier based on silicon nanocomposites with respect to silicon and a significant reduction of threshold power are reported. These results have a potential interest for silicon-based Raman lasers.

TM OMS 2393 Post-deadline

Spatially resolved birefringence of computer-generated holographic gratings

G. Zito, A. Finizio, S. De Nicola; Istituto di Cibernetica "E. Caianiello" del Consiglio Nazionale delle Ricerche (IT).

In this work, a spatially resolved interferometric technique is used to investigate the two-dimensional distribution of the birefringence of computer-generated holographic gratings.

TM OMS 2387 Post-deadline

Reflection Z-scan for characterization of materials with third- and fifth-order optical nonlinearities

A. Petris[1], V. I. Vlad[1], E. Fazio[2]; [1]National Institute for Laser, Plasma and Radiation Physics, Dept. Lasers (RO), [2]University "La Sapienza", Dept. Energetics (IT).

We present a study of open aperture reflection Z-scan in materials with third- and fifth-order nonlinearities. The analytical expression of normalized reflectance in the presence of these nonlinearities is derived. We experimentally checked it in the measurement of the nonlinearity of nano-patterned SOI with femtosecond pulses.

TM OMS 2379 Post-deadline

An optical electromagnetic field sensor for terrestrial & space applications

Mario Medugno, Consiglio Nazionale delle Ricerche, Institute for Microelectronics and Microsystems (IT).

We present an integrated optical device enabling an affordable electromagnetic field sensing in the Fresnel region. The sensor theorical bases, its technological implementation steps, the experimental results and applications to terrestrial and space field monitoring are discussed.

TM OMS 2378 Post-deadline

1.55 μm silicon-based reflection-type waveguide integrated thermo-optic 2×2 switch

Sandro Rao, Francesco G. Della Corte; Department of Information Science, Mathematics, Electronics and Transportations (DIMET) "Mediterranea" University (IT).

We report a novel four-ports optical beam deflector based on the thermo-optic effect in hydrogenated amorphous silicon and crystalline silicon. It is a reflection-type waveguide-integrated switch, controlled by the refractive index thermal change. The different impact of temperature on the refractive indices in the two materials is exploited to switch the propagation direction of light between the two input and output ports.

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