European Optical Society — Coherence for Europe ®

EOS Annual Meeting 2010 (EOSAM 2010)

26 - 29 October 2010, Parc Floral de Paris, France

ON-SITE PROGRAMME

EOSAM 2010 is held in conjunction with PRI-OPTO
26 - 28 October 2010

PRI PHOTON INDUSTRIES OPTO

Sponsors

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> reasonable publication rates

Regardless the length of the articles, the regular publication rates are:

350 € for EOS members*

400 € for non-members

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

Discounted publication rates
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

14 January 2011

JEOS:RP - the Online Journal of the European Optical Society Rapid Publications
Contact and more information:
jeos-rp@myeos.org

www.jeos.org

Contact: European Optical Society (EOS) · Judith Oumard (EOS Senior Communications Manager) · Hollerithallee 8 · 30419 Hannover, Gemany
Phone: +49 (0)511 2788 159 · Fax: +49 (0)511 2788 119 · Email: **paris@myeos.org** · URL: **www.myeos.org/events/eosam2010**

INFORMATION FOR AUTHORS AND ATTENDEES

ON-SITE REGISTRATION HOURS

Tuesday, 26 October	8:00-18:00	Attendees paying by cash are requested to bring the exact change in Euro.
Wednesday, 27 October	8:00-18:00	
Thursday, 28 October	8:00-18:00	Payment receipts and confirmations of attendance will be available
Friday, 29 October	8:30-16:00	at the registration desk.

REGISTRATION

For each accepted abstract, at least one author is requested to register properly. The registration for one Topical Meeting includes admission to all Topical Meetings held at EOSAM 2010 as well as to PRI-OPTO.

ORAL PRESENTATIONS

Time slots: Presenting authors are allotted 15 minutes (12 minutes presentation plus 3 minutes for discussion). Please plan your presentation accordingly to meet the 15 minute maximum.

Presentation upload: Speakers are requested to upload their presentation to the computer in the meeting room well in advance to their talk.

Presentation format: Please bring your presentation on a USB mass storage, CD-ROM or DVD and include all video files. File formats: ppt, pptx and pdf. A Windows-based presentation computer will be provided.

For Mac users: To make sure your presentation is displayed correctly, please:

- bring your presentation as pdf-file with fonts embedded or
- restrict yourself to Arial/Times New Roman (not Times)/Courier New (not Courier)/Symbol/Windings when creating your ppt- or pptx-file.

Technical equipment: All technical equipment (presentation computer, video projector, sound system, laser pointer) will be available on-site. It is not possible to use your personal laptop.

POSTER PRESENTATIONS

There will be two poster sessions during EOSAM 2010. Please see the programme (from page 76) to find out for which day your poster presentation is scheduled.

Poster authors are requested to be present at their posters during the official poster session. The poster set-up and removal is the responsibility of the authors only. Poster strips will be provided by the organisers. Important: Posters must be removed directly after the poster session.
Poster size maximum: A 0 (841 mm width x 1189 mm height)

Poster Session I: Wednesday, 27 October, 13:45 - 15:15, exhibition hall
Poster Session II: Thursday, 28 October, 13:30 - 15:00, exhibition hall

JOINT POST-DEADLINE SESSION

There will be taking place a joint post-deadline session for all topical meetings. Only a very limited number of was accepted for this session.

Date: Thursday, 28 October 2010 **Time**: 15:00 - 15:45 **Room**: Amphithéâtre Fresnel

BEST STUDENT PRESENTATION AWARDS

Best Student Poster Presentation
The best student posters presented at EOSAM 2010 will be awarded a diploma and a prize sponsored by the publisher Springer. All student poster contributions are eligible to the prize. The criteria for the award are relevance, originality, scientific merit and clarity.

Best Student Oral Presentation
The best student oral presentations at EOSAM will be awarded a diploma and a prize sponsored by the publisher Springer. All students giving an oral presentation are eligible to the prize. The criteria for the award are relevance, originality, scientific merit and clarity.

Notification to the Awardees
The winners of the Best Student Oral Presentation and Poster Presentation Award will be notified by the organisers directly after EOSAM 2010.

Sponsord by

EOS WELCOME RECEPTION

Open to all attendees of EOSAM 2010.

Date: Tuesday, 26 October **Time:** 18:30 - 20:30 **Room:** Entrance area of PRI-OPTO

INFORMATION FOR AUTHORS AND ATTENDEES (continued)

EOS CONFERENCE DIGEST

The registration for EOSAM 2010 (except for the one-day registration) includes a digest CD-ROM with the abstracts of all presentations given at the EOS Annual Meeting 2010 (except for the workshop abstracts). The CD-ROM is ISBN numbered.

NOTE: **A one-day registration does not include the digest CD-ROM**. The digest may be purchased separately on-site at the registration desk.

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). The publication offer for JEOS:RP is an option but no obligation.

PAPER PUBLICATION IN JEOS:RP – SPECIAL OFFER

All attendees of the EOS Annual Meeting 2010 receive a 20% discount on the publication rate for JEOS:RP, the open access journal of the European Optical Society: Rapid Publications (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 14 January 2011.

Special rates:

- EOS members: 280 € (instead of 350 €)
- EOS non-members: 320 € (instead of 400 €)

Notes

Notes

PRI-PHOTON RESEARCH INDUSTRY / OPTO

26 - 28 October 2010
Parc Floral de Paris, France
www.pri-event.org

EOSAM 2010 will be held alongside PRI PHOTON Research Industry, the annual event on photonics issues and challenges taking place in France - a trade show of international stature. Energized by industry professionals, its objective is to stimulate networking and business and to enhance the visibility of the photonics industry and issues in a lively and convivial environment.

Several events and programmes will be taking place during 26 - 28 October:

P.6 OPTO (26 - 28 October)
The 30th edition of OPTO, the European tradeshow dedicated to all optics-photonics solutions, joins PRI in 2010. The OPTO 2010 exhibitors come from various fields including:

- Optical solutions for test, measurement and security
- Microscopy
- Spectroscopy
- Optical measurement instruments
- Sensors and detectors
- Imaging and displays
- Vision systems and components
- OEM optical and optoelectrical components
- Lasers and industrial laser systems
- Medical and scientific lasers
- LEDs
- Green photonics
- Nanotechnologies
- Biophotonics
- Materials
- Systems & components for telecoms
- Active components
- Ultra high-speed optical networks
- Materials and protocols for transmission
- Network installation materials
- Network test and measurement
- Network supervision
- Services

Annual Meeting of CNOP
The National Council on Optics and Photonics (FR) will hold its first Annual Meeting.

Competitions and awards
Vitrine de l'innovation is the annual ceremony for the award granted by the *Photoniques* magazine.

50 years of laser
PRI will host a number of industrial conferences and diverse activities dedicated to the 50th laser anniversary.

The opening hours of PRI (in particular for OPTO) are:
Tuesday, 26 October: 10:00 – 18:00 | Wednesday, 27 October: 09:00 – 18:00
Thursday, 28 October: 09:00 – 17:00

More information at: www.pri-event.org

LAB TOUR TO THE "LABORATOIRE CHARLES FABRY DE L'INSTITUT D'OPTIQUE"

The "Institut d'Optique Graduate School" is pleased to offer to all EOSAM 2010 attendees the visit of its laboratory, the "Laboratoire Charles Fabry de l'Institut d'Optique". Pre-registration is required (free-of-charge). **Contact:** paris@myeos.org

Date: Monday, 25 October (one day before EOSAM 2010 starts) **Time:** 13:30 at the train station "RER B Massy-Palaiseau"

Getting there:
Visitors will be picked up by bus at the train station "RER B Massy-Palaiseau" at 13:30 and will be released at the same station around 18:00. This is the fastest and easiest way to travel between the "Institut d'Optique", Paris and the airports. More information will be sent to the registered visitors by email. The participation in the lab tour is free-of-charge.

EOS ANNUAL GENERAL MEETING

The EOS Annual General Meeting is open to all EOS members and attendees of EOSAM 2010.

Date: Wednesday, 27 October **Time:** 18:00 - 20:00 **Room:** Amphithéâtre Fresnel

EOS PRIZE AND FELLOWS CEREMONIES

At the beginning of the EOS General Meeting on Wednesday, 27 October (please see the previous paragraph), the EOS Prize winners from 2009 and 2010 will be awarded their prize and will give a short presentation of the highlights of their work.

Date: Wednesday, 27 October **Time:** 18:00 (during the Annual General Assembly) **Room:** Amphithéâtre Fresnel

EOS PRIZE WINNERS 2009

The EOS Prize 2009 is shared by

F. Sorrentino[1], M. de Angelis[1], A. Bertoldi[2], L. Cacciapuoti[3], A. Giorgini[4], M. Prevedelli[5], G. Rosi[6], G.M. Tino[7]; [1]Istituto di Cibernetica CNR, (IT); [2]Laboratoire Charles Fabry de l'Institut d'Optique (FR); [3]ESA Reasearch and Scientific Support Department (NL), [4]Dipartimento di Fisica, Università di Napoli, (IT); [5]Dipartimento di Chimica Fisica e Inorganica, Università di Bologna (IT); [6]Dipartimento di Fisica "Enrico Fermi" (IT); [7]Dipartimento di Fisica and LENS, Università di Firenze - INFN (IT),

for their contribution on "**Precision measurements of gravity using cold atom sensor**"

and

J. Clark[1], L. Bazzana[2], W.C. Tsoi[3], R. Xia[4], A.L. Mendonca[5], A. Charas[5], J. Cabanillas-Gonzalez[1], T. Virgili[1], L. Paracchini[1], D.D.C. Bradley[4], D.G. Lidzey[3], J. Morgado[5], A. Nocivelli[2], G. Lanzani[1]; [1]Politecnico di Milano, Dipartimento di Fisica and Istituto di Fotonica e Nanotecnologie - CNR (IT); [2]LUCEAT S.p.A. (IT); [3]University of Sheffield, Physics Department (UK); [4]Imperial College, Physics Department (UK); [5]Instituto de Telecomunicacioes, and Departamento de Engenharia Química (PT),

for their contribution on "**Ultrafast gain switching in conjugated polymer-doped Plastic Optical Fibers**"

EOS PRIZE WINNER 2010

Self-imaging effect in multimode waveguides with longitudinal periodicity

S.F. Helfert, B. Huneke, J. Jahns; Fernuniversitaet in Hagen, Optical Information Technology (DE).

EOS FELLOWS

The EOS Prize Ceremony will be followed by the EOS Fellow Ceremony. The Society's Fellows will be officially announced and will receive their fellowship diploma.

ICO PRIZE AND GALILEO GALILEI AWARD CEREMONIES

EOSAM 2010 will host the ICO Prize and Galileo Galilei Award Ceremonies including the awardees' Ernst Abbe and Galileo Galilei lectures.

Date: Thursday, 28 October 2010 **Time:** 17:30 - 19:45 **Room:** Maiman

ICO Prize 2009

The ICO Prize 2009 goes to Rajesh Menon, Department of Electrical and Computer Engineering at the University of Utah and a affiliate of the Research Laboratory of Electronics at the Massachusetts Institute of Technology (MIT), for his "breakthrough achievement in nanolithography, in particular for his invention and development of the absorbance modulation method for a wider range of nanophotonic applications".

Abstract

On breaking the Abbé diffraction limit in optical nanopatterning and nanoscopy

R. Menon

The Abbe diffraction limit prevents visible light from accessing the nanoscale. Recent advances in wavelength-selective photochemistry and wavefront engineering of light have begun to break this limit. Here, I will describe absorbance modulation and related techniques that enable optical nanopatterning and nanoscopy.

ICO Galileo Galilei Award 2009

The 2009 Award is shared by Marat S. Soskin (Institute of Physics of the National Academy of Sciences of Ukraine) "for his achievements in the fields of tunable lasers, dynamic holography, and linear and nonlinear singular optics", and Dumitru Mihalache (Horia Hulubei National Institute of Physics and Nuclear Engineering, Bucharest, Romania) "for his achievements in the field of theoretical nonlinear optics".

Abstracts

Singular optics of carbon nanotubes dispersion in liquid crystals

M.S. Soskin

Fractal nanotubes clusters dispersed in nematic 5CB were investigated first by singular Stokes polarimetry. They induce optical vortices in the scattered laser light and polarization singularities in the passed laser beam refracted on the microns size inhomogeneous birefringent interfacial layers of 5CB surrounding nanotubes clusters.

Nonlinear optical modes in micro- and nanostructured media: From light bullets to plasmonic lattice solitons

D. Mihalache

I give an overview of recent results in the area of discrete-continuous light bullets propagating in one- and two-dimensional waveguide arrays. I also present the unique features of subwavelength plasmonic lattice solitons which form in arrays of metallic nanowires embedded in Kerr-type nonlinear media.

More information is available at www.ico-optics.org or at www.ico-optics.org/ico_jan10.html

HOTEL LIST

The hotels listed below are located in the vicinity of the venue (Parc Floral de Paris) and in the Bastille quarter. The room rates (single occupation) are taken from the homepages of the listed hotels. Rates may vary according to room availability and reservation date. Please contact the hotel directly to make your reservation.

**** Hotels

Hotel Marceau Bastille ****
13, rue Jules César
75012 Paris
Tel.: +33 (0)1 43 43 11 65
Fax: +33 (0)1 43 41 67 70
E-mail: infos@hotelmarceaubastille.com
URL: www.hotelmarceaubastille.com
Rates: from 150 €
Breakfast: 22 €
Remarks: Wi-Fi/WLAN free, near the Bastille a. Bois de Vicennes
Metro: lines M 1, 5, 8 Bastille; lines M 1,14 Gare de Lyon

Villa Beaumarchais **
5, rue des Arquebusiers
75003 Paris, France
Tel.: +33 (0)1 40 29 14 00
Fax: +33 (0)1 40 29 14 01
E-mail: Beaumarchais@leshotelsdeparis.com
URL: www.villa-beaumarchais.com/
Remarks: Wi-Fi/WLAN
Rates: 150-300 €
Remarks: Wi-Fi available
Metro: lines M1, 5, Bastille or line M 8, Chemin-Vert

*** Hotels

Hotel Saint Louis - Best Western ***
2 bis, rue Robert Giraudineau
94300 Vincennes
Tel.: + 33 (0)1 43 74 16 78
Fax: + 33 (0)1 43 74 16 49
E-mail: saint-louis@paris-inn.com
URL: www.paris-inn.com/fr-hotel-paris-saint-louis-description-17.html
Rates: from 56 €
Remarks: Wi-Fi /WLAN
Near the Parc Floral de Paris, the Castle of Vincennes,
RER Station (line A)
Metro: line M 1, Château de Vincennes (350 m)

Daumesnil Vincennes***
50, Avenue de Paris
94300 Vincennes
Tel.: + 33 (0)1 48 08 44 10
Fax: + 33 (0)1 436 510 94
E-mail: info@hotel-daumesnil
URL: www.hotel-daumesnil.com/uk/
Rates: 89-199 €
Breakfast: 12 €
Remarks: Wi-Fi /WLAN available; near the Castle of Vincennes, Parc Floral, Bois de Vincennes
Metro: line M1, Château de Vincennes (400 m) or Bérault (290 m); line RER A, Vincennes

Hotel Blason (Ex Continental) ***
30, Avenue de Paris, 1, rue de Montreuil
94300 Vincennes Paris
Tel.: + 33 (0)1 419 318 62
URL: www.activehotels.com/1/1/2942165-hotel-blason-ex-continental-vincennes.html
Rates: from 50 €
Remarks: Wi-Fi/WLAN free of charge
Near the Castle of Vincennes, Parc Floral, Bois de Vincennes, RER A (station: Vincennes, 347m)
Metro: line M 1, Bérault (102 m)

Royal Regency ***
69-71, Rue Defrance
94300 Vincennes Paris
Tel.: + 33 (0)1 49 57 12 00
Fax: +33 (0)1 43 65 76 61
E-mail: RoyalRegency@diamondresorts.com
URL: www.diamondresorts.com/Royal-Regency
Rates: from 79 €
Remarks: Wi-Fi/WLAN available; near the Castle of Vincennes, Parc Floral, Bois de Vincennes
Metro: line M 1, Château de Vincennes (850m)

Hotel Le Patio St Antoine Paris ***
289 bis, Rue Du Faubourg
75011 Paris
Tel.: + 33 (0)1 40 09 40 00
Fax: +33 (0)1 40 09 11 55
E-mail: info@homeplazza.com
URL: www.lepatiosaintantoine.com/fr/index.php
Rates: from 99 €
Breakfast: 18 €
Remarks: Wi-Fi/WLAN with charge; near the Bastille, Nation's Square and La Place des Vosges
Metro: lines M 1, 8, Reuilly-Diderot (350 m)

Hotel Turenne Le Marais ***
6, Rue De Turenne
75004 Paris
Tel.: +33 (0)1 42 78 43 25
Fax: + 33 (0)1 42 74 10 72
E-mail: hotel@turennemarais.com
URL: www.hotels-francepatrimoine.com/turenne-la-marais/en/hotel-marais-paris.html
Rates: 115-200 €
Remarks: free internet access
Metro: line M 1, Saint Paul; lines M1, 5, 8, Bastille

HOTEL LIST

Hotel Novotel Paris Gare de Lyon***
2, Rue Hector Malot
75012 Paris
Tel.: +33 (0)1 44 67 60 00
Fax: + 33 (0)1 44 67 60 60
E-mail: h1735@accor.com
URL: www.novotel.com/gb/hotel-1735-novotel-paris-gare-de-lyon/index.shtml
Rates: 119-259 €
Remarks: Wi-Fi available
Metro: lines M 1,14, RER A + D, Gare de Lyon (110 m)

** Hotels

Hotel du Château **
1, Rue Robert Giraudineau
94300 Vincennes
Tel.: + 33 (0)1 48 08 67 40
Fax: + 33 (0)1 43 28 73 27
E-mail: reservation@hotel-du-chateau.com
URL: www.hotel-du-chateau.com
Rates: 59-119 €
Breakfast: 7.9 €
Remarks: Wi-Fi /WLAN available; near the Castle of Vincennes, Parc Floral, Bois de Vincennes, RER line A (station: Vincennes)
Metro: line M 1, Château de Vincennes (400m)

Jardins **
39, Rue de Fontenay
94300 Vincennes
Tel.: + 33 (0)1 43 28 25 64
E-mail: hoteldesjardins@wanadoo.fr
URL: http://hoteldesjardins.free.fr
Rates: 58-85 €
Breakfast: 6 €
Remarks: Near the Castle of Vincennes, Parc Floral, Bois de Vincennes
Metro: line M 1, Château de Vincennes (400m); line RER A, Vincennes

Hotel Du Donjon-Vincennes **
22, Rue du Donjon
94300 Vincennes
Tel.: +33 (0)1 43 28
Fax: +33 (0)1 49 57
E-mail: info@hotel-donjon-vincennes.fr
URL: www.hotel-donjon-vincennes.fr
Rates: 60-100 €
Breakfast: 7 €
Remarks: Wi-Fi /WLAN free of charge; near the Castle of Vincennes, Parc Floral, Bois de Vincennes
Metro: line M 1, Bérault or Château de Vincennes (350 m)

Hotel Charma **
14 bis, rue des Maraîchers
75020 Paris
Tel.: +33 (0) 1 43 72 51 96
Fax: +33 (0) 1 43 72 38 85
Mobile: + 33 6 60 99 25 86
E-mail: hotelcharma@free.fr
URL: www.hotelcharma.com/
Rates: 70-95 €
Breakfast: 6 €
Metro: line M 1, Porte de Vincennes (100 m), line M 9, Maraîchers (150 m)

Hotel Du Printemps **
80, Boulevard de Picpus
75012 Paris
Tel.: +33 (0)1 43 43 62 31
Fax: +33 (0)1 49 28 97 11
E-mail: contact@hotel-paris-printemps.com
URL: www.hotel-paris-printemps.com
Rates: 56-120 €
Remarks: Wi-Fi/WLAN available
Metro: lines M 1, 2, 6, 9, RER A, Nation (100 m) or line 6, Picpus

Hostels/Student accomodations

CISP - Centre International Maurice Ravel
6, Avenue Maurice Ravel
75012 Paris
Tel.: +33 (0)1 43 58 96 00
Fax: +33 (0)1 43 58 95 12
E-mail: reservation@cisp.fr
URL: www.cisp.fr
Rates: 19.90 - 40.30 €
Breakfast: included
Remarks: Wi-Fi free of charge in the foyer
Metro: line M1, Porte de Vincennes (10 minutes walk); line M 6, Bel-Air; ligne M 8, Porte Dorée

Hostelworld - hostel booking website
www.hostelworld.com/hostels/Paris

GETTING TO PARIS

Paris is easy to reach from many places in the world - be it by air, train or car. Useful information you will find in the Paris Travel Kit (download: www.ratp.info/orienter/interface/plans_et_horaires.php?methode=affiche_pdf&loc=touristes&nompdf=paris_tourisme&fm=pdf&lang=fr&partenaire=ratp; pdf-file 1.7 MB), or you contact the Paris tourist office at tel. +33 (0) 892 68 3112 or via www.parisinfo.com.

BY AIR

Paris has three airports that can be reached by direct connections from various airports in the world. All three airports are within easy reach of Paris.

- Paris-Charles de Gaulle (CDG)
- Paris-Orly (ORY)
- Paris-Beauvais (BVA)

For more information about how to get to Paris by air please visit http://en.parisinfo.com/paris-map/arrivals-departures/by-air/guide/by-air_your-arrival-at-the-airport.

BY TRAIN

Paris has seven major train stations that can be reached within few hours from all major European cities. Each train station offers connections with the public transport network (metro, RER, bus).

- Gare du Nord
- Gare de l'Est
- Gare de Lyon
- Gare de Bercy
- Gare d'Austerlitz
- Gare Montparnasse
- Gare Saint-Lazare

For more information about how to get to Paris by train please visit http://en.parisinfo.com/paris-map/arrivals-departures/by-train/guide/by-train_your-arrival-by-train.

BY CAR

Depending on from where you come in, you can join the "Périphérique" (ring road) at one of its 30 "portes" (gateways). Paris has two ring roads the "périphérique extérieur" (outer ring road) and the "périphérique intérieur" (inner ring road).

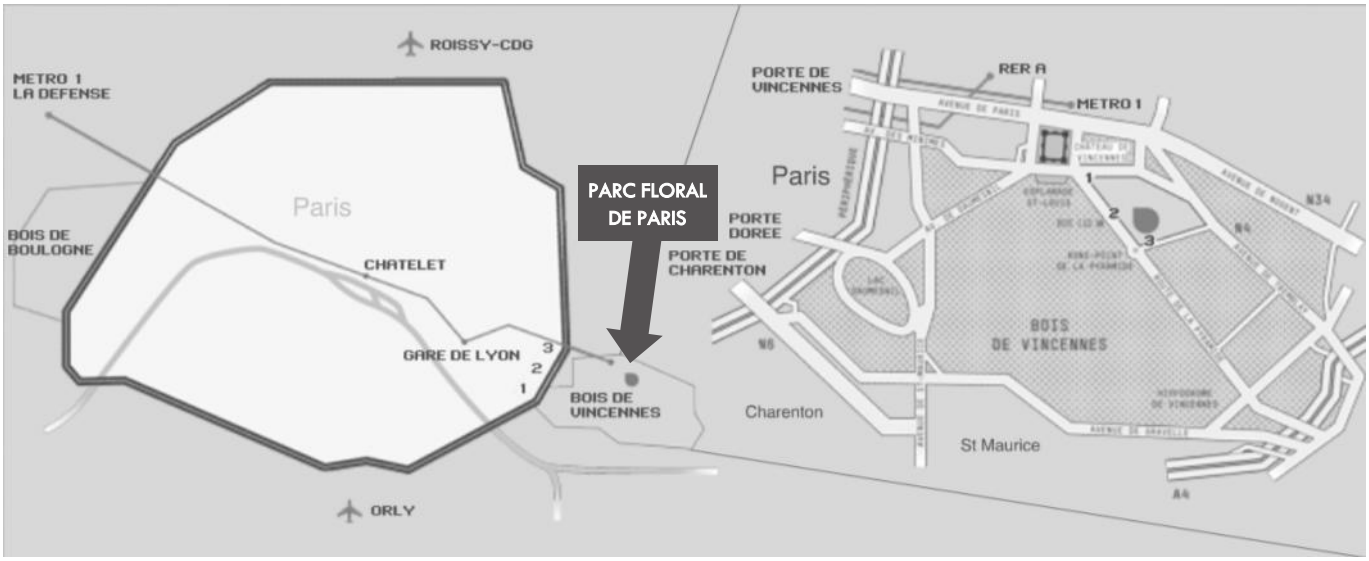
For more information about how to get to Paris by car and about the French motorway system and tolls please visit http://en.parisinfo.com/paris-map/arrivals-departures/by-car/guide/by-car_motorway-system-and-tolls.

THE VENUE: PARC FLORAL DE PARIS

EOSAM 2010 will be held at Parc Floral de Paris (www.parcfloraldeparis.com) - a unique setting where the bustle of Paris meets the wonders of nature. Parc Floral de Paris is situated in the heart of the Bois de Vincennes, where legend has it Saint-Louis meted out justice from beneath his oak tree. The castle, its dungeon and ramparts bear witness to over ten centuries of history. Parc Floral is only 20 minutes from the city centre.

Parc Floral de Paris
Esplanade du Château de Vincennes
"Pyramide" Entrance
Route de la Pyramide
75012 PARIS

There is **a free car park** close to the venue.



GETTING THERE

On foot, by car, bicycle, bus or subway...accessibility is one of the great features of Parc Floral de Paris. The event centre provides you with everything you need (shuttles, free visitor parking....).

From the airport

From Charles de Gaulle Airport:

- Take RER Line B, direction "Massy-Palaiseau", and exit at „Châtelet Les Halles".
- At „Châtelet Les Halles" change to Metro Line 1, direction „Château de Vincennes" and exit at „Château de Vincennes".
- Duration: ~ 1 hour.

From Orly Airport:

- Take the Metro Line „Orly Val", direction „Antony", and exit at „Antony".
- At „Antony" change to RER B, direction „Aeroport Charles de Gaulle 2 TGV", and exit at „Châtelet Les Halles".
- At „Châtelet Les Halles" you may either
  - change to RER A, direction „Boissy-Saint-Leger", and exit at „Nation" and there change to Metro Line 1 direction „Château de Vincennes" and exit at „Château de Vincennes".
  - or you walk to „Châtelet" (4 min.) and take the Metro Line 1, direction „Château de Vincennes" and exit at „Château de Vincennes".
- Duration: ~ 1 hour.

For more information about ground transport between Paris and the airports, see

- www.conciergerie.com - Practical information - Arriving in Paris / Departing Paris

Public transport

Parc Floral de Paris is easy to reach by the RER, Metro and bus lines. Paris public transport is operated by the RATP and includes the metro subway system, RER trains, busses, night busses, Montmartre bus, and the Montmartre funicular railway, all of which accept the same tickets and passes (except see RER Trains). You can purchase individual tickets, booklets of ten tickets, or Paris Visite passes (www.conciergerie.com/paris_metro_pass.htm) designed expressly for visitors and offering unlimited travel.

- RER Line A, station "Vincennes"
- RER Line B to station "Châtelet Les Halles", change to Metro line 1 station "Château de Vincennes"
- Metro: Line 1, station "Château de Vincennes"
- Bus Line 112 stop "Stade Leo Lagrange"

For public transport timetables and itineraries please see: www.ratp.fr.

Taxis

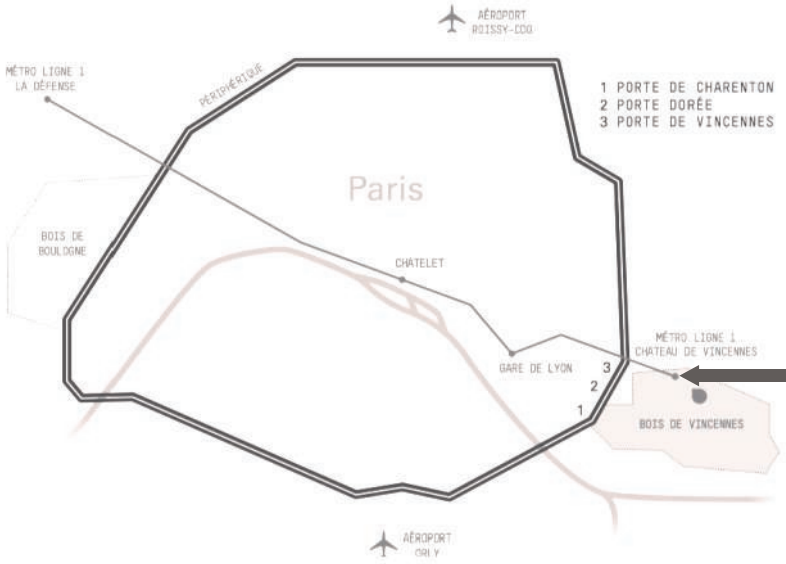
- G7: +33 (0) 147 3947 39
- Taxis bleus: +33 (0) 149 36 1010
- Borne Taxis Vincennes: +33 (0) 148 08 0000

Getting there by car

- 5 minutes from the Peripherique (Porte Dorée/Vincennes/de Charenton)
- 5 minutes from the A4 motorway, Joinville exit

BUS SHUTTLE SERVICE

A shuttle service from the metro station "Chateau de Vincennes" to Parc Floral is arranged.



The shuttle busses wait at the **"Chateau de Vincennes" metro station exit** and depart every 8-10 minutes between:

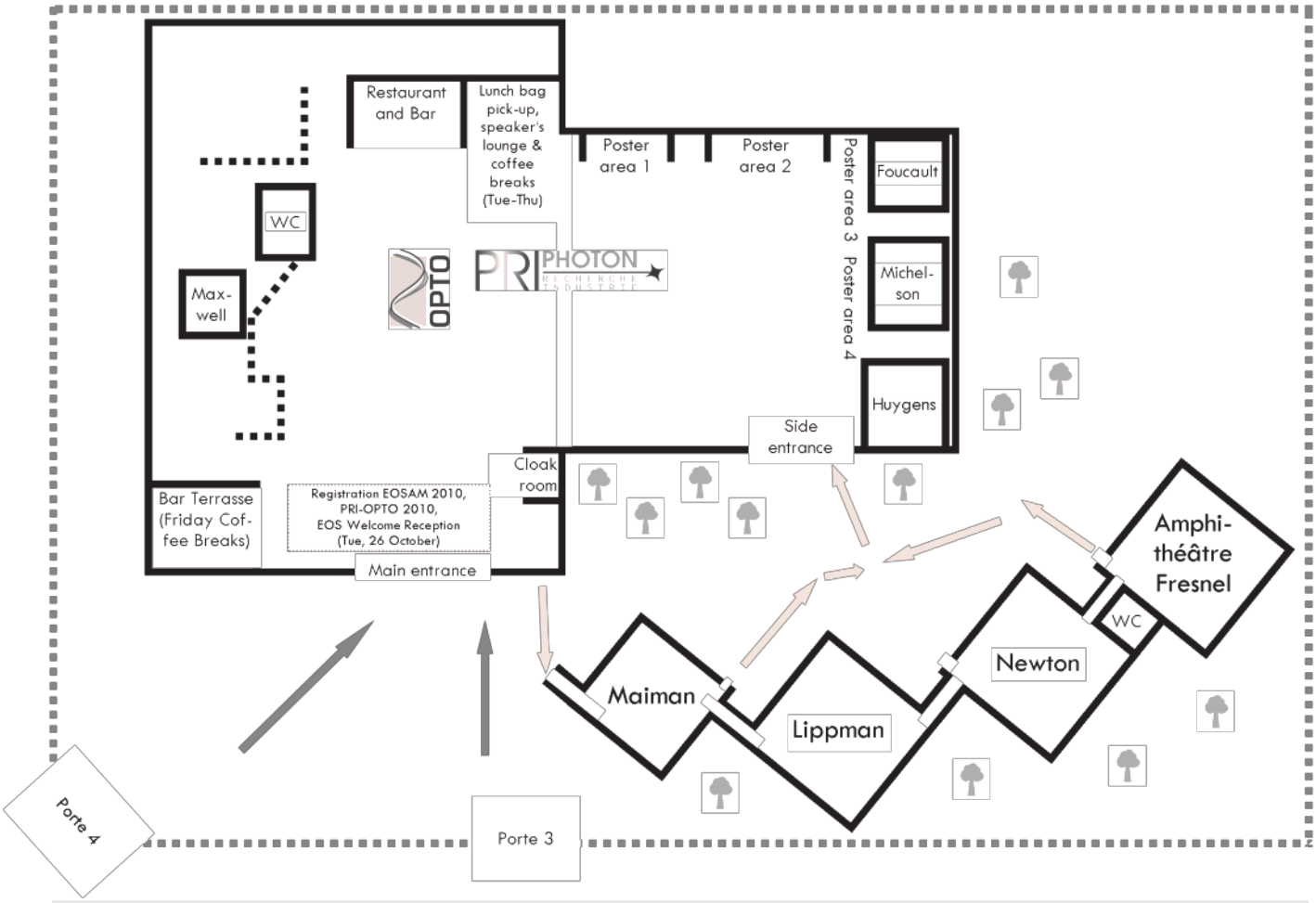
- 7:30 – 12:00
- 16:00 – 20:00

For public transport timetables and itineraries please see: www.ratp.fr

Metro station "Chateau de Vincennes"

Notes

HALL PLAN



- **TOM 1: BIOPHOTONICS - ADVANCED TRAPPING AND OPTOFLUIDICS IN LIFE SCIENCES**
  26 & 27 October: Maiman
  28 October: Lippmann
- **TOM 2: TERAHERTZ SCIENCE AND TECHNOLOGY**
  26 - 29 October: Michelson
- **TOM 3: NANOPHOTONICS AND METAMATERIALS**
  26 - 29 October: Foucault
- **TOM 4: MICRO-OPTICS**
  26 - 29 October: Newton
- **TOM 5: ORGANIC PHOTONICS**
  26 - 28 October: Huygens
- **TOM 6: NONLINEAR OPTICS AND PHOTONICS**
  26 - 29 October: Amphithéâtre Fresnel
- **TOM 7: ICO/EOS TOM ON OPTICS & ENERGY**
  28 - 29 October: Maiman
- **WORKSHOP ON ENTREPRENEURSHIP AND BUSINESS INNOVATION IN PHD EDUCATION**
  29 October: Lippmann

- **PLENARY SESSIONS**
  26 - 29 October: Amphithéâtre Fresnel
- **JOINT POST-DEADLINE SESSION**
  28 October: Amphithéâtre Fresnel
- **GRAND CHALLENGES OF PHOTONICS**
  27 October: Amphithéâtre Fresnel

Notes:

FOREWORD BY THE GENERAL CHAIR

Dear attendees of EOSAM 2010,

Welcome to the Scientific Annual Meeting of the EOS in Paris! The third edition of this bi-annual event is again a great opportunity to meet and exchange information with your colleagues from the optics and photonics community. EOSAM 2010 will be held alongside PRI PHOTON Research Industry, the annual event on photonics issues and challenges taking place in France, and OPTO, a trade show of international stature.

Large international conferences in a big city are often held in a business-oriented impersonal environment. This time, we can offer you not only outstanding presentations, but also a great location. Parc Floral de Paris is situated in the heart of the Bois de Vincennes, and is world-renowned for its exceptional floral collections of over 3,000 plants. It is a privileged environment for discovery and heavenly promenades, not only for scientists thinking about green photonics.

EOSAM 2010 is organised in seven topical meetings (TOM 1 – 7), giving a broad overview of contemporary optics and photonics, from basic phenomena to highly innovative applied research: *Biophotonics – Advanced Trapping and Optofluidics in Life Sciences; Terahertz Science and Technology; Nanophotonics and Metamaterials; Micro-Optics; Organic Photonics; Nonlinear Optics and Photonics* and *Optics and Energy,* a Topical Meeting organised in collaboration between EOS and ICO – the International Commission for Optics. Also, be sure to attend the Workshop on *Entrepreneurship and Business Innovation in PhD Education* and as a dessert the *Grand Challenges of Photonics*.

EOSAM 2010 will be opened by the Head of the Photonics Unit of the European Commission, Thomas Skordas, who will illustrate the prospects and potentials of Photonics in Europe. The seven plenary speakers will offer an overview of the latest developments and trends in the fields addressed by all topical meetings. Nonlinear optics, resonance phenomena, the interaction of photons with electrons, terahertz dynamics and optofluidics as systems concept, will be addressed. Promising titles, such as "Is this the beginning of a new age in green photonics" invite to join the future. The plenary talks start late in the morning, giving late risers a chance to attend the highlights.

For the second time, EOS will dedicate a special session to the *Grand Challenges of Photonics,* focusing on the fantastic capabilities of photonics and the science of light. I don't want to say more about it here. Discover, learn and enjoy!

To conclude, I would like to express my gratitude to the Chairs of all topical meetings and workshops, who have worked really hard to prepare a stimulating scientific program, and to the EOS Office, that has taken care of all the organisational work.

I look forward to welcoming you in Paris, and I wish you a fruitful and exciting EOS Annual Meeting.

Hans Peter Herzig
General Chair EOS Annual Meeting 2010
EOS President, CH

ORGANISING COMMITTEE

Hervé Lefèvre
Vice-Chair EOSAM 2010,
EOS President Elect, FR

Silke Kramprich
European Optical
Society (EOS), DE

Judith Oumard
European Optical
Society (EOS), DE

TOM 1: Biophotonics - Advanced Trapping and Optofluidics in Life Sciences

26-28 October 2010

As we approach the fiftieth anniversary of the laser, we find seminal applications of photonics at the microscale making an ever growing impact. Light may exert forces on biological material. This field of optical trapping or micromanipulation enhances our fundamental knowledge across the sciences, highlighting our understanding of (nano-scale) molecular motors, unravelling the mechanics of DNA and cells, and making a great impact on studies of soft condensed matter and hydrodynamic interactions. Biological studies of single molecules have been revolutionised and new applications continue to appear: for example optical trapping combined with imaging (e.g., Raman) or other photonics technologies (e.g. nanosurgery) enhancing the ever growing "optical toolkit". In the broader remit integrating optical methodologies with microfluidics is a current 'hot' topic in the field and indeed may be seen part of the exciting emergent area of optofluidics which combines microfluidics and photonics with particular emphasis on biological applications. Microfluidics is ideal for controlled sample delivery and advanced photonics for sensing or imaging thus leading to real innovation in analysis and future potential for integration. Such methodologies are highly reconfigurable offering advantages for manipulating, imaging, treating and handling of biological and colloidal samples.

Biophotonics - Advanced Trapping and Optofluidics in Life Sciences aims at exploring the exciting marriage of optical techniques and microfluidics with an emphasis upon the topics of optofluidics and optical trapping.

Plenary speaker

Optofluidics
Demetri Psaltis
École Polytechnique Fédérale de Lausanne - EPFL, CH

Invited speakers

Femtosecond laser surgery on a chip for nerve regeneration
Adela Ben-Yakar
University of Texas at Austin, US

Laser-based nanotechnologies for biomedical applications
Boris Chichkov
Laser Zentrum Hannover e.V., DE

Optical tools and techniques for studying behavior and neuronal regeneration in the roundworm C. elegans
Samuel Chung
Boston University, US

Wide field supercritical angle fluorescence microscopy
Emmanuel Fort
University Paris Diderot, FR

Plasmon nano-optics for biosciences: sensing, trapping and hyperthermia
Roman Quidant
Institute of Photonics Sciences - ICFO, ES

Optical integration for microfluidic systems
James Wilkinson
University of Southampton, UK

Chairs

Gert von Bally
Westfälische Wilhelms-Universität Münster, DE

Kishan Dholakia
University of St. Andrews, UK

Roberta Ramponi
Politecnico Di Milano, IT

Programme committee

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Cornell University, US
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Monika Ritsch-Marte
Medical University of Innsbruck, AT
Halina Rubinsztein-Dunlop
University of Queensland, AU
Antonio Sasso
University of Naples Federico II, IT
Holger Schmidt
University of California, US
Changhuei Yang
California Institute of Technology - Caltech, US
Pavel Zemánek
Academy of Sciences of the Czech Republic, CZ

Sessions

- Microfluidic devices and systems
- Nano-optics and biosensing
- Optical trapping for biosensing
- Optical nanosurgery and cell micromanipulation
- Micro- and nanotechnologies for biomedical applications
- Perspectives on biophysical dynamics, kinetics and imaging
- Advanced and optimized photonics technology

TOM 2: Terahertz Science and Technology

26-29 October 2010

The field of THz Science and Technology is growing at a tremendous speed, as evidenced by the exponentially increasing number of publications in this field and by the strongly increasing number of patents and applications.

This topical meeting provides a platform on which the latest results in the generation, detection and use of THz radiation in science and technology can be presented and discussed. The meeting is for senior scientists and (under)graduate students alike. There will be two 45 minute-long Masterclasses, especially aimed at the undergraduate/graduate student level.

Plenary speaker

Terahertz Dynamics of Condensed Matter: from the quantum limit to ultrahigh fields
Alfred Leitenstorfer
University of Konstanz, DE

Master class speakers

Terahertz metamaterials: recent developments and new opportunities
Richard Averitt
Boston University, US

THz imaging systems
Hartmut Roskos
Johann Wolfgang Goethe-University, DE

Invited speakers

Terahertz measurements of the peptide dynamical transistion
Andrea Markelz
State University of New York at Buffalo, US

300-GHz-band wireless link based on photonic signal generation
Tadao Nagatsuma
Osaka University, JP

THz systems based on 1.55 µm telecom technologies
Bernd Sartorius
Fraunhofer Institute for Telecommunications - Heinrich-Hertz-Institute, DE

Quantum cascade laser based terahertz amplifiers
Jerome Tignon
Ecole Normale Superieure, FR

Chairs

Peter Uhd Jepsen
Technical University of Denmark, DK

Martin Koch
Philipps-Universitaet Marburg, DE

Programme committee

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Kyoto University, JP
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Scuola Normale Superiore (SNS), IT
Karl Unterrainer
Technische Universität Wien, AT
Markus Walther
University of Freiburg, DE
Xi-Cheng Zhang
Rensselaer Polytechnic Institute, US

Sessions

- THz metamaterials
- THz generation and modulation
- THz imaging I - near and far-field imaging
- THz quantum cascade lasers
- THz imaging II - far-field imaging
- THz spectroscopy of organic and biological material
- THz spectroscopy techniques and tools
- THz solid-state spectroscopy
- THz systems and facilities

TOM 3: Nanophotonics and Metamaterials

26-29 October 2010

Both nanophotonics and metamaterials rely on our understanding of light-matter interaction on the nanoscale. Recent developments in this broad field are based on nanostructured dielectrics, semiconductors and metals and lead to applications and devices in which electromagnetic field can be generated, manipulated and controlled in sub-wavelength structures. Nanophotonics and metamaterials pave the way to many novel applications in various technological areas spanning from biosensing and high-resolution imaging to datacomm and energy harvesting.

This topical meeting will cover all experimental and theoretical aspects of light interaction with nanoscale objects and nanostructured materials, new optical properties of nanostructured matter and their applications.

Plenary speaker

Trends in nanoplasmonics: smaller, faster, stronger
Mark I. Stockman
Georgia State University, US

Invited speakers

Nanoplasmonic enhancement of light–matter interaction
Sergey Gaponenko
National Academy of Sciences of Belarus, BY

High-resolution optical microscopy of nanotubes and nanowires
Achim Hartschuh
Ludwig-Maximilians-Universität München, DE

Nanoscale light control
Kobus Kuipers
FOM Institute for Atomic and Molecular Physics (AMOLF), NL

Photonic crystal nanobeam cavities
Marko Lončar
Harvard University, US

Amorphous metamaterials
Carsten Rockstuhl
Friedrich-Schiller-Universität Jena, DE

Theory and plasmons: going beyond conventional classical electrodynamics
George Schatz
Northwestern University, US

Chairs

Concita Sibilia
Università di Roma "La Sapienza", IT

Anatoly V. Zayats
The Queen's University of Belfast, UK

Programme committee

Mario Bertolotti
Università di Roma "La Sapienza", IT
Peter Bienstman
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Alexandre Bouhelier
Université de Bourgogne, FR
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University of Stuttgart, DE
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Institut d'Optique, FR
Cefe López
Consejo Superior de Investigaciones Científicas (CSIC), ES
Stefan Maier
Imperial College London, UK
Fabrice Raineri
CNRS - LPN, FR

Sessions

- Metamaterials
- Theory and modelling
- Gratings for nanophotonics
- Photonic cavities
- Nano-antennas
- Subwavelength waveguiding
- Nanoparticles
- Plasmonics
- High-resolution imaging

TOM 4: Micro-Optics

26-29 October 2010

This topical meeting is intended to provide an international forum for an update, review and exchange of scientific and technical breakthroughs and information covering a wide range of topics within the field of micro-optics, from fundamental theory and research to applications and systems.

Plenary speaker

Resonance waveguide gratings
Markku Kuittinen
University of Eastern Finland, FI

Invited speakers

Laser beam shaping by active GRIN media
Teresa Flores-Arias
University of Santiago de Compostela, ES

Real-time non-invasive identification of micro/nano organisms using 3D computational imaging
Bahram Javidi
University of Connecticut, US

Optical coherence tomography in medicine and art conservation
Andrzej Kowalczyk
Nicolaus Copernicus University, PL

Optimal fabrication techniques for digital micro-optics
Bernard Kress
USI Inc., Photonics Division, US

Micro-optical sources for quantum communication in space
Valerio Pruneri
Institut de Ciències Fotòniques - ICFO, ES

Micro-optics system and SPAD array detectors for parallel photon timing applications
Ivan Rech
Politecnico di Milano, IT

Micro-optics: Key Enabling Technology (KET) for advanced mask aligner lithography
Reinhard Voelkel
SUSS MicroOptics, CH

Polarisation sensitive nanostructured micro-optics
Andrew John Waddie
Heriot-Watt University, UK

Photonic metamaterials
Martin Wegener
Karlsruhe Institute of Technology, DE

Chairs

Mohammad R. Taghizadeh
Heriot-Watt University, UK

Norbert Lindlein
University of Erlangen-Nürnberg, DE

Programme committee

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University of Warsaw, PL
Carlos Gómez-Reino Carnota
Universidad de Santiago de Compostela, ES
Zbigniew Jaroszewicz
Institute of Applied Optics, PL
Lifeng Li
Tsinghua University, CN
Fredrik Nikolajeff
Uppsala University, SE
Heidi Ottevaere
Vrije Universiteit Brussel - VUB, BE
Olivier Parriaux
Université de Saint Etienne - Jean Monnet, FR
Stefano Pelli
Istituto di Fisica Applicata (IFAC-CNR), IT
Stefan Sinzinger
Technische Universität Ilmenau, DE
Hans Zappe
University of Freiburg, DE
Uwe D. Zeitner
Fraunhofer Institute for Applied Optics and Precision Engineering, DE

Sessions

- Diffractive and holographic structures
- Sub-wavelength and polarization sensitive micro-optics
- Fabrication methods
- Micro-optics for fabrication, measurement and interferometry I
- Micro-optics for fabrication, measurement and interferometry II
- Biological applications
- Active micro-optics & lasers
- Simulation and theory
- Gradient index and guided optics

TOM 5: Organic Photonics

26-28 October 2010

Organic semiconductors are a broad class of materials comprising small molecules, conjugated polymers and carbon based nanostructures (e.g. carbon nanotubes), which can play a role in photonics. They all have in common p-electron delocalization, in low dimensional space, which yields a number of interesting properties for photonics such as large optical cross-sections and short response time, large nonlinear optical responses, energy and charge transport together with mechanical qualities (film formation, deposition, high damage threshold, low cost technology). In addition the interaction of organic with inorganic semiconductors leads to new and promising functions which appear in hybrid systems and devices.

TOM 5 aims at providing a state-of-art review on organic and hybrid photonics, incl. its fundamentals, potentiality and applications. The program format allows for open discussion among participants and fruitful exchange of experience.

Plenary speaker

Molecular control for organic photonics
Donal D.C. Bradley
Imperial College London, UK

Invited speakers

A targeted review of hybrid integrated photonics
Bruno Bêche
Université de Rennes I, FR

High-speed signal processing with silicon-organic hybrid devices
Wolfgang Freude
Karlsruhe Institute of Technology (KIT), DE

FRET optoelectronics
Pavlos Lagoudakis
University of Southampton, UK

Insights on diffraction by a dielectric wedge from polymer-based micro-lasers
Melanie Lebental
ENS de Cachan, FR

Photogeneration and ultrafast dynamics of excitons and charges in polymer/fullerene/quantum dot blend films
Laurens D. A. Siebbeles
Delft University of Technology, NL

Fabrication of active and functional organic photonic crystal templates using holographic lithography
Kam Sing Wong
The Hong Kong University of Science and Technology, CN

Chairs

Guglielmo Lanzani
Politecnico Di Milano, IT

David G. Lidzey
University of Sheffield, UK

Programme committee

Donal D.C. Bradley
Imperial College London, UK
Juan Cabanillas Gonzalez
IMDEA Nanociencia, ES
Franco Cacialli
University College London, UK
Karl Leo
Technische Universität Dresden, DE
Jorge Morgado
Instituto Superior Técnico, PT
Jenny Nelson
Imperial College London, UK
Sigurd Schrader
University of Applied Sciences Wildau, DE
Tersilla Virgili
Politecnico Di Milano, IT
Joseph Zyss
ENS de Cachan, FR

Sessions

- Hybrid electronics
- Organic photonics
- Spectroscopy, photonics and hybrid materials
- Organic lasing and optical amplification
- Organic photovoltaic: materials and devices
- Organic photovoltaics and spectroscoy of related materials
- High-speed signal processing and ultrafast phenomena

TOM 6: Nonlinear Optics and Photonics

26-29 October 2010

The Topical Meeting on Nonlinear Optics and Photonics will address both the fundamentals and applications of modern nonlinear optics from a broad range of viewpoints, including several presentations on spatial and spatiotemporal dynamics, nonlinear pulse propagation, nano- and microstructured materials, novel nonlinear sources, as well as nonlinear microscopy and spectroscopy.

The program will consist of a plenary talk, seven invited talks, around 40 contributed talks, and 34 posters. We are very pleased to have as the plenary speaker Prof. Yuen-Ron Shen (University of California, Berkeley), one of the pioneers of the whole field of nonlinear optics, who will review the history and present state-of-the-art of nonlinear optics. Invited talks highlight several recent milestone contributions to the field, including plasmonic high-harmonic generation, nematicons, rogue waves and pulse self-compression in supercontinua, light-induced transverse magnetism, and the rapidly developing field of silicon waveguide optics, featuring comb generation with cw sources as well as solitonic supermodes, Finally, contributed talks provide a broad overview of the current development, ranging from chaos, nonlinear dynamics, nano- and microstructures, and quantum effects to applications in biology, imaging, and for pulse generation.

We look forward to meeting you in Paris. Martti Kauranen and Günter Steinmeyer

Plenary speaker

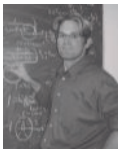
Historical perspective of nonlinear optics
Yuen-Ron Shen
University of California - Berkeley, US

Invited speakers

Nematicons: self-steering self-confined light beams in liquid crystals
Gaetano Assanto
Università di Roma Tre, IT

Solitonic supermodes and resonant radiation in subwavelength silicon-on-insulator
Andrey Gorbach
University of Bath, Department of Physics, UK

High harmonic generation by plasmonic resonance field enhancement
Seungchul Kim
KAIST Institute of Science and Technology, KR



Octave-spanning tunable frequency combs on a chip
Tobias Kippenberg
Max Planck Institute of Quantum Optics, DE

Intense coherent transverse magnetism induced by light - experiments and theory
Steve Rand
University of Michigan, US

Self-compression of ultrashort laser pulses
Stefan Skupin
Max Planck Institute for the Physics of Complex Systems, DE

Optical rogue waves: extreme events in supercontinuum generation
Daniel Solli
University of California - UCLA, US

Chairs

Martti Kauranen
Tampere University of Technology, FI

Günter Steinmeyer
Max Born Institut, DE

Programme committee

Jennifer Herek
University of Twente, NL
Malgosia Kaczmarek
University of Southampton, UK
Olga Kosareva
Moscow State University, RU
Wieslaw Krolikowski
Australian National University, AU
Fedor Mitschke
Rostock University, DE
Markus Raschke
University of Washington, US
Marc Sciamanna
SUPELEC, FR
Dmitry Skryabin
University of Bath, UK

Sessions

- Temporal effects
- Nanostructured materials
- Fundamentals
- Compression and filamentation
- Spatial and spatiotemporal effects
- Biological applications and imaging
- Nonlinear lattices and waveguides
- Parametric sources and effects
- Coherent effects, quantum effects, and chaos

TOM 7: ICO/EOS TOM on Optics & Energy

28-29 October 2010

The 21st century is the century of photonics and of the revolution triggered by energy resources. Sustainable technologies based upon optics and photonics picture a challenging future. These new technologies, adequately located inside devices for energy production, involve fundamental aspects of physics such as interaction of matter with radiation, with particular emphasis on photon optics, physical properties of materials in the optical band, the physics of semiconductors and new photo-materials, among other relevant subjects. Those fundamental issues concern basic physical processes such as the photovoltaic effect, currently revisited for new flexible designs and devices. The related new emerging technologies contemplate topics such as silicon photonics, structures for the harvesting of light, solar energy, design and fabrication of optical elements with high optical performances, such as photovoltaic concentrators. This is indeed a short sketch of the vast field involving optics and energy, covered in the core lectures of the forum.

There is in addition another interpretation of the subjects mentioned. Global economy is facing as well a period of challenges and scientists are urged to provide answers and initiatives by facilita-ting the feasibility of a wide dissemination of new sustainable energy transfer of technology. In this challenge, no restrictions apply, and both developed and developing societies may share the new future assuring a better quality of life.

The International Commission for Optics has as main objective the support for the dissemination of optics and photonics all over the world. This new venture with the European Optical Society, as one part of the international societies partners inside ICO, will offer, for the first time, a forum addressed to scientists, young researchers, technicians, and in general, to all those interested in this new field of current impact and strong development.

TOM 7 is organised in cooperation with the International Commission for Optics (ICO) and is sponsored by the International Union of Pure and Applied Physics (IUPAP).

Plenary speaker

Is this the beginning of a new age in green photonics?
Michael Lebby
Translucent Inc., US

Invited speakers

Subwavelength photonics: A new waveguide principle for highly efficient planar waveguide components
Pavel Cheben
National Research Council of Canada, CA

Rare earth doped glasses as down-converters to improve Si-based solar cell efficiency
Maurizio Ferrari
CNR-IFN, Istituto di Fotonica e Nanotecnologie, IT

Increased performance of thin film silicon photovoltaic modules through optical confinement strategies
Marta Fonrodona
T-Solar, Barcelona, ES

Ultrafast all-optical signal processing how and why?
Ivan Glesk
University of Strathclyde, Scotland, UK

Improved photovoltaic performances of heterostructured tetrapod-shaped CdSe/CdTe nanocrystals using C60
Giuseppe Gigli
University of Salento, NNL, IT

Technology drivers for an acceleration of PV development
Jean-Pierre Joly
Institut National de l'Energie Solaire, FR

Novel nonimaging designs of compact optics with the SMS method
Juan Carlos Miñano
Universidad Politécnica de Madrid (UPM), ES

Chairs

Maria L. Calvo
ICO President, ES

Duncan T. Moore
ICO Elected Vice-President, Chair of the ICO Committee for Regional Development, US

Programme committee

Pavel Cheben
National Research Council Canada, CA
Anna Consortini
University of Florence, IT
Miltcho Danailov
Sincrotrone-Trieste, IT
Marta de la Fuente
Indra Sistemas S.A., ES
Ivan Glesk
University of Strathclyde, UK
Michael Graetzel
École Polytechnique de Lausanne - EPFL, CH
Angela M. Guzman
Florida Atlantic University, US
Jean-Pierre Huignard
Consultant in Photonics, FR
Michael Lebby
Translucent Inc., US
Humberto Michinel Álvarez
Universidade de Vigo, ES

Sessions

- Photonics for solar energy
- New advanced photovoltaic devices
- Optical design and processing for photovoltaic concentrators
- Novel technologies for high performance solar concentrators

Workshop on Entrepreneurship and Business Innovation in PhD Education

29 October 2010

The main focus of PhD study is scholarly research. The endpoint is a Thesis that describes original research, showing some degree of innovation and/or a critical analysis of a particular research topic. According to the formalities of the Bologna agreement, PhD study is a three-year activity, although through Europe the actual time taken to reach the required level is almost always longer (probably closer to 3.5 to 4 years).

Against this background, there are pressures on PhD course organisers and supervisors to provide additional professional education as an integrated part of the PhD. One topic that is particularly prominent at present is the desire to instil a sense of entrepreneurship and business innovation into the PhD.

This Workshop focuses on the issues involved in integrating ideas of entrepreneurship and business innovation into PhDs in optics and photonics.

Chairs

Pierre Chavel
Institut d'Optique, FR

Christopher Dainty
National University of Ireland, IE

Hugues Giovannini
Institut Fresnel, FR

Keynote speaker

Entrepreneurship for scientists and engineers
Duncan Moore
University of Rochester, US

Invited speakers

Involving doctoral students in the innovation-entrepreneurship study track at Institut d'Optique
Frédéric Capmas
Insitut d'Optique, FR

Embedded business development in academic photonics research
Danae Delbeke
Ghent University, BE

Introductory talk
Hervé Lefèvre
iXCore S.A.S., FR

From PhD to CEO?
Michel Mariton
Horiba Jobin Yvon, FR

Case study: creating and sustaining an entrepreneurial research environment at the applied optics group @ NUI Galway
Una Murphy
National University of Ireland, IE

Programme committee

Roel Baets
Epixnet C/O Ghent University - IMEC, BE
Silvia Carrasco
ICFO - The Institute of Photonic Sciences, ES
Hans-Jürgen Hartmann
OptecNet Deutschland, DE
Ajoy Kar
Heriot-Watt University, UK
Thomas Pertsch
Friedrich-Schiller-Universität Jena, DE
Malgorzata Kujawinska
Warsaw University of Technology, PL

GRAND CHALLENGES OF PHOTONICS

27 October 2010

Synopsis

For the second time, EOS will dedicate a special session to the "Grand Challenges of Photonics" focusing on the fantastic capabilities of photonics and the science of light.
Photonics is a true enabling technology that each one of us uses on a daily basis. For example, it brings us information over the internet, it provides new ways for energy production and lighting, it is used for treatments of diseases and it can create the warmest and the coldest place in the universe.

Grand Challenges of Photonics will give you the opportunity to hear from world-class speakers about technologies which are revolutionary, uncommon and not realizable to date, but can pave the way for a bright future in optics and photonics.

Grand Challenges of Photonics is held in the spirit of Albert Einstein saying:
"If we knew what it was we were doing, it would not be called research, would it?"

Invited speakers

Light in femtoseconds: the making of molecular movies with ultrashort lasers
Luis Bañares
Universidad Complutense de Madrid, ES

Inkjet printing in device and materials discovery
Ghassan Jabbour
University of Oulu, FI

Geometry and light
Ulf Leonhardt
University of St Andrews, Scotland, UK

Light trapping in thin-film solar cells
Albert Polman
FOM Institute AMOLF, NL

Chairs

Fredrik Laurell
KTH - Royal Institute of Technology, SE

Paul Urbach
University of Delft, NL

Tuesday, 26 October

9:45 - 10:30
TOM 6

Historical perspective of nonlinear optics

Yuen Ron Shen, Physics Department, University of California (US).

The birth of nonlinear optics that immediately followed the invention of laser 50 years ago has revolutionized the field of optics. Continual new discoveries in the field over the years have created great excitement and tremendous impact in many areas of science and technology. Presented here is a brief survey on the progress of nonlinear optics in the past as well as a projection into the future. [3380]

Wednesday, 27 October

11:15 - 12:00
TOM 3

Trends in nanoplasmonics: smaller, faster, stronger

Mark I. Stockman, Department of Physics and Astronomy, Georgia State University (US).

We consider latest developments in nanoplasmonics and its numerous applications. Nanoplasmonics deals with collective electron dynamics on the surface of metal nanostructures, which arises as a result of excitations called surface plasmons. The surface plasmons localize and concentrate optical energy in nanoscopic regions creating highly enhanced local optical fields. [3901]

12:00 - 12:45
TOM 5

Molecular control for organic photonics

Donal D.C. Bradley, Department of Physics and Centre for Plastic Electronics, Imperial College London (UK).

This talk will focus on the influence of molecular structure (chemical and physical) on the optical properties of organic semiconductor materials. In particular, I will discuss approaches to enhancing the potential of organic materials for application in photonics. Recent results will be presented from work addressing materials development for electrically pumped organic lasers, a metamaterials inspired approach to optical structure fabrication and the use of organic gain media for plasmonic amplifier structures. [3912]

Thursday, 28 October

11:00 - 11:45
TOM 4

Resonance waveguide gratings

Markku Kuittinen, Department of Physics and Mathematics, University of the Eastern Finland (FI).

Dielectric sub wavelength resonant waveguide gratings (RWGs) were designed and fabricated to act as reflectors. Furthermore, the usage of RWGs in enhancing of the second harmonic generation, the fluorescence signal and the Raman scattering was considered. [3395]

11:45 - 12:30
TOM 1

Optofluidics

Demetri Psaltis, Ecole Polytechnique Federale de Lausanne (EPFL) (CH).

Optofluidics refers to a class of adaptive optical circuits that integrate optical and fluidic devices. Familiar examples include liquid crystals and dye lasers. The introduction of liquids in the optical structure enables fine-tuning and reconfiguration of circuits so they can perform tasks optimally in a changing environment. We will discuss how the emergence of fluidic transport technologies at the micron and nanometer levels opens possibilities for novel adaptive optical devices. [3879]

Friday, 29 October

11:15 - 12:00
TOM 7

Is this the beginning of a new age in green photonics?

Michael Lebby, Translucent Inc. (US).

We may not have seen it, we may not have felt the impact, but green photonics has been quietly growing in our lives over the past decade. Engineers and scientists have always designed for efficiency in mind when they researched or built products. It is only in the recent few years, that our community has realized the bigger picture, and global impact of green photonics. Engineers and scientists will still strive for energy efficiency, cleaner solutions and improved health in their designs, except now, along with a larger percentage of the population, they focus more of their design in areas that impact beyond the actual product design itself. It is now a case of designing photonics for a greener world. Over the past half decade, the topic has become topical, political, and to some extent even cultural. [3360]

12:00 - 12:45
TOM 2

Terahertz dynamics of condensed matter: from the quantum limit to ultrahigh fields

Alfred Leitenstorfer, University of Konstanz, Department of Physics a. Center for Applied Photonics (DE).

Recent studies on ultrafast dynamics of solids and nanostructures using few-cycle multi-terahertz pulses are presented. Phase-locked excitation transients with peak amplitudes beyond 1 V/Å are combined with uncertainty-limited electro-optic detection, resulting in an advanced access to the quantum properties of both condensed matter and light fields. [3615]

TUESDAY, 26 OCTOBER

		Room
9:00 - 9:15	Welcome by the General Chair Hans Peter Herzig, EOS President (CH).	Amphithéâtre Fresnel
9:15 - 9:45	**OPENING TALK** Thomas Skordas, Head of the Photonics Unit of the European Commission (BE).	Amphithéâtre Fresnel
9:45 - 10:30	**PLENARY TALK** (TOM 6) **Historical perspective of nonlinear optics** Yuen Ron Shen, University of California (US).	Amphithéâtre Fresnel
10:30 - 11:00	*Coffee break (exhibition hall)*	
11:00 - 12:20	**TOM 4:** Diffractive and holographic structures	Newton
11:00 - 12:35	**TOM 1:** Microfluidic devices and systems **TOM 2:** Terahertz metamaterials **TOM 3:** Metamaterials **TOM 5:** Hybrid electronics **TOM 6:** Temporal effects	Maiman Michelson Foucault Huygens Amphithéâtre Fresnel
12:20 - 13:45/12:35 - 14:00	*Lunch break*	
13:45 - 16:00	**TOM 4:** Sub-wavelength and polarization sensitive micro-optics	Newton
14:00 - 16:00	**TOM 1:** Nano-optics and biosensing **TOM 2:** THz generation and modulation **TOM 3:** Theory and modelling **TOM 5:** Organic photonics **TOM 6:** Nanostructured materials	Maiman Michelson Foucault Huygens Amphithéâtre Fresnel
16:00 - 16:30	*Coffee break (exhibition hall)*	
16:30 - 18:00	**TOM 5:** Spectroscopy, photonics and hybrid materials	Huygens
16:30 - 18:15	**TOM 2:** THz imaging I - near and far-field imaging	Michelson
16:30 - 18:30	**TOM 1:** Optical trapping for biosensing **TOM 3:** Gratings for nanophotonics **TOM 4:** Fabrication methods **TOM 6:** Fundamentals	Maiman Foucault Newton Amphithéâtre Fresnel
18:30 - 20:30	Welcome reception Open to all attendees of EOSAM 2010.	Entrance area of PRI-OPTO

WEDNESDAY, 27 OCTOBER

		Room
8:45 - 10:45	**TOM 4:** Micro-optics for fabrication, measurement and interferometry I	Newton
9:00 - 10:45	**TOM 1:** Optical nanosurgery and cell micromanipulation **TOM 2:** THz quantum cascade lasers **TOM 3:** Photonic cavities **TOM 5:** Organic lasing and optical amplification **TOM 6:** Compression and filamentation	Maiman Michelson Foucault Huygens Amphithéâtre Fresnel
10:45 - 11:15	*Coffee break (exhibition hall)*	
11:15 - 12:00	**PLENARY TALK** (TOM 3) **Trends in nanoplasmonics: smaller, faster, stronger** Mark I. Stockman, Georgia State University (US).	Amphithéâtre Fresnel
12:00 - 12:45	**PLENARY TALK** (TOM 5) **Molecular control for organic photonics** Donal D.C. Bradley, Imperial College London (UK).	Amphithéâtre Fresnel
12:45 - 13:45	*Lunch break*	
13:45 - 15:15	POSTER SESSION I and EXHIBITION ONLY	Exhibition hall
15:15 - 17:35	Grand Challenges of Photonics	Amphithéâtre Fresnel
17:35 - 18:00	*Coffee break (exhibition hall)*	
18:00 - 20:00	EOS Annual General Meeting & EOS Prize and Fellows Ceremonies Open to all EOS members & attendees of EOSAM 2010.	Amphithéâtre Fresnel

THURSDAY, 28 OCTOBER

		Room
8:45 - 10:30	**TOM 7:** Photonics for solar energy	Maiman
9:00 - 10:30	**TOM 1:** Micro- and nanotechnologies for biomedical applications	Lippmann
	TOM 2: THz imaging II - far-field imaging	Michelson
	TOM 3: Nano-antennas	Foucault
	TOM 4: Micro-optics for fabrication, measurement and interferometry II	Newton
	TOM 5: Organic photovoltaic: materials and devices	Huygens
	TOM 6: Spatial and spatiotemporal effects	Amphithéâtre Fresnel
10:30 - 11:00	*Coffee break (exhibition hall)*	
11:00 - 11:45	**PLENARY TALK** (TOM 4) **Resonance waveguide gratings** Markku Kuittinen, Department of Physics and Mathematics, University of the Eastern Finland (FI).	Amphithéâtre Fresnel
11:45 - 12:30	**PLENARY TALK** (TOM 1) **Optofluidics** Demetri Psaltis, Ecole Polytechnique Federale de Lausanne (EPFL) (CH).	Amphithéâtre Fresnel
12:30 - 13:30	*Lunch break*	
13:30 - 15:00	POSTER SESSION II and EXHIBITION ONLY	exhibition hall
15:00 - 15:45	**TOM 1-7** JOINT Post-deadline session	Amphithéâtre Fresnel
16:00 - 16:45	**TOM 5:** Organic photovoltaics and spectroscoy of related materials	Huygens
16:00 - 17:00	**TOM 1:** Perspectives on biophysical dynamics, kinetics and imaging	Lippmann
	TOM 2: THz spectroscopy of organic and biological material	Michelson
	TOM 3: Subwavelength waveguiding	Foucault
	TOM 4: Biological applications	Newton
	TOM 6: Biological applications and imaging	Amphithéâtre Fresnel
	TOM 7: New advanced photovoltaic devices	Maiman
17:00 - 17:30	*Coffee break (Bar terrasse)*	
17:30 - 18:45	**TOM 2:** Terahertz spectroscopy techniques and tools	Michelson
	TOM 5: High-speed signal processing and ultra-fast phenomena	Huygens
	TOM 6: Nonlinear lattices and waveguides	Amphithéâtre Fresnel
17:30 - 19:00	**TOM 1:** Advanced and optimized photonics technology	Lippmann
	TOM 3: Nanoparticles	Foucault
17:30 - 19:30	**TOM 4:** Active micro-optics & lasers	Newton
17:30 - 19:45	**ICO Prize and Galileo Galilei Award Ceremonies**	Maiman

FRIDAY, 29 OCTOBER

		Room
9:00 - 10:45	**TOM 2:** THz solid-state spectroscopy	Michelson
	TOM 3: Plasmonics	Foucault
	TOM 4: Simulation and theory	Newton
	TOM 6: Parametric sources and effects	Amphithéâtre Fresnel
	TOM 7: Optical design and processing For photovoltaic concentrators	Maiman
9:00 - 10:40	**Workshop** on Entrepreneurship and business innovation in PhD education	Lippmann
10:45 - 11:15	*Coffee break (Bar terrasse)*	
11:15 - 12:00	**PLENARY TALK** (TOM 7) **Is this the beginning of a new age in green photonics?** Michael Lebby, Translucent Inc. (US).	Amphithéâtre Fresnel
12:00 - 12:45	**PLENARY TALK** (TOM 2) **Terahertz dynamics of condensed matter: from the quantum limit to ultrahigh fields** Alfred Leitenstorfer, University of Konstanz (DE).	Amphithéâtre Fresnel
12:45 - 13:45	*Lunch break*	
13:45 - 15:00	**TOM 2:** THz systems and facilities	Michelson
13:45 - 15:15	**TOM 6:** Coherent effects, quantum effects, and chaos	Amphithéâtre Fresnel
13:45 - 16:00	**TOM 4:** Gradient index and guided optics	Newton
13:45 - 16:15	**TOM 3:** High-resolution imaging	Foucault
	Workshop on entrepreneurship and business innovation in PhD education	Lippmann
13:45 - 16:30	**TOM 7:** Novel technologies for high performance solar concentrators	Maiman
Farewell		

Tuesday, 26 October

9:00 - 9:15 **Welcome by the General Chair of EOSAM 2010** **Room: Amphithéâtre Fresnel**

Hans Peter Herzig

EOS President, Ecole Polytechnique Fédérale de Lausanne - EPFL IMT OPT (CH).

9:15 - 9:45 **Opening Talk** **Room: Amphithéâtre Fresnel**

Thomas Skordas

Head of the Photonics Unit of the European Commission (BE).

Room: Maiman	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	**TOM 2**	**TOM 3**	**TOM 4**

10:30 - 11:00 coffee break (exhibition hall)

TOM 1

11:00 - 12:35
Microfluidic devices and systems
Session chair: G. von Bally
Westfälische Wilhelms-Universität Münster (DE)

11:00
Introduction

11:05 INVITED TALK
Optical Integration for microfluidic systems
J.S. Wilkinson, Optoelectronics Research Centre, University of Southampton (UK).
Integrated optical waveguides offer great potential for constructing sensors and sorters for integrated optofluidic devices in low-cost on-chip systems. Progress towards optical integration for bioanalysis will be discussed, with examples in key applications, and challenges and opportunities will be described. [3549]

TOM 2

11:00 - 12:35
Terahertz metamaterials
Session chair: P.U. Jepsen
Technical University of Denmark (DK)

11:00
Introduction

11:05 MASTER CLASS TALK
Terahertz metamaterials: recent developments and new opportunities
R.D. Averitt; Boston University, Dept. of Physics and Photonics Center (US).
This master class will introduce metamaterials including an overview of progress at terahertz frequencies during the past five years. Subsequently, specific results will be presented with an emphasis on active and reconfigurable metamaterials including a discussion of potential future research directions. [3288]

TOM 3

11:00 - 12:35
Metamaterials
Session chair: A. Zayats
The Queen's University of Belfast (UK)

11:00
Introduction

11:05 INVITED TALK
Amorphous metamaterials
C. Rockstuhl[1], C. Menzel[1], S. Mühlig[1], C. Helgert[2], B. Walther[2], A. Chipouline[2], C. Etrich[2], A. Cunningham[3], T. Bürgi[3], E.-B. Kley[2], T. Pertsch[2], F. Lederer[1]; [1]Institute of Condensed Matter Theory and Solid State Optics, Friedrich-Schiller-Universität Jena (DE), [2]Institute of Applied Physics, Friedrich-Schiller-Universität Jena (DE), [3]Institute for Physical Chemistry, Ruprecht-Karls-Universität Heidelberg (DE).
We review our recent activities on amorphous metamaterials consisting of strongly scattering unit cells that are aperiodically arranged. We distinguish between amor-phous metamaterials that can be fabricated by top-down or bottom-up approaches and show how they can solve some problems associated to periodic metamaterials. [3330]

TOM 4

11:00 - 12:20
Diffractive and holographic structures
Session chair: Z. Jaroszewicz
Institute of Applied Optics (PL)

11:00
Introduction

11:05 INVITED TALK
Real-time non-invasive identification of micro/nano organisms using 3D computational imaging
B. Javidi[1], A. Anand[1], D. Hak Shin[1], M. DaneshPanah[1], I. Moon[2]; [1]Department of Electrical and Computer Engineering, University of Connecticut (US), [2]School of Computer Engineering, Chosun University (KR).
We present an overview of our work on real time non invasive sensing and identification of living micro/nano organisms such as cells, bacteria, etc. using computational 3D imaging. Both digital holography and integral imaging sensing approaches are presented. [3116]

9:00 - 9:15 **Welcome by the General Chair of EOSAM 2010** **Room: Amphithéâtre Fresnel**

Hans Peter Herzig

EOS President, Ecole Polytechnique Fédérale de Lausanne - EPFL IMT OPT (CH).

9:15 - 9:45 **Opening Talk** **Room: Amphithéâtre Fresnel**

Thomas Skordas

Head of the Photonics Unit of the European Commission (BE).

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	**TOM 6**	**Notes**
	9:45 - 10:30 **PLENARY TALK** **Historical perspective of nonlinear optics** *Y. Ron Shen; Physics Department, University of California (US).* The birth of nonlinear optics that immediately followed the invention of laser 50 years ago has revolutionized the field of optics. Continual new discoveries in the field over the years have created great excitement and tremendous impact in many areas of science and technology. Presented here is a brief survey on the progress of nonlinear optics in the past as well as a projection into the future. [3380] **[Room: Amphithéâtre Fresnel]**	
10:30 - 11:00 coffee break (exhibition hall)		
11:00 - 12:35 **Hybrid electronics** **Session chair: K.S. Wong** The Hong Kong University of Science and Technology (CN)	11:00 - 12:35 **Temporal effects** **Session chair: S. Skupin** Max Planck Institute for the Physics of Complex Systems (DE)	
11:00 **Introduction**	11:00 **Introduction**	
11:05 **INVITED TALK** **FRET optoelectronics** *P.G. Lagoudakis, School of Physics and Astronomy, University of Southampton (UK).* We engineer Fluorescence Resonance Energy Transfer (FRET) into hybrid organic/inorganic and colloidal/epitaxial semiconductor nanostructures and utilise it as an efficient mechanism to couple these heterogeneous material systems leading to improved efficiencies both in photovoltaic solar and light emitting diode devices. [3626]	11:05 **INVITED TALK** **Optical rogue waves: extreme events in supercontinuum generation** *D.R. Solli[1], C. Ropers[1,2], B. Jalali[1]; [1]University of California Los Angeles, Department of Electrical Engineering (US), [2]Courant Research Center Nano-Spectroscopy and X-Ray Imaging, University of Göttingen (DE).* Optical rogue waves have been observed during spectral broadening. The method of experimentally detecting these rare events by their redshifted energy is discussed in different input power and noise regimes of supercontinuum generation. [3664]	

Room: Maiman	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	TOM 2	TOM 3	TOM 4
11:35 **Student presentation** **Liquid-core waveguide filter for pptofluidic biosensing** *P. Measor[1], B.S. Philips[2], A.R. Hawkins[2], H. Schmidt[1]; [1]University of California Santa Cruz, School of Engineering (US), [2]Brigham Young University, ECEn Department (US).* We report the implementation of on-chip spectral filtering for biosensing in optofluidic devices. A dedicated layer design for liquid-core waveguides results in fluidically reconfigurable filters with 30 dB rejection and more than 8-fold improvement in the signal-to-noise ratio of FRET measurements. [3308]		11:35 **Student presentation** **Novel metallo-dielectric nanostructures for plasmonic applications** *S. Beckett, W. Dickson, J. McPhillips, A. Murphy, C. McClatchey, S. Vilain, J.S. Bouillard, A.V. Zayats; Centre for Nanostructured Media, The Queen's University of Belfast (GB).* We investigated the plasmonic-like resonances in nanostructured metamaterials consisting of an array of aligned Au rods. Experimental results and modelling were compared and the properties of the plasmonic resonances were determined. [3502]	11:35 **Full parallax hologram synthesis-method and device** *J. Svoboda, P. Fiala, M. Škereň; Faculty of Nuclear Sciences and Physical Engineering, Department of Physical Electronics, Czech Technical University in Prague (CZ).* A full automatic device has been designed and manufactured to do a research in the field of synthetic holography. The device creates synthetic transmission master holograms, which are then copied into either rainbow holograms or reflection holograms. RGB channel mixing and other effects can be included. [3534]
11:50 **Student presentation** **Lab-on-a-Chip approach based on heterogeneous III-V/silicon photonic integrated circuits for bio-medical applications** *G. Roelkens, N. Hattasan, E. Ryckeboer, D. Delbeke, D. Van Thourhout, R. Baets, Ghent University/imec, Photonics Research Group (BE).* In this paper we present the use of ultra-compact low-cost heterogeneous III-V/silicon photonic integrated circuits for spectroscopic analysis in bio-medical applications. Hybrid III-V/silicon photodetectors and optically pumped light emitters are realized, operating in the near infrared and short-wave infrared wavelength range. [3382]	11:50 **Generation process of surface waves excited on a structured perfect conductor surface** *F. Miyamaru[1,2], M. Kamijyo[2], K. Takano[3], M. Hangyo[3], H. Miyazaki[4], M.W. Takeda[2]; [1]Department of Physics, Faculty of Science, Shinshu University (JP); [2]PRESTO, Japan Science and Technology Agency (JP); [3]Institute of Laser Engineering, Osaka University (JP); [4]Department of Applied Physics, Faculty of Engineering, Tohoku University (JP).* We investigate characteristics and generation process of surface waves excited on a structured perfect conductor surface in order to clarify the mechanism of resonant transmission in metal hole arrays made of the perfect conductor. [3606]	11:50 **Non specular phenomena on reflection from exotic multilayered structures** *R. Pollès[1,2], J. Benedicto[1,2], A. Moreau[1,2], M. Mihailovic[1,2], G. Granet[1,2]; [1]Clermont Université, Université Blaise Pascal (FR), [2]CNRS, UMR6602 (FR).* When a beam is reflected by a structure in which negative refraction occurs, it may undergo a giant negative lateral shift. That is a signature of negative refraction: we have simulated the behaviour of a beam propagating in a lefthanded slab and in a metallodielectric structure and in both cases giant negative lateral shift are obtained. [3281]	11:50 **Student presentation** **A novel approach for design, interpretation and fabrication of high efficient three-level grating** *M. Oliva, D. Michaelis, T. Benkenstein, J. Dunkel, T. Harzendorf, A. Matthes, U.D. Zeitner; Fraunhofer Institute for Applied Optics & Precision Engineering (DE).* Three level gratings in the resonance domain without shadowing losses based on an appropriate three-beam interference mechanism are designed and realized. A new technological approach allows for fabrication of homogeneous large area gratings without spurious artefacts and efficiencies of about 90%. [3529]
12:05 **Advances in fluorescent detection of molecules in an optofluidic chip** *C. Dongre[1], J. van Weerd[2], G.A.J. Besselink[3], R. Martinez Vazquez[4], R. Osellame[4], G. Cerullo[4], R. van Weeghel[2], H.H. v. d. Vlekkert[3], H.J.W.M. Hoekstra[1], M. Pollnau[1]; [1]Integrated Optical Microsystems group, MESA+ Institute for Nanotechnology, University of Twente (NL), [2]Zebra Bioscience BV (NL), [3]LioniX BV (NL), [4]Dipartimento di Fisica, Politecnico di Milano (IT).* We present recent progress in the field of sensing fluorescently labeled biomolecules, as separated by microchip capillary electrophoresis, being a method to improve the detection limit of the fluorescence signal by numerical post-processing and a way for parallel detection of differently labeled sets of molecules using encoded excitation. [3437]	12:05 **Student presentation** **Terahertz response of a metamaterial consisting of 3-D microcoils** *S. Waselikowski[1], K. Kratt[2], M. Walther[1]; [1]Freiburg Materials Research Center, University of Freiburg (DE); [2]Laboratory for Microactuators, Department of Microsystems Eng. IMTEK, University of Freiburg (DE).* In this paper we use terahertz time-domain spectroscopy and numerical simulations to investigate the response of a metamaterial consisting of subwavelength-sized 3-D micro coils fabricated by an automated wire bonding technique. We demonstrate that periodic arrays of the coils show a strong electromagnetic response, exhibiting characteristic resonances in their far-field transmission spectrum. [3582]	12:05 **Optical forces on cloaked Rayleigh particles** *S. Tricarico, F. Bilotti, L. Vegni; Applied Electronics Department, University Roma Tre (IT).* In this contribution, we investigate the behavior of optical forces acting on nanoparticles covered by metamaterial cloaking covers based on the scattering cancellation technique. We show here, how it is possible to govern such forces by a proper design of the cloaking cover. [3562]	12:05 **Student presentation** **High capacity Lippmann storage in a page-oriented architecture** *K. Contreras, G. Pauliat; Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Université Paris Sud (FR).* We present a new data storage system based on Lippmann photography. We have implemented a wavelength-multiplexed memory using a page-oriented configuration and we have validated our previous theoretical approach where we demonstrated that data capacities of the order of TeraOctets should be achievable. [3423]

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	**TOM 6**	**Notes**

11:35
Ultrafast excitation energy transfer in small semiconducting carbon nanotube aggregates
L. Luer[1,2], J. Crochet[3,4], T. Hertel[3], G. Cerullo[5], G. Lanzani[6]; [1]Politecnico di Milano, CNR/INFM-ULTRAS (IT); [2]Madrid Institute of Advanced Studies, IMDEA Nanociencia (ES); [3]Universität Würzburg, Institut für Physikalische und Theoretische Chemie (DE); [4]Los Alamos National Laboratory, Center for Integrated Nanotechnologies (US); [5]Politecnico di Milano, Dipartimento di Fisica (IT); [6]Center for Nanoscience and Technology of IIT @ POLIMI (IT).
We present a time-domain study of the transfer of excitonic population between carbon nanotubes in small hexagonal aggregates. Using pump-probe spectroscopy with 20 fs pump and probe pulses, tuned to the first excitonic transition of the (6,5) CNT, we observe transfer towards the (7,5) tube in less than 10 fs. [3526]

11:35
Efficient Raman converter emitting in the orange range on the second Stokes order of toluene
S. Lebrun, C. Buy, P. Delaye, R. Frey, G. Pauliat; Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Université Paris-Sud (FR).
We present a Raman converter emitting at 595 nm based on a 80 cm long hollow core photonic crystal fiber filled with a mixture of toluene and methanol. The conversion efficiency of the pump to the second Stokes order of toluene is 42%. [3290]

11:50
Photoluminescence from higher energy states in a layer by layer assembled hybrid organic-inorganic film
I. Suárez López[1], F. Tassone[2], B. Vercelli[3], G. Angella[3] G. Zotti[3], T. Virgili[1]; [1]IFN, CNR c\o Dipartimento di Fisica, Politecnico di Milano (IT); [2]Istituto Italiano di Tecnologia (IT); [3]Istituto per l'Energetica e le Interfasi Institute for Energetics and Interphases IENI-CNR (IT).
An additional band in the high-fluence photoluminescence spectra of a CdSe nanoparticle film and uncapped NP solution was observed, whereas it was not in capped NP solutions. Herein the role of NPs surface states in the dynamics of photoexcited charges is discussed. [3648]

11:50
Self phase modulation in liquid core photonic crystal fibers
M.C. Phan Huy, A. Baron, S. Lebrun, R. Frey, P. Delaye; Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Univ. Paris-Sud (FR).
We present a characterization of self phase modulation in a hollow core photonic band gap fiber filled with a liquid. The analysis of the spectral broadening of a secant hyperbolic picosecond pulse using a new analytical expression of the transmitted spectrum allows a precise determination of the nonlinear index change of the liquid. [3321]

12:05
Hybrid bio-organic active interfaces
M.R. Antognazza[1], D. Ghezzi[2], M. Dal Maschio[2], E. Lanzarini[1], F. Benfenati[2], G. Lanzani[1,3]; [1]Center for Nanoscience and Technology of IIT@PoliMi (IT); [2]Italian Institute of Technology, Dept. of Neuroscience and Brain Technologies (IT); [3]Politecnico di Milano, Physics Dept. (IT).
We demonstrate the successful interfacing of an organic photovoltaic blend to a network of cultured primary neurons: photostimulation of the polymer layer leads to the excitation of the neural activity. Our results have important implications for the development of organic-based artificial visual systems. [3400]

12:05 **Student presentation**
Rains of solitons: characterization and control
S. Chouli, Ph. Grelu; Université de Bourgogne, Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 5209 CNRS (FR).
We present the experimental study of a new dynamics found in a highly-pumped but weakly mode-locked fiber laser. In this case, both soliton pulses and cw background can coexist and strongly interact. The new dynamics, called soliton rain, illustrates the potential for self-organization between large numbers of solitons and radiation. [3350]

Room: Maiman	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	**TOM 2**	**TOM 3**	**TOM 4**
12:20 **Propulsion Velocity of Red Blood Cells on Ta2O5 Optical Waveguides** *B. Singh Ahluwalia[1], P. McCourt[2], T. Huser[1,3], O.G. Hellesø[1]; [1]Department of Physics and Technology, University of Tromsø (NO), [2]Department of Medical Biology, University of Tromsø (NO), [3]Department of Internal Medicine, University of California (US).* We have studied trapping and propulsion of red blood cells in the evanescent field of an optical waveguide. In particular, we have measured the propulsion velocity as a function of the waveguide width. [3547]	12:20 **Student presentation** **Radiative coupling in metamaterial arrays** *J. Wallauer[1], A. Bitzer[2], M. Walther[1]; [1]Freiburg Materials Research Center, University of Freiburg (DE); [2]Institute of Applied Physics, University of Bern (CH).* We show that a resonant response with very high quality factors can be achieved in periodic metamaterials by radiatively coupling their structural elements. The coupling is mediated by lattice modes and can be efficiently controlled by tuning the lattice periodicity. Using a recently developed terahertz (THz) near-field imaging technique and conventional far-field spectroscopy together with numerical simulations we pinpoint the underlying mechanisms. In the strong coupling regimes we identify avoided crossings between the plasmonic eigenmodes and the diffractive lattice modes. [3581]	12:20 **Student presentation** **More on the near-field connection to far-field transmission resonances for periodic U-shaped metal nanostructures** *S. Iyer[1], S. Popov[1], L. Dong[1], A.T. Friberg[1,2,3]; [1]School of Information and Communication Technology, Royal Institute of Technology (SE), [2]Department of Applied Physics, Aalto University (FI), [3]Department of Physics and Mathematics, University of Joensuu (FI).* The far-field transmission spectrum of crescent-like metallic nanostructures on a glass substrate is studied numerically. The interpretation of transmission resonances arising from a periodic U-shaped metal nanostructure is revisited. Appearing of additional resonances and Impact of the structure geometry on their positions is discussed. [3401]	
12:20 - 13:45/12:35 - 14:00 lunch break			
14:00 - 16:00 **Nano-optics and biosensing** **Session chair: J. Wilkinson** University of Southampton (UK)	14:00 - 16:00 **THz generation and modulation** **Session chair: M. Koch** Philipps-Universitaet Marburg (DE)	14:00 - 16:00 **Theory and modelling** **Session chair: M.I. Stockman** Georgia State University (US)	13:45 - 16:00 **Sub-wavelength and polarization sensitive micro-optics** **Session chair: O. Parriaux** Université de Saint Etienne - Jean Monnet (FR)
14:00 **INVITED TALK** **Plasmon nano-optics for biosciences: sensing, trapping and hyperthermia** *R. Quidant[1,2], [1]ICFO-Institut de Ciencies Fotoniques (ES), [2]ICREA-Institucio (ES).* In this talk, we describe our recent advances in the engineering of both the optical and thermal properties of plasmonic nanosystems and discuss their respective applications to biosciences. [3206]	14:00 **INVITED TALK** **300-GHz-band wireless link based on photonic signal generation** *T. Nagatsuma[1], H.-J. Song[2], Y. Fujimoto[1], T. Takada[1], M. Kawamura[1], K. Ajito[2], N. Kukutsu[2], Y. Kado[2], A. Wakatuski[3], Y. Muramoto[3]; [1]Osaka University, Graduate School of Engineering Science (JP); [2]NTT Microsystem Integration Laboratories (JP); [3]NTT Photonics Laboratories (JP).* This paper describes high-speed wireless links using 300-400 GHz carrier frequencies. One of the enabling technologies is photonic generation and modulation of continuous terahertz-wave signals. Recent results such as an ultra-large bandwidth of >12.5 Gbit/s, a multi-channel transmission, and a zero-bias operation are presented. [3421]	14:00 **INVITED TALK** **Theory and plasmons: going beyond conventional classical electrodynamics** *G.C. Schatz; Northwestern University (US).* This talk will describe our recent efforts to improve on classical electromagnetic theory in the description of metal nanostructure (plasmonic) optical properties, with emphasis on surface enhanced Raman spectroscopy. A top-down approach involves the use of nonlocal dielectric response in classical electrodynamics. [3035]	13:45 **INVITED TALK** **Polarisation Sensitive Nanostructured Micro-Optics** *A.J. Waddie, R. Buczynski, M.R. Taghizadeh; School of Engineering and Physical Sciences, Heriot-Watt University (UK).* The advent of the soft glass nanostructuring technology, based around the stack-and-draw method used in the fabrication of optical fibres, gives us unparalleled micro-optical design freedom. In this paper we shall review the fundamentals of this technology and describe its extension to 1D and 2D structures for manipulation of polarised light. [3383]

Room: Huygens	Amphithéâtre Fresnel	Notes
TOM 5	**TOM 6**	

12:20 **Student presentation**

Structural and Optical Properties of a Hybrid Nanocomposite Combining Dyes and Ag Nanoparticles in a Micelle Structure

G. Rainò[1], T. Stöferle[1], C. Park[2], Ho-Cheol Kim[2], T. Topuria[2], P.M. Rice[2], In-Joo Chin[3], R.D. Miller[3], R.F. Mahrt[1]; [1]IBM Research – Zurich (CH); [2]IBM Research Almaden (US); [3]Polymer Science and Engineering Department, Inha University (KR).

We report on the synthesis and on the structural and optical properties of a hybrid nanocomposite combining fluorescent dyes and small metal nanoparticles.
We found that Coumarin dyes encapsulated in micelle structures spontaneously form J-like nanoaggregates with red-shifted absorption band and increased emission rate. The interaction with metal nanoparticles manifests itself with a shorter exciton lifetime and a slower exciton energy relaxation through the inhomogenously broadened density of states of the dyes ensemble within the micelles. [3211]

12:20 **Student presentation**

Initial dynamics of pulsed noise-driven supercontinuum generation

M. Erkintalo, G. Genty, J.M. Dudley; [1]Tampere University of Technology, Institute of Physics (FI), [2]Département d'Optique , Institut FEMTO-ST (FR).

We show that Akhmediev Breather theory describes the initial evolution of noise-driven fiber supercontinuum with picosecond pulses. Dispersive wave generation can also occur due to significant temporal compression of the breather state. [3483]

12:35 - 14:00 lunch break

14:00 - 16:00
Organic photonics
Session chair: B. Bêche
Université de Rennes I (FR)

14:00 - 16:00
Nanostructured materials
Session chair: C. Sibilia
Università di Roma "La Sapienza" (IT)

14:00

Threaded molecular wires: recent achievements and future prospects for organic photonics and electronics

F. Cacialli; Department of Physics and Astronomy, and London Centre for Nanotechnology, University College London (UK).

Threaded molecular wires (TMWs) are supramolecular architectures that can be conveniently used for fundamental studies in the context of organic electronics. Of particular interest is the possibility of insulating conjugated polymers for controlling intermolecular interactions, while still preserving their intrinsic semiconducting properties. Here, we will review recent achievements obtained within the context of the Marie-Curie Research Training Network, THREADMILL (www.threadmill.eu) and outline future perspectives for the development of the science and technology of these intriguing materials. [3487]

14:00 **Student presentation**

Second harmonic generation from gold nanoparticles: From ensemble to single nanoparticle measurements

J. Butet, G. Bachelier , I. Russier-Antoine, Ch. Jonin, E. Benichou, P.F. Brevet; Laboratoire de Spectrométrie Ionique et Moléculaire, UMR CNRS 5579, Université Claude Bernard Lyon 1 (FR).

We report the Second Harmonic Generation (SHG) from gold nanoparticles dispersed in homogeneous matrices allowing for the determination of their intrinsic nonlinear optical properties. In ensemble measurements, we can observe the interference patterns between selected multipolar modes of the SHG response. At the single particle level, we present a two dimensional mapping of single metallic particles dispersed in a homogeneous matrix and the corresponding light polarization analysis. [3497]

Room: Maiman

TOM 1

14:30
Engineering uniform, large area, plasmonic nanostructures for biomolecular detection
A.J. Chung, Y. Suk Huh, D. Erickson; Sibley School of Mechanical and Aerospace Engineering, Cornell University (US).
Here we present a simple method for the creation of uniform, large area, three-dimensional SERS-active substrates through shadow mask assisted evaporation (SMAE). With this technique we report a total electric field enhancement factor of 2600 (SERS enhancement greater than 1012) and demonstrate the detection of TAMRAlabeled Dengue virus sequences with a limit of detection of 50 pM. [3346]

14:45 Student presentation
pH nanosensors based on modified carbon nanotubes
F. Baldini[1], C. Bianchini[2], G. Ghini[1], G. Giambastiani[2], A. Giannetti[1], L. Luconi[2], G.L. Puleo[2], C. Trono[1]; [1]IFAC-CNR, Institute of Applied Physics (IT), [2]ICCOM-CNR, Institute of Chemistry of Organometallic Compounds (IT).
Carboxylic acid functionalized multiwalled carbon nanotubes (MWCNT-COOH) have been studied as macromolecular carriers of pH nanosensors to be used inside cells. Fluorescein derivatives were anchored covalently on the MWCNT surface. Fluorescence measurements conducted on water solution/dispersion of fluoresceine functionalized MWCNT, have shown a pH dependence in the 4-9 pH range. [3647]

15:00
A highly reproducible SERS detection of biomolecules using lithographied nanoparticles: application to biosensor
C. David[1], N. Guillot[1], H. Shen[2], T. Toury[2], M. Lamy de la Chapelle[1]; [1]Université Paris XIII, Laboratoire CSPBAT (FRE 3043), UFR SMBH, équipe LBPS (FR), [2]Université de technologie de Troyes, Laboratoire de Nanotechnologie et d'instrumentation Optique, Institut Charles Delaunay (FRE 2848) (FR).
The purpose of the present study is to achieve a SERS sensor with extreme sensitivity and very high molecular specificity by combining the enhancement of vibrational signal, surface functionalization, respectively, and detection of vibrational Raman spectra signals in order to provide at very low concentration the spectral signature of proteins. [3608]

Room: Michelson

TOM 2

14:30
Narrowband terahertz signal generator based on dual-mode Fabry-Pérot semiconductor laser and unitravelling carrier photodiode
S. Latkowski[1], J. Parra-Cetina[1], R. Maldonado-Basilio[1], P. Landais[1], G. Ducournau[2], A. Beck[2], E. Peytavit[2], T. Akalin[2], J-F. Lampin[2]; [1]Research Institute for Networks and Communication Engineering, Dublin City University (IE); [2]Institut d'Electronique de Microélectronique et de Nanotechnologie (IEMN), UMR CNRS 8520 Université de Lille 1 (FR).
The generation of a narrowband terahertz signal using a unitravelling carrier photodiode interfaced with a dual-mode Fabry–Pérot semiconductor laser at room temperature is demonstrated. A 0.372 THz signal, which corresponds to the lasers free spectral range is generated and exhibits a linewidth of 17 MHz. [3635]

14:45
1.04 THz fundamental oscillation of resonant tunneling diode at room temperature
S. Suzuki[1], M. Asada[1], A. Teranishi[1], H. Sugiyama[2], H. Yokoyama[2]; [1]Interdisciplinary Graduate School of Science and Technology, Tokyo Institute of Technology (JP); [2]NTT Photonics Laboratories, NTT Corporation (JP).
Room-temperature fundamental oscillation of up to 1.04 THz was achieved in resonant tunneling diodes (RTDs) with planar slot antennas. The graded emitter and thin barriers were introduced in the RTD structure to reduce the transit and tunneling delay times. The total output power was 7 μW at 1.04 THz. [3628]

15:00
Terahertz detection and emission by field effect transistors: influence of high magnetic fields and channel geometry
W. Knap, D. Coquillat, F. Teppe, N. Dyakonova; Universite Montpellier 2 and CNRS Montpellier (FR).
We review the most important results concerning the physics and applications of FETs as Terahertz detectors and emitters. Particulary we stress recent results concerning dependance of THz detection and emission on the geometry of the FETs and influence of high/quantizing magnetic fields. [3602]

Room: Foucault

TOM 3

14:30
Microscopic theory of negative refraction in a fishnet
J. Yang[1], C. Sauvan[1], S. Collin[2], P. Lalanne[1]; [1]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Univ. Paris-Sud (FR), [2]Laboratoire de Photonique et de Nanostructures, CNRS (FR).
We propose a microscopic theory for the phenomenon of negative refraction in the so-called fishnet structure, i.e. a hole array drilled in a metal/dielectric/metal periodic stack. The theory relies on the elementary scattering processes of plasmonic guided modes inside the structure. We discuss the physical mechanisms responsible for the appearance of a negative effective index with low loss in the near-infrared. [3465]

14:45 Student presentation
Recent improvements and applications of aperiodic rigorous coupled wave analysis technique
P. Kwiecien[1], I. Richter[1], J. Čtyroký[2]; [1]Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (CZ), [2]Institute of Photonics and Electronics AS CR, v.v.i. (CZ).
The aperiodic rigorous coupled wave analysis method has shown itself very efficient and reliable algorithm for simulations of photonic structures. Several our recent extensions (e.g. Bloch modes, full anisotropy) as well as selected applications to both magnetooptics and plasmonic structures is described and critically assessed. [3415]

15:00
The limitations of the "Perfect Lens": An old problem of classical optics with a new dress
M. Nieto-Vesperinas; Instituto de Ciencia de Materiales de Madrid, CSIC (ES).
The "perfect lens"; or more properly, the superlens, consists of a slab of left handed material which has been proposed as capable of amplifying evanescent waves and, hence, of providing superresolved images. It was soon recognized that it has severe limitations, one of which is the critical role of absorption. However, It is not generally appreciated that this device performs "inverse diffraction" and, therefore, is hurdled by the same problems of loss of information and instabilities as other methods of signal recovery, extensively, and long ago, studied in optics. Here we discuss and illustrate these facts. [3291]

Room: Newton

TOM 4

14:15
Electromagnetic analysis of specular resonance by periodic bilayer cylinders
H. Ichikawa, U. Nishimoto; Ehime University, Faculty of Engineering (JP).
Specular resonance by periodic bilayer cylinders is electromagnetically analysed for the time to our knowledge. It is found that such an element has a function to concentrate exit light wave in a relatively narrow angular range. [3322]

14:30 Student presentation
Diamond subwavelength gratings for mid-infrared diamond AGPM coronagraph: manufacturing assessment
C. Delacroix[1], S. Habraken[1], M. Karlsson[2], F. Nikolajeff[2], P. Forsberg[2]; [1]Liège University, Hololab Group (BE), [2]Uppsala University, Ångström Laboratory (SE).
We present the manufacturing and measurement results obtained with a mid-infrared (Lband ~ 3.8 μm) diamond Annular Groove Phase Mask (AGPM) coronagraph (Mawet et al 2005[1]), using subwavelength gratings and diamond-optimized microfabrication techniques such as Nano-Imprint Lithography and Reactive Ion Etching. [3658]

14:45
Confinement of light in marine centric diatoms: a study of the wavelength dependence
E. De Tommasi[1], I. Rea[1], V. Mocella[1], L. Moretti[2], M. De Stefano[3], I. Rendina[1], L. De Stefano[1]; [1]National Council for Research, Institute for Microelectronics and Microsystems, Department of Naples (IT), [2]Department of Mathematics, Second University of Naples (IT), [3]Department of Environmental Science, Second University of Naples (IT).
Valves of Coscinodiscus wailesii diatoms are able to confine light in a spot of few μm^2. This effect can be ascribed to the superposition of diffracted wave fronts coming from the pores on the valve surface. We studied the transmission of partially coherent light, at different wavelengths, through single valves of Coscinodiscus wailesii diatoms. [3448]

15:00 Student presentation
Concentric ring metal grating for generating radially polarized light
Z. Ghadyani[1,2], I. Vartiainen[3], I. Harder[2], W. Iff[1], A. Berger[1], N. Lindlein[1], M. Kuittinen[3]; [1]University of Erlangen-Nuremberg (DE), [2]Max Plank Institute for the Science of Light (DE), [3]University of Eastern Finland, Department of Physics and Mathematics (FI).
A sub wavelength concentric ring metal grating for visible light (λ=632.8nm) is designed and fabricated by electron beam lithography to transfer circularly polarized light into radially polarized form. Experimental results are compared to theoretical predictions and the advantages and disadvantages of the element with alternative methods are discussed. [3405]

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	**TOM 6**	**Notes**

14:15
Chirality appearance in molecular films of achiral molecules at the air/water interface
E. Benichou[1], I. Russier-Antoine[1], G. Bachelier[1], Ch. Jonin[1], M. Liu[2], P.F. Brevet[1]; [1]Laboratoire de Spectrométrie Ionique et Moléculaire, UMR CNRS 5579, Université Claude Bernard Lyon1 (FR); [2]Beijing National Laboratory for Molecular Sciences, Institute of Chemistry (CN).
Second Harmonic Generation was used to study optical properties of twodimensional film formed at the air-water interface. The film reveals chirality arising from the formation of molecular aggregates. It is demonstrated that this chiral property arises from electric and magnetic dipole contributions. [3333]

14:15
Towards dipole limit in second-harmonic generation from metal nanostructures
R. Czaplicki[1], M. Zdanowicz[1,2], K. Koskinen[1], H. Husu[1], J. Laukkanen[3], M. Kuittinen[3], M. Kauranen[1]; [1]Tampere University of Technology, Institute of Physics, Optics Laboratory (FI), [2]National Institute of Telecommunications, Department of Transmission and Optical Technology (PL), [3]University of Eastern Finland, Department of Physics and Mathematics (FI).
We show that the apparent higher multipole (magnetic-dipole and electric quadrupole) effects in second-harmonic generation from metal nanoparticles arise from defects. Improved sample quality leads to purely dipolar response. [3456]

14:30 INVITED TALK
Fabrication of active and functional organic photonic crystal templates using holographic lithography
K.S. Wong[1], Y. Zhong[1], B.Z. Tang[2] J. Zhou[3], A.B. Djurišić[3]; [1]Hong Kong University of Science and Technology, Department of Physics (HK); [2]Hong Kong University of Science and Technology, Department of Chemistry (HK); [3]Sun Yet-sun University, State Key Laboratory of Optoelectronic Materials and Techology, Guangzhou (CN); [4]The University of Hong Kong, Department of Physics (HK).
Holographic lithography technique was used to fabricate two- and three-dimensional organic photonic crystals (PCs). These PCs were used as templates to make active/functional devices such as organic distributed feedback laser or ZnO PC with enhanced spontaneous emission rate and lower lasing threshold. [3370]

14:30 INVITED TALK
High harmonic generation by plasmonic resonance field enhancement
I.-Y. Park, S. Kim, J.-H. Choi, S.-W. Kim; KAIST (KR).
Nano-waveguides are tested to generate high harmonics from femtosecond pulses. Experimental results show that the field enhancement induced by SPPs is strong enough to generate EUV radiation around 50 nm in wavelength. The tested waveguides can be fabricated on the tip of a cantilever that enables various near-field applications. [3390]

15:00 Student presentation
Small-molecule organic microcavities – from optical to electrical excitation
D. Kasemann, M. Sudzius, M. Langner, S.I. Hintschich, H. Fröb, V.G. Lyssenko, K. Leo; Institut für Angewandte Photophysik, Technische Universität Dresden (DE).
In this contribution we report on the control of the spatial, temporal, and spectral characteristics of organic microcavity lasers. We study electrical excitation by investigating full pin-OLEDs under high current densities in pulsed operation. [3398]

15:00 Student presentation
Efficient second-harmonic generation from a single gold dimer
A. Slablab, X.L. Le, M. Zielinski, V. Jacques, D. Chauvat, J.-F. Roch; Laboratoire de Photonique Quantique et Moléculaire, UMR CNRS 8537 ENS Cachan (FR).
Optimizing the interaction of light with a nanometer-sized volume of matter is a major objective of nanophotonics. It may contribute to the elaboration of future nanodevices like nanosources or nanoprobes. Recently, nanoparticles with second-order nonlinear response have been investigated and the second-harmonic generated field has been studied in detail. Yet it would desirable to engineer the efficiency of such nonlinear nanosources. The efficiency may be enhanced by using a material with a large electronic response to an electromagnetic excitation, which is the case for metallic nanoparticle, and a structuration that can develop localized high field intensity. [3392]

Room: Maiman — TOM 1

15:15 Student presentation

Heterodyne holographic microscopy of gold nanoparticles in biological media

F. Joud[1,3], F. Verpillat[1], M. Atlan[2], M. Abboud[3], M. Gross[1], [1]Laboratoire Kastler Brossel, École Normale Supérieure (FR), [2]Institut Langevin, ESPCI (FR), [3]Dépt. Physique - Faculté des Sciences, Université Saint-Joseph (LB).

We present a new holographic microscope combining off-axis heterodyne geometry and phase-shifting acquisition. Observation of 40 nm gold nanoparticles conjugated to 3T3 mouse fibroblasts is reported. The technique offers a full field 3D localisation of the nanomarkers where intrinsic dynamic properties of such systems are probed. [3402]

15:30

In-situ blood analysis by Raman Spectroscopy

D. Chapron[1], L. Unipan[1], M. Marchetti[2], R. Claverie[2], P. Bourson[1], M. Fontana[1]; [1]LMOPS, Université Paul Verlaine (FR), [2]CÉTÉ de l'Est-LRPC (FR).

Raman spectroscopy is an adapted tool for in-situ monitoring of many materials including biological species. We will present the benefits of such a technology for whole blood analysis through usual medical containers, such as Vacutainer tubes after blood tests and catheter for in-vivo monitoring. [3559]

15:45

Dispensing and manipulation of nano-drops in 2D and 3D by Pyro-EHD (Electro-Hydro-Dynamic) effect

S. Coppola, V. Vespini, M. Paturzo, S. Grilli, P. Ferraro; CNR Istituto Nazionale di Ottica, Unit of Napoli (IT).

A new and simple method is presented here for dispensing liquid nano- and pico-droplets through a non-invasive electrode-less configuration using the electric field generated by the pyroelectric effect into a dielectric crystal. The results show how the system is potentially useful for delivering liquid samples of biochemical interest, avoiding cross contaminations and special nozzles. [3461]

Room: Michelson — TOM 2

15:15 Student presentation

Continuous-wave optical parametric oscillator for terahertz light

J. Kiessling, I. Breunig, R. Sowade, K. Buse; University of Bonn, Institute of Physics (DE).

We demonstrate the generation of continuous-wave terahertz light at 1.4 THz frequency by parametric oscillations. The emitted beam has a power of several µW, a MHz-linewidth and can be focussed to a diffraction-limited spot. Furthermore, we show that the signal waves can be used to detect the terahertz wave coherently. [3328]

15:30

A new THz room-temperature integrated source

A. Taormina[1], S. Ducci[1], I. Favero[1], J. Claudon[2], J.-M. Gérard[2], G. Leo[1]; [1]Laboratoire Matériaux et Phénomènes Quantiques, CNRS-UMR 7162, Université Paris Diderot (FR); [2]CEA-CNRS, INAC/SP2M (FR).

We propose a new CW, electrically pumped THz emitter, operating at 300K. This source will emit at µW level, with 2.4 to 6 THz custom frequency, and lends itself to multi-spectral emission and coherent detection schemes. [3623]

15:45

Terahertz generation from nano-superconducting fluxon cloning circuits

H. Farhan-Hassan[1,2], D.R. Gulevich[1], P.N. Dmitriev[3], V.P. Koshelets[3], F.V. Kusmartsev[1]; [1]Department of Physics, Loughborough University (UK); [2]Department of Physics, King Abdulaziz University (SA); [3]Russian Acad. Sci., Inst. Radio Engn. and Elect (RU).

We have developed a new device for a generation of terahertz radiation operated with flux cloning phenomena arising in superconducting circuits. The device made from a long Josephson T-shaped junction with Nb -AlO_x-Nb technology. We have tested the device and found that the spectral line of T-rays radiation is very narrow. We have also described the properties of such a device and the dynamics of vortices there. [3675]

Room: Foucault — TOM 3

15:15 Student presentation

Efficient modeling of multilayered metallic strip gratings

H. Elamine[1,3], B. Guizal[2], M. Oueslati[1], T. Gharbi[1]; [1]FEMTO-ST, UMR CNRS No. 6174 (FR), [2]Equipe de Nanophotonique, G.E.S UMR 5650 (FR), [3]Faculté des Sciences de Tunis, U.R. Spectroscopie Raman (TN).

The parametric formulation of the Combined Boundary conditions Method (CBCM) with spatial adaptive resolution is extended to multi-layered structures of strip gratings using a new method to solve the eigenvalue problem in all the layers. [3555]

15:30

Modal analysis of conical diffraction by binary gratings using subsectional basis expansions

A.M. Armeanu[1,2], L.B. Andriamanampisoa[2,3,4], K. Edee[2,3], G. Granet[2,3], P. Schiavone[5]; [1]Laboratoire des Technologies de la Micro électronique CNRS (FR), [2]CNRS UMR 6602 (FR), [3]Clermont Universités, Université Blaise Pascal (FR), [4]Faculté des Sciences, Université de Fianarantsoa (MG), [5]UMI 2958 CNRSGeorgia Tech, Georgia Institute of Technology (US).

The problem of conical diffraction by onedimensional gratings is numerically solved by using the Method of Moments with subsectional functions as expansion functions and test functions. [3339]

15:45

Discrete and gap solitons in arrays of surface plasmon waveguides

A. Marini, A.V. Gorbach, D.V. Skryabin; University of Bath, Department of Physics (GB).

We present the first principle theory of light propagation in an array of nonlinear plasmonic waveguides. Different couplings through metal and dielectric slabs are responsible for the two-band dispersion, allowing formation of discrete and gap solitons in the nonlinear regime. [3532]

Room: Newton — TOM 4

15:15

Different methods for generating antireflecting nanostructures on optical components

M. Helgert[1], D. Lehr[1,4], M. Sundermann[1], R. Brunner[1,2], C. Morhard[3], C. Pacholski[3], J.P. Spatz[3], M. Schulze[4], E.-B. Kley[4]; [1]Carl Zeiss Jena GmbH, Technology Centre (DE), [2]University of Applied Science Jena (DE), [3]Max Planck Institute for Metals Research, Department of New Materials and Biosystems (DE), [4]Friedrich Schiller University Jena, Institute of Applied Physics (DE).

Three different technologies for the generation of subwavelength structures have been used to attain an antireflecting (AR) effect on several optical components as lenses and spherical or cylindrical micro lens arrays (MLAs). Results which demonstrate the potential of the methods are presented. [3254]

15:30

On feasibilities of the use of spatial polarization modulation for estimating coherence of optical fields

O.V. Angelsky; Department of Correlation Optics, Chernivtsi National University (UA).

The possibility of estimating the degree of coherence of superposing vector waves linearly polarized at the incidence plane is shown. The influence of phase relations and the degree of mutual coherence of these waves in the arrangements of two- and four-wave mixing on the characteristics of microparicle's motion has been analyzed. [3046]

15:45

The metrology of the correlation properties of circularly-polarizaed and linearly-polarized plane waves

O.V. Angelsky[1], C. Yu. Zenkova[2], M.P. Gorsky[1], N.V. Gorodyns'ka[1]; [1]Department of Correlation Optics, Chernivtsi National University (UA), [2]Optics and Spectroscopy Department, Chernivtsi National University (UA).

The paper shows the possibilities of defining the degree of correlation of mutually orthogonal superposing circularly-polarized and linearly-polarized plane waves. The alternative method for estimating the correlation properties of interacting fields is proposed here. [3042]

16:00 - 16:30 coffee break (exhibition hall)

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	**TOM 6**	**Notes**

15:15 **Student presentation**

Flexible microcavities: directional photoluminescence enhancement

L. Frezza[1], M. Liscidini[2], M. Patrini[2], D. Comoretto[1], [1]Università degli Studi di Genova, Dipartimento di Chimica e Chimica Industriale (IT); [2]Università degli Studi di Pavia, Dipartimento di Fisica "A. Volta" (IT).

We have prepared full plastic one-dimensional photonic crystal with a defect layer made of poly(9,9'-dioctylfluorene-co-benzothiadiazole) (F8BT). The optical properties of these flexible microcavities have been investigated and modelled. It is shown that strong directional enhancement of the emission occurs due to light localization in the defect layer. [3343]

15:15

Plasmon-assisted resonant third-order nonlinear optical effects in core-shell nanoparticles

I.A. Kolmychek, T.V. Murzina, O.A. Aktsipetrov; Department of Physics, Moscow State University (RU).

Plasmon-assisted resonant effects in third-order nonlinear-optical response of core(shell) nanoparticles in a polymer matrix are observed by spectroscopic Z-scan technique. Optical rectification and nonlinear refraction spectra are described in terms of plasmon-induced enhancement of local optical fields in nanoparticles. [3878]

15:30

Directional enhancement of the photoluminescence in bisTEGPEPEP solution infiltrated opals

L. Berti[1], F. Di Stasio[1], M. Galli[2], F. Marabelli[2], N. Manfredi[3], A. Abbotto[3], D. Comoretto[1]; [1]Università degli Studi di Genova, Dipartimento di Chimica e Chimica Industriale (IT); [2]Università degli Studi di Pavia, Dipartimento di Fisica "A. Volta" (IT); [3]Università degli Studi di Milano-Bicocca, Dipartimento di Scienza dei Materiali (IT).

We report on the optical properties of polystyrene opals infiltrated with solutions of bisTEG-PEPEP, a heteroaromatic quadrupolar dyes endowed with strong nonlinear optical properties. Photoluminescence spectra of these opals show clear evidence of directional enhancement of emission in the high energy side of the opal stop band. [3300]

15:30

Enhanced second-harmonic generation from $BaTiO_3$ – $SrTiO_3$ superlattices

A. Saari[1], H. Pietarinen[1], G. Genty[1], J. Hiltunen[2], J. Lappalainen[3], M. Kauranen[1]; [1]Tampere University of Technology, Optics Laboratory (FI), [2]Technical Research Centre of Finland (FI), [3]University of Oulu, Microelectronics and Materials Physics Laboratory (FI).

We study experimentally second-harmonic generation (SHG) in ferroelectric $BaTiO_3$ - $SrTiO_3$ superlattices manufactured by pulsed laser deposition. We find that the second-harmonic signal is significantly enhanced by the superlattice structure and that there exists an optimal layer thickness. [3416]

15:45

Photochromic polyurethane based on diarylethenes for holography

A. Bianco[1], G. Pariani[1,2], G. Dassa[2], C. Bertarelli[2]; [1]Osservatorio Astronomico di Brera (IT); [2]Dipartimento di Chimica, Materiali ed Ingegneria Chimica, Politecnico di Milano (IT).

Photochromic materials are interesting for making rewritable substrates to be used in holographic optical elements (HOEs) thanks to strong changes of transparency in the visible (for amplitude holography) and modulation of the refractive index in the NIR (for phase holography). For making efficient holographic devices it is necessary to maximize the contrast of transparency and refractive index of the active materials. Optimization of the chemical structure of the photochromic unit and development of high content photochromic materials are the tools used to make it possible. Moreover, these materials have to guarantee good optical properties to be efficiently used. [3694]

15:45

Biomimetic silica-based nanocomposite materials for nonlinear optics

Yu.N. Kulchin[1], A.V Bezverbny[1], S.S. Voznesenskiy[1], S.S. Golik[1], A.N. Galkina[1], A.Yu. Mayor[1], I.V. Postnova[2], A.A. Sergeev[1], Yu.A. Shchipunov[2]; [1]Institute of Automation and Control Processes of Far Eastern Branch of Russian Academy of science (RU), [2]Institute of Chemistry of Far Eastern Branch of Russian Academy of science Vladivostok (RU).

The results of the comparative analysis of the optical and nonlinear-optical characteristics of biominerals structures and biomimetic silica-based nanocomposite materials as promising prototypes for creating the nanostructure optical materials for systems and devices of photonics are represented. [3593]

16:00 - 16:30 coffee break (exhibition hall)

Room: Maiman

TOM 1

16:30 - 18:30
Optical trapping for biosensing
Session chair: D. Cojoc
CNR-INFM, Laboratorio Nazionale TASC (IT)

16:30 INVITED TALK
Optical tools and techniques for studying behavior and neuronal regeneration in the roundworm *C. elegans*
S.H. Chung[1,2], E. Mazur[2,3], C.V. Gabel[1]; [1]Boston University School of Medicine, Department of Physiology and Biophysics (US), [2]Harvard University, School of Engineering and Applied Sciences (US), [3]Harvard University, Department of Physics (US).
Femtosecond laser ablation can dissect the nervous system of *C. elegans* with submicrometer resolution. Microfluidic devices allow us to immobilize, position, and assay the worm. Using these techniques we can illuminate the origins of behavior and mechanisms of neuronal regeneration. [3481]

17:00 Student presentation
Trapping and stretching of single cells in an optofluidic chip fabricated by a femtosecond laser
F. Bragheri[1], L. Ferrara[1], N. Bellini[2], K.C. Vishnubhatla[3], P. Minzioni[1], R. Ramponi[2], R. Osellame[2], I. Cristiani[1]; [1]CNISM and Dipartimento di Elettronica – Università di Pavia (IT), [2]IFN-CNR and Dipartimento di Fisica – Politecnico di Milano (IT), [3]CNST (Center for Nano Science and Technology), IIT @ PoliMI (IT).
We present an optofluidic monolithic chip able to perform single-cell trapping and stretching without physical contact. The chip is based on a fused silica glass substrate and it is fabricated by femtosecond laser micromachining. [3454]

Room: Michelson

TOM 2

16:30 - 18:15
THz imaging I - near and far-field imaging
Session chair: M. Walther
University Freiburg, Physik (DE)

16:30
THz near-field microscopy of complementary metamaterial structures: Babinet's principle
A. Ortner[1], A. Bitzer[2], M. Walther[1]; [1]Freiburg Materials Research Center, University of Freiburg (DE); [2]Institute of Applied Physics, University of Bern (CH).
We apply terahertz (THz) near-field microscopy to investigate the resonant response of plain and complementary split-ring resonators. The field maps show that at the resonances the measured electric near-fields of the structures correspond to the magnetic near-fields of their complements, as also predicted by recent numerical simulations in consistence with Babinet's principle. [3580]

16:45
Terahertz near-field microspectroscopy
J.R. Knab, A.J.L. Adam, R. Chakkittakandy, P.C.M. Planken; Delft University of Technology, Faculty of Applied Sciences, Optics Research Group (NL).
Using near-field terahertz time-domain spectroscopy (THz-TDS), we investigate the effects of filling a subwavelength-diameter, cylindrical waveguide with various dielectric materials, with and without resonance. We show how one may use this approach to perform spectroscopic measurements on tiny sample volumes. [3477]

17:00
Influence of the dielectric substrate on the Terahertz electric near-field of a hole in a metal
L. Guestin, P.C.M. Planken, A.J.L. Adam; Delft University of Technology (NL).
We present calculations and experimentally on the effect of a dielectric substrate on the frequency-dependent terahertz electric near-field of a small hole in a metal layer. We find that the thickness of the metal layers can dramatically influence the nearfield transmission spectrum and the field distribution beneath the hole. [3412]

Room: Foucault

TOM 3

16:30 - 18:30
Gratings for nanophotonics
Session chair: G. Schatz
Northwestern University (US)

16:30
Colour filtering by laterally textured subwavelength structures
H. Lochbihler; Papierfabrik Louisenthal GmbH (DE).
Subwavelength structures may exhibit electromagnetic resonances in the visible wavelength range yielding to a strong modification of reflectance and transmittance. Laterally textured nanostructures with tuneable colour properties have great potential in industrial applications of colour filtering. [3324]

16:45 Student presentation
Light transmission beyond total internal reflection via plasmonic crystals
R. McCarron, D. O'Connor, J.-S. Bouillard, W. Dickson, A.V. Zayats; Centre for Nanostructured Media, Queens University Belfast (GB).
Optical transmission at angles of incidence beyond the angle of total internal reflection has been observed through plasmonic crystals. Experiments and computational analysis will be discussed from the point of view of the enhancement of light extraction from lightemitting devices. [3431]

17:00
Local density of states fluctuations on random metallic films
V. Krachmalnicoff, E. Castanié, Y. De Wilde, R. Carminati; Institut Langevin, ESPCI ParisTech, CNRS UMR 7587 (FR).
We report on the experimental study of lifetime fluctuations at the surface of disordered metallic films. Lifetime measurements are directly related to the local density of states (LDOS), that describes the optical transport properties of the medium. We find that the lifetimes distribution strongly depends on the topological properties of the metallic film. [3384]

Room: Newton

TOM 4

16:30 - 18:30
Fabrication Methods
Session chair: F. Nikolajeff
Uppsala University (SE)

16:30 INVITED TALK
Optimal fabrication techniques for digital micro-optics
B. Kress, V. Hejmadi; USI Photonics Inc. (US).
This paper will review the various optimizations and adaptations of standard IC fab techniques that have been performed by industries in the last decades, in order to pave down the road for digital optics to reach the various conditions imposed by mainstream industry and consumer products, as it has been done its counterpart micro-electronics 50 years ago. [3372]

17:00 Student presentation
Phase-mask grating printing to extremes
Y. Bourgin[1], Y. Jourlin[1], S. Tonchev[1,2], I. Vartiainen[3], M. Kuittinen[3], A. Talneau[4], O. Parriaux[1]; [1]University of Lyon, Lab. H. Curien UMR CNRS 5516 (FR); [2]Institute of Solid State Physics (BG); [3]University of Eastern Finland, Department of Physics (FI); [4]Lab. Photonique et Nanostructures, CNRS (FR).
The very restricted range of grating periods printable by standard silica phase-masks is here extended from close to the 45 nm CD-node to arbitrarily large periods by the appropriate choice of material and interference-generating scheme with a potential for unlimited length and wide area. [3637]

Room: Huygens

TOM 5

16:30 - 18:00
Spectroscopy, photonics and hybrid materials
Session chair: P. Lagoudakis
University of Southampton (UK)

16:30 INVITED TALK
A targeted review of hybrid integrated photonics
B. Bêche[1], N. Huby[1], D. Duval[1], D. Pluchon[1], G. Loas[1], N. Coulon[2], H. Lhermite[2], L. Camberlein[3], J. Zyss[4], L. Frein[1], E. Gaviot[3]; [1]Université Rennes 1, IPR UMR CNRS 6251 (FR); [2]Université Rennes 1, IETR UMR CNRS 6164 (FR); [3]Université Maine, LAUM UMR CNRS 6613 (FR); [4]Ecole Normale Supérieure, LPQM UMR CNRS 8537 (FR).
We give a preview of targeted current research on integrated photonics based on organic materials. Such devices devoted to sensors applications and their solving approach highlight the interest to develop specific hybrid processes such as biomolecular film deposition, self-assembled growth and handling, plasma treatments coupled with microtechnologic thin layers processes, and micro-fluidic devices. [3017]

17:00 Student presentation
The role of non-radiative energy transfer for efficient colour-conversion in hybrid organic/GaN LEDs
J.J. Rindermann, P.G. Lagoudakis; University of Southampton, School of Physics and Astronomy (UK).
Non-radiative energy transfer (FRET) is used to enhance the colour-conversion efficiency in hybrid organic/GaN LEDs. We study FRET from the LED to an organic overlayer under optical pumping and electrical operation of the LEDs. [3366]

Amphithéâtre Fresnel

TOM 6

16:30 - 18:30
Fundamentals
Session chair: M. Kauranen
Tampere University of Technology (FI)

16:30 INVITED TALK
Intense coherent transverse magnetism induced by light - experiments and theory
S.C. Rand, W.M. Fisher; Division of Appl. Phys., University of Michigan (US).
A new class of magneto-electric nonlinearities is reported, that originates from a mixed ($D_0 B_0$) product of applied fields. As the result of parametric enhancement, extraordinary levels of magnetic dipole radiation are observed at non-relativistic intensities. This and other unanticipated effects are in accord with recent theory. [3104]

17:00 Student presentation
Generation efficiency of the second harmonic inhomogeneous component
V. Roppo[1,3], C. Cojocaru[1], J. Trull[1], F. Raineri[2,4], D. Chouteau[2], I. Sagnes[2], R. Raj[2], R. Vilaseca[1], M. Scalora[3]; [1]Universitat Politècnica de Catalunya, Departament de Física i Eng. Nuclear (ES), [2]Laboratoire de Photonique et de Nanostructures (FR), [3]C.M. Bowden Research Facility, US Army RDECOM (US), [4]Université Paris Diderot (FR).
In this work we measure second harmonic generation in a GaAs cavity with conversion efficiency of the order of 0.1% at 612nm, using 3ps pump pulses with 10 MW/cm^2 peak intensities. We show that the conversion efficiency of the inhomogeneous second harmonic component grows quadraticaly with the cavity quality factor. [3304]

Notes

Room: Maiman

TOM 1

17:15
Immunofluorescence screening of cytomegalovirus in an opto-fluidic mobile device
T. Mangeat[1], J.S. Guerrini[2], H. Benalia[1], C. Pieralli[1], A. Rouleau[1], W. Boireau[1], A. Coaquette[2], G. Herbein[2], C. Davrinche[3], L. Pazart[2], B. Wacogne[1]; [1]Optics Dpt, FEMTO-ST Institute, UMR CNRS 6174 (FR), [2]INSERM-CIT 808, Besançon University Hospital (FR), [3]Clinic-Innovation Proteomic Platform, FEMTO-ST Institute, UMR CNRS 6174 (FR), [4]Lab. of virology, University Hospital and UPRES EA 4266 Agents, Pathogènes et Inflammation (FR), [5]INSERM U 563, Paul Sabatier University (FR).
We present an opto-fluidic mobile device used to screen the cytomegalovirus at the newborn's bed. The detection is based on immunofluorescence and the device is composed of a disposable cartridge including all the required reactives and a mobile reader/actuator that to drives the fluids and to perform the optical measurement. [3122]

17:30
Investigating the dynamics of helical bacteria trapped with line scanning optical tweezers
M. Koch, A. Rohrbach; University of Freiburg, Lab for Bio- and Nano-Photonics (DE).
We show how a scanning optical point trap can be used to hold and orientate a single helically shaped bacterium of only 200nm thickness. In addition, we show that back focal plane interferometry can be used to get precise 3D information of the complex dynamics of these bacteria with high temporal resolution and nanometer spatial precision. [3277]

17:45
Antibody-mediated influenza viral detection by waveguide-mode sensor
K. Awazu, S.C.B. Gopinath, M. Fujimaki; Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (JP).
Methods for the antibody-based detection of influenza viruses using monolithic-sensing-plate technology of waveguide-mode sensors are demonstrated. Based on this method Haemagglutinin from influenza of bird (H5N1) and human (*A/Panama//2007/1999) and* human virus (*A/Brisbane/59/2007*) were detected. [3351]

Room: Michelson

TOM 2

17:15
Terahertz imaging of ferroelectric domains in the near-field domain
M. Berta, P. Kužel, F. Kadlec; Institute of Physics AS CR (CZ).
We report on results of near-field pulsed THz imaging experiments with a metalized sapphire probe scanning a $BaTiO_3$ multi-domain single crystal. The method is sensitive to the direction of spontaneous polarization, and spatial resolution is better than the dimensions of the probe at its extremity. [3406]

17:30
Dynamic THz near-field imaging of free induction decay from tyrosine crystal
F. Blanchard[1,2], A. Doi[2,3], H. Hirori[1,2], T. Tanaka[1,2], K. Tanaka[1,2,4]; [1]Institute for Integrated Cell-Material Sciences, Kyoto University (JP); [2]CREST, Japan Science and Technology Agency (JP); [3]Olympus Corporation (JP); [4]Department of Physics, Graduate School of Science, Kyoto University (JP).
We report on near-field terahertz (THz) imaging of a tyrosine crystal sample using high intensity terahertz pulses. We observe the electric field blinking with the free induction decay (FID) signal with spatial resolution better than 70 µm. [3283]

17:45 **Student presentation**
Total internal reflection Terahertz imaging
A. Wojdyla, G. Gallot; Laboratoire d'Optique et Biosciences, Ecole Polytechnique, CNRS, INSERM (FR).
We present a new Terahertz imaging scheme based on total internal reflection that allows the study of aqueous samples. [3475]

Room: Foucault

TOM 3

17:15
Design of plasmonic nano-resonators to achieve power transmission enhancement through single sub-wavelength apertures
L. Scorrano, F. Bilotti, L. Vegni; University "Roma Tre", Department of Applied Electronics (IT).
In this contribution we propose a novel setup based on arrangements of silver nano-particles to increase the power transmission through single sub-wavelength apertures. The design details and possible issues are discussed and illustrated through full-wave simulations. The proposed approaches may be applied to the design of ultra-diffractive imaging systems, high-resolution spatial filters, high-precision lithography systems. [3561]

17:30
Nanoslits in metallic membranes: nearly perfect transmission for multispectral imaging
S. Collin[1], G. Vincent[2], R. Haidar[2], N. Bardou[1], J.-L. Pelouard[1]; [1]Laboratoire de Photonique et de Nanostructures (LPN-CNRS) (FR), [2]ONERA/DOTA (FR).
We report the fabrication of large-area metallic membranes with nanoslits. We analyze their remarkable optical properties and demonstrate nearly perfect resonant transmission (87 %). Radiative and non radiative losses are experimentally determined. We also report the fabrication of a mosaic of bandpass filters by changing the slit pattern in a single 25mm² membrane. The filter array is integrated in a compact multichannel camera, and parallel multispectral imaging is achieved in the 2.5-5 µm wavelength range. [3492]

17:45 **Student presentation**
Coupling localized and propagating plasmons to improve the light transmission through metallic thin films
J. Delahaye, S. Grésillon, E. Fort; Institut Langevin, ESPCI ParisTech, CNRS UMR 7587, Université Pierre and Marie Curie, University Paris Diderot (FR).
We investigated the optical interactions between metal nanoparticles and thin metallic films using leakage radiation microscopy. The images of the nanoparticles deposited on the metallic thin films show an unexpectedly enhanced light transmission through the films. [3494]

Room: Newton

TOM 4

17:15 **Student presentation**
Periodical microstructure fabrication based on the Talbot effect
L. Stuerzebecher[1], T. Harzendorf[1], U. Vogler[2], U.D. Zeitner[1], R. Voelkel[2]; [1]Fraunhofer Institut für Angewandte Optik und Feinmechanik IOF (DE), [2]SUSS MicroOptics SA (CH).
The Talbot effect on pinhole arrays is utilized for periodical microstructure fabrication via proximity lithography in a mask aligner. A novel lighting system is used which offers a controllable angular spectrum of illumination. The proposed method comprises great flexibility and sub-micron resolution even in large proximity gaps. [3411]

17:30
Wafer level manufacturing of glass optics
D. Hollstegge, M. Hünten, O. Dambon, F. Klocke; Fraunhofer Institute for Production Technology IPT (DE).
The wafer-based manufacturing approach, which perfectly uses the economics of scale, is already established for polymer optics. In this work, the manufacturing approach for glass optics molded on wafer scale is presented. It comprises a detailed view on each process step that needs to be accomplished. [3565]

17:45 **Student presentation**
Reflective hybrid optical components – Functionalization of non-planar optical surfaces using direct ps-laser ablation
R. Kleindienst, R. Kampmann, S. Stoebenau, S. Sinzinger; Technische Universität Ilmenau, IMN MacroNano, Fachgebiet Technische Optik (DE).
Hybrid diffractive/reflective or diffractive/refractive components provide additional potential for the integration of complex optical functionality. We present an integrated approach for the manufacturing of hybrid optical components. To this end ps-laser ablation is combined with ultra precision micromachining of freeform optical surfaces. [3550]

Room: Huygens

TOM 5

17:15 Student presentation

Synthesis and optical properties of a ter (9,9'-spirobifluorene)-*co*-methylmethacrylate copolymer

A. L. Mendonça[1], A. Charas[1], J. Clark[2,3], L. Bazzana[4], A. Nocivelli[4], G. Lanzani[5], J. Morgado[1,6]; [1]Instituto de Telecomunicações (PT); [2]Dipartimento di Fisica, Politecnico di Milano (IT); [3]Cavendish Laboratory, University of Cambridge (UK); [4]LUCEAT S. p. A. (IT); [5]CNST-IIT@POLIMI, Dipartimento di Fisica, Politecnico di Milano (IT); [6]Departamento de Engenharia Química e Biológica, Instituto Superior Técnico (PT).

A functionalised 9,9'-spirobifluorene trimer was copolymerised with methylmethacrylate and the optical properties of this fluorophore, in particular, stimulated emission and ultrafast optical switching, are reported. [3205]

17:30

Sensitized ultra low power photon up-conversion: from solution to solid state

A. Monguzzi[1], M. Frigoli[2], C. Larpent[2], R. Tubino[1], F. Meinardi[1]; [1]Dipartimento di Scienza dei Materiali, Università Milano Bicocca (IT); [2]Institut Lavoisier UMR-CNRS 8180, Université de Versailles (FR).

The sensitized triplet-triplet annihilation in multi-component organic systems has been already demonstrated to be suitable for obtaining efficient up-conversion at ultra-low power in solution, but fails in the solid state. We demonstrated how it is possible to overcome this severe limitation by the incorporation of a standard bi-component system in polymer nanoparticles, preserving the same performances of the starting moieties in solution. [3208]

17:45

Scanning thermochemical lithography of a conjugated polymer and the role of the thermal conductivity of the substrate

O. Fenwick[1], M. Tolk[1], G. Lazzerini[1], S. Ahmad[1], Y. Silberberg[1], L. Bozec[2], D. Credgington[3], F. Cacialli[1]; [1]Department of Physics and Astronomy and London Centre for Nanotechnology (UK); [2]UCL Eastman Dental Institute (UK); [3]Department of Chemistry, Imperial College London (UK).

We show the use of a heated atomic force microscope (AFM) probe to pattern the conjugated polymer poly (*p*-phenylene vinylene) (PPV) from its precursor with resolution <28nm. We demonstrate such resolutions on high thermal conductivity substrates and discuss the advantages of a thermochemical approach to lithography. [3506]

Amphithéâtre Fresnel

TOM 6

17:15 Student presentation

Group-velocity reduction in phase-shifted photorefractive narrowband filter

S. Kroesen[1], W. Horn[1], A. Sukhorukov[2], C. Denz[1]; [1]Westfälische Wilhelms-Universität, Institut für Angewandte Physik and Center for Nonlinear Science (DE), [2]Australian National University, Nonlinear Physics Centre, Research School of Physics and Engineering (AU).

We investigate the group velocity modification of an optically reconfigurable, photorefractive narrowband filter around 1530 nm. Optical phase-shift keying is used to obtain different filter configurations. Dispersion and group delay are determined by the modulation phase-shift method. [3521]

17:30

Saturation of the Raman amplification by self-phase modulation in silicon nanowaveguides

F. Kroeger, A. Baron, A. Ryasnyanskiy, P. Delaye, R. Frey, N. Dubreuil; Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Université Paris -Sud (FR).

We experimentally show that the self -phase modulation of picosecond pump pulses, induced by both the optical Kerr effect and free-carrier refraction, has a detrimental effect on the maximum on-off Raman gain achievable in silicon on insulator nanowaveguides, causing it to saturate, as we confirm with a simple calculation of the Raman gain. [3462]

17:45

Flexible generation of non-diffracting beams and applications to femtosecond laser ablation

M.K. Bhuyan, F. Courvoisier, M. Jacquot, P.-A. Lacourt, L. Furfaro, J.M. Dudley; Département d'Optique P. M. Duffieux, Institut FEMTO-ST, UMR 6174, CNRS-Université de Franche-Comté (FR).

We report on the development and numerical modeling of a spatial light modulator based setup that allows for a flexible generation of femtosecond non-diffracting beams with long working distance and with a micron-size central spot. We also review recent results concerning the machining of high-aspect ratio channels in glass. [3557]

Notes

Tuesday, 26 October

Room: Maiman	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	**TOM 2**	**TOM 3**	**TOM 4**
18:00 **Spectral fingerprints of cancer change in biotissues** *O.V Angelsky, S.B. Yermolenko, A.G. Ushenko, Chernivtsi National University (UA).* This work is directed to the investigation of the scope of the technique of polarization spectrometry of oncological changes in model mice's tissues and in human prostate tissues under the conditions of multiple scattering. [3355]	18:00 **Student presentation** **Fresnel losses in terahertz computed tomography** *A. Younus[1], P. Mounaix[1], S. Salort[2], J.P. Caumes[2], B. Recur[3], J.P. Domenger[3], P. Desbarats[3], E. Abraham[1]; [1]CPMOH, Université de Bordeaux/CNRS (FR); [2]ALPhANOV Centre Technologique Optique et Lasers, Université de Bordeaux/CNRS (FR); [3]LABRI, Université de Bordeaux/CNRS (FR).* A pulsed-terahertz source and a continuous millimeter wave emitter have been separately employed to visualize the internal structures of opaque 3D samples. By applying a filtered backprojection algorithm, computed terahertz tomography has been performed to reconstruct the cross-sections. Especially, phantoms have been used to investigate the diffraction and refraction losses. [3654]	18:00 **Nanostructuration of lithium niobate substrates for sensing applications** *N. Courjal, J. Dahdah, G. Ulliac, B. Guichardaz, J.Y. Rauch, F. Baida; FEMTO-ST Institute (FR).* We present LiNbO3 nanostructures with ultra-smoothed walls realized by FIB or ICP-RIE. Besides, we describe an original approach based on "optical grade dicing" for fabricating ridges dedicated to the coupling of light into photonic (PhC) cavities. Experimental transmissions responses through PhC cavities are finally presented. [3464]	18:00 **Optofluidic microsystems fabricated by ultra precision micromachining** *M. Amberg, S. Stoebenau, S. Sinzinger; IMN MarcoNano, Fachgebiet Technische Optik, Technische Universität Ilmenau (DE).* We present optical Microsystems fabricated by ultra precision micro milling. The unique variety of surface profiles fabric able with optical surface quality allows for the integration of optical, mechanical and fluidic functionality. Highly integrated systems for fluorescence detection or optical micromanipulation are discussed. [3422]
18:15 **Student presentation** **Organic microlaser based sensors for environmental monitoring** *S. Lozenko[1], D. Faye[2], M. Lebental[1], J. Lautru[1], I. Ledoux[1], I. Leray[2], J-P. Lefevre[2], J. Delaire[2], J. Zyss[1]; [1]Laboratoire de Photonique Quantique et Moléculaire, Institut d'Alembert (IFR 121), ENS de Cachan, CNRS UMR 8537 (FR), [2]Laboratoire de Photophysique et Photochimie Supramoléculaires et Macromoléculaires, Institut d'Alembert (IFR 121), ENS de Cachan, CNRS UMR 8531 (FR).* A prototype of an optofluidic sensor is proposed for the detection of drinking water pollution with heavy metal ions (Cd2+, Hg2+ and Pb2+) and other bio-/chemical sensing applications. The sensor is based on high Q-factor active polymer microcavities supporting whispering gallery modes. [3501]		18:15 **Student presentation** **Spectrum of layered structures for quantum cascade lasers** *A.A. Bogdanov, R.A. Suris; Ioffe Institute (RU).* We consider spectrum of quantum the cascade laser (QCL) resonators taking into account electron plasma in the laser structure layers. Optical losses due to the free carrier absorption are analyzed for different modes of the resonators. [3512]	18:15 **Student presentation** **Sapphire shaped crystals with capillary channels for spectroscopy** *I.A. Shikunova, V.N. Kurlov, S.N. Rossolenko, S.L. Shikunov; Institute of Solid State Physics RAS (RU).* A manufacturing process for growth of sapphire shaped crystals with capillary channels is being developed. The crystals were applied as constructive and optical elements to low-power compact gas plasma micro analytical system and to smart scalpels with a possibility of on-line fluorescent diagnostics of incised tissue. [3213]

18:30 - 20:30 welcome reception (Entrance area of PRI-OPTO)

Notes

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	TOM 6	Notes
	18:00 **Equivalent temperature of crystal interacting with laser radiation** *O.A. Ryabushkin[1,2,3], A.V. Konyashkin[1,2,3], D.V. Myasnikov[2,3]; [1]Kotelnikov Institute of Radioengineering and Electronics of RAS (RU), [2]NTO «IRE-Polus» (RU), [3]Moscow Institute of Physics and Technology (State University) (RU).* Most of the nonlinear-optical crystals posses piezoelectric properties. Piezoelectric resonance, induced by the external radiofrequency electric field, allows measuring the internal temperature of the crystal, which interacts with the laser radiation. [3480]	
	18:15 **Observation of the Optical Peregrine Soliton** *B. Kibler[1], J. Fatome[1], C. Finot[1], G. Millot[1], F. Dias[2], G. Genty[3], N. Akhmediev[4], J.M. Dudley[5]; [1]Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 5209 CNRS - Université de Bourgogne (FR) ; [2]CMLA, ENS Cachan (FR), UCD School of Mathematical Sciences, University College Dublin (IE); [3]Tampere University of Technology, Optics Laboratory (FI); [4]Optical Sciences Group, Research School of Physics and Engineering, The Australian National University (AU); [5]Institut FEMTO-STUniversité de Franche-Comté (FR).* We report the first experimental observation of the optical Peregrine soliton, a novel class of nonlinear localized structure first predicted to exist over 25 years ago. Our results confirm the increasingly important role that experiments in optics play in providing insight into wider areas of nonlinear physics. [4017]	
18:30 - 20:30 welcome reception (Entrance area of PRI-OPTO)		
Notes		

Room: Maiman

TOM 1

9:00 - 10:45
Optical nanosurgery and cell micromanipulation
Session chair: R. Ramponi
Politecnico Di Milano (IT)

9:00 INVITED TALK
Femtosecond laser surgery on a chip for nerve regeneration
A. Ben-Yakar, The University of Texas at Austin, Mechanical Engineering (US).
Merging microfluidics and femtosecond laser nanosurgery has recently enlarged the specificities and the speed of laser surgeries and given a tremendous momentum in experimental biology, especially for fast genome-wide screenings of various biological processes, and more specifically nerve regeneration in animal models. [3888]

9:30 Student presentation
Surface scanning with optically trapped probes
L. Friedrich, A. Rohrbach; University of Freiburg, Department of Microsystems Technology, Laboratory for Bio- and Nano-Photonics (DE).
Optically trapped beads (probe) with diameters of 100 nm to 500 nm are scanned across surface structures (sample). The elongation of the probe from the trap center is measured interferometrically so that the height profile of the sample can be recovered. The Brownian motion of the probe helps to find the local force field and viscosity. [3234]

9:45
Stimulation of neurons by optically manipulated liposomes
G. Pinato, T. Raffaeli, E. D'Este, F. Tavano, D. Cojoc; CNR-IOM, TASC Laboratory (IT).
We propose a local delivery optical technique to stimulate neuronal cells. Liposomes filled with glutamate solutions were manipulated by an IR optical tweezers in the vicinity of hippocampal neurons and broken by an UV pulsed laser. The stimulation of the cells by the delivered molecules was demonstrated by calcium imaging. [3660]

Room: Michelson

TOM 2

9:00 - 10:45
THz quantum cascade lasers
Session chair. A. Tredicucci
Scuola Normale Superiore (SNS) (IT)

9:00 INVITED TALK
Quantum cascade laser based tera-Hertz amplifiers
N. Jukam[1], S. Dhillon[1], R. Rungsawang[1], D. Oustinov[1], J. Madeo[1], S. Barbieri[2], C. Manquest[2], C. Sirtori[2], S.P. Khanna[3], E.H. Linfield[3], A.G. Davies[3], J. Tignon[1]; [1]Laboratoire Pierre Aigrain, Ecole Normale Supérieure, UMR8551 CNRS, UPMC Univ. Paris 6 (FR); [2]Matériaux et Phénomènes Quantiques, Univ. Denis Diderot (FR); [3]School of Electronic and Electrical Engineering, University of Leeds (UK).
A terahertz quantum cascade laser and an integrated Auston-switch are coupled to perform ultrafast gain switching. The resulting non-equilibrium gain is not clamped above laser threshold and large amplification of input terahertz pulses is demonstrated. [3673]

9:30
Phase-locking of terahertz quantum cascade lasers to a femtosecond mode-locked Er-fiber laser
M. Ravaro[1], P.Gellie[1], G. Santarelli[2], L. Ding[1], W. Maineult[1], C. Sirtori[1], S. Barbieri[1], R. Colombelli[3], H.E. Beere[4], D.A. Ritchie[4], S.P. Khanna[5], E.H. Linfield[5]; [1]Laboratoire Matériaux et Phénomènes Quantiques, Université Paris Diderot and CNRS (UMR 7162) (FR); [2]LNE-SYRTE, CNRS, UPMC, Observatoire de Paris (FR); [3]Institut d'Electronique Fondamentale, Université Paris Sud and CNRS, UMR 8622 (FR); [4]Cavendish Laboratory (UK); [5]School of Electronic and Electrical Engineering, University of Leeds (UK).
We demonstrate the phase-locking of Terahertz Quantum Cascade Lasers to the repetition rate of a commercial Er-doped fiber-fs-laser. We observe a linewidth of the beat-note signal with a signal-to-noise of 80 dB in 1Hz bandwidth. [3649]

9:45
Injection locking of Terahertz quantum cascade lasers using RF amplitude modulation
P. Gellie[1], S. Barbieri[1], J.F. Lampin[2], P. Filloux[1], C. Manquest[1], C. Sirtori[1], I. Sagne[3], S.P. Khanna[4], E.H. Linfield[4], H.E. Beere[5], D.A. Ritchie[5]; [1]Laboratoire MPQ, Université Paris7 and CNRS UMR 7162 (FR); [2]Laboratoire IEMN, Université de Lille 1 & CNRS UMR 8520 (FR); [3]Laboratoire LPN (FR); [4]School of Electronic and Electrical Engineering, University of Leeds (UK); [5]Cavendish Laboratory, University of Cambridge (UK).
We demonstrate that the round-trip frequency of terahertz (THz) quantum cascade lasers (QCLs) can injection-locked by direct amplitude modulation of the bias current using an RF source. [3646]

Room: Foucault

TOM 3

9:00 - 10:45
Photonic cavities
Session chair: M. Bertolotti
Università La Sapienza Di Roma (IT)

9:00 INVITED TALK
Photonic crystal nanobeam cavities
M. Lončar, P.B. Deotare, I.W. Frank, Q. Quan, Y. Zhang, I.B. Burgess, R. Shankar M.W. McCutcheon, I. Bulu; Harvard University, School of Engineering and Applied Sciences (US).
We present wavelength-scale high-Q photonic crystal nanobeam resonators made in various materials (Si, III-Vs, Si_3N_4) and designed to operate at wavelengths ranging from visible to microwave. Applications of these devices in reconfigurable photonics, optoelectronics, sensing, optical and quantum information processing is discussed. [3880]

9:30
Photonic crystal nanolasers, modulation and coherence characteristics
R. Braive, R. Hostein, D. Elivra, X. Hachair, I. Abram, I. Sagnes, G. Beaudoin, L. Le Gratiet, A. Talneau, I. Robert-Philip, A. Beveratos; CNRS-Laboratoire de Photonique et de Nanostructures (FR).
We demostrate coherent emission at room temperature from photonic crystal nanolaser subjected to Cavity Quantum Electrodynamics effects. We also show 10 GHz gain switching operation with bit-pattern independent chirp. [3644]

9:45
Sharp resonance of multimode periodic waveguide open resonator defined in Silicon-on-insulator
N.A. Piskunov[1,2], O. Khayam[2], H. Benisty[2]; [1]Physics Department, M.V. Lomonosov Moscow State University (RU), [2]Institut d'Optique Graduate School, Laboratoire Charles Fabry, CNRS (FR).
Broad periodic waveguide with side corrugation can offer flat bands and slow light of multiple modes in the so-called critical coupling regime. We implemented corrugated guides of width ~5 μm thanks to the Epixfab silicon-on-insulator facility. By vertical coupling, we measure at 1550-1580 nm quality factors Q>1200 at order m=75. [3640]

Room: Newton

TOM 4

8:45 - 10:45
Micro-optics for fabrication, measurement and Interferometry I
Session chair: U.D. Zeitner
Fraunhofer Institute for Applied Optics and Precision Engineering (DE)

8:45 INVITED TALK
Micro-optics: Key Enabling Technology (KET) for advanced mask aligner lithography
R. Voelkel[1], U. Vogler[1], M. Hornung[2], R. Zoberbier[2], L. Stuerzebecher[3], T. Harzendorf[3], U.D. Zeitner[3]; [1]SUSS MicroOptics SA (CH), [2]SUSS MicroTec Lithography GmbH (DE), [3]Fraunhofer Institut für Angew. Optik und Feinmechanik IOF (DE).
Microlens-based Köhler integrators are Key Enabling Technology (KET) for MO Exposure Optics, a novel illumination system for Mask Aligners. MO Exposure Optics provides excellent uniformity of mask illuminating light and allows to print at sub-micron resolution in large proximity gap using Mask Aligner Lithography. [3452]

9:15
Novel volume Bragg grating notch filters for ultralow-frequency Raman measurements
A. Glebov[1], O. Mokhun[1], V. Smirnov[1], L. Glebov[1], A. Rapaport[2], B. Roussel[2], H.-J.n Reich[2], F. Adar[3]; [1]OptiGrate Corp (US); [2]HORIBA Jobin-Yvon SAS (FR); [3]HORIBA Jobin-Yvon Inc (US).
Recent advances in volume Bragg grating (VBG) technologies have enabled development of new types of notch filters with a bandwidth of 5 -10 cm-1. The ultranarrow band filters made it possible for the first time to measure Stokes and Anti-Stokes lines less than 10 cm-1 with a single stage Raman spectrometer. [4007]

9:30
Differential Chromatic Dispersion Compensation in Long Arms Broadband Fiber Interferometer
H. Chikh Touami, L.M. Simohamed; Opto electronic laboratory, Military Polytechnic School (DZ).
The aim of this paper is to demonstrate that it's possible to totally compensate the effects of the dispersion in a long arm broadband interferometer, even by stretching fiber, or by progressively reducing the differential dispersion thanks to a cutting/polishing process. [3590]

Room: Huygens

TOM 5

9:00 - 10:45
Organic lasing and optical amplification
Session chair: G. Lanzani
Politecnico Di Milano (IT)

9:00 INVITED TALK
Insights on diffraction by a dielectric wedge from polymer-based micro-lasers
M. Lebental[1], N. Djellali[1], C. Ulysse[2], J. Zyss[1]; [1]Ecole Normale Supérieure de Cachan, CNRS UMR 8537, Laboratoire de Photonique Quantique et Moléculaire (FR); [2]Laboratoire de Photonique et Nanostructures, CNRS UPR20 (FR).
Diffraction of an electromagnetic wave by a dielectric wedge remains an open problem which is being addressed through polymer-based micro-lasers. Actually their spectra and far-field patterns strongly depend on the shape of the resonator, in particular to the presence (or absence) of contour edge singularities. [3631]

9:30
Integrated optofluidic random laser on femtosecond laser fabricated chip
K.C. Vishnubhatla[1], N. Bellini[2], R. Osellame[2], G. Lanzani[1,2], R. Ramponi[2], T. Virgili[2]; [1]Center for Nano Science and Technology of IIT@POLIMI (IT); [2]Istituto di Fotonica e Nanotecnologie - CNR and Dipartimento di Fisica - Politecnico di Milano (IT).
We demonstrate a novel approach to organic photonic devices, where the unique properties of a conjugated polymer in solution are exploited in a microfluidic configuration in order to produce easy-to-integrate random lasing photonic devices. [3642]

9:45 Student presentation
Highly efficient vertical external cavity surface-emitting organic laser (vecsol)
H. Rabbani-Haghighi, S. Forget, A. Siove, S. Chenais; Laboratoire de Physique des Lasers, Université Paris 13/CNRS (UMR7538) (FR).
We report on a solid-state laser structure being the organic counterpart of the optically-pumped Vertical External-Cavity Surface-Emitting Laser (VECSEL) concept. This approach allows diffraction-limited laser emission (M2=1) with a conversion efficiency as high as 43% (slope efficiency of 52%). [3337]

Amphithéâtre Fresnel

TOM 6

9:00 - 10:45
Compression and filamentation
Session chair: M. Sciamanna
SUPELEC (FR)

9:00 INVITED TALK
Self-compression of ultrashort laser pulses
S. Skupin[1,2], C. Brée[3], C. Köhler[1], A. Demircan[3], L. Bergé[4]; [1]Max Planck Institute for the Physics of Complex Systems (DE), [2]Friedrich Schiller University, Institute of Condensed Matter Theory and Optics (DE), [3]Weierstraß-Institut für Angewandte Analysis und Stochastik (DE), [4]CEA-DAM, DIF (FR).
Pulse self-compression in pressurized cells filled with noble gases is one of the hot and challenging topics in ultrafast nonlinear optics. The impressively simple setup and the high compression rates achieved so far make this technique attractive for various applications, from material processing to pump-probe experiments. [3253]

9:30 Student presentation
Fine control of THz radiation from bifilamentation by molecular lensing in air
M. Durand[1,2], Y. Liu[1], A. Houard[1], A. Mysyrowicz[1]; [1]Laboratoire d'Optique Appliquée, ENSTA ParisTech – Ecole Polytechnique, CNRS UMR 7639 (FR), [2]Département d'Optique Théorique et Appliquée, ONERA (FR).
We demonstrate a method to remotely control the Terahertz (THz) radiation emitted in air by femtosecond bifilaments, by fine tuning of the time delay between the two laser pulses. The phenomenon is relying on the molecular quantum lensing effect. [3194]

9:45 Student presentation
Energy transfer between femtosecond laser filaments in gases
M. Durand[1,2], Y. Liu[1], S. Chen[1], A. Houard[1], B. Prade[1], B. Forestier[1], A. Mysyrowicz[1], [1]Laboratoire d'Optique Appliquée, ENSTA ParisTech - Ecole Polytechnique, CNRS UMR 7639 (FR), [2]Département d'Optique Théorique et Appliquée, ONERA (FR).
Energy transfer between two femtosecond filaments is demonstrated. The physical mechanism is attributed to a travelling plasma grating formed at the intersection of the beams. An energy transfer ratio as high as 50 percent is achieved for pulses with energy of several millijoules, which can be useful to remotely replenish filaments. [3195]

Notes

Room: Maiman	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	TOM 2	TOM 3	TOM 4
			9:45 **Student presentation** **Complete wavefront reconstruction at infrared wavelength using speckle phase retrieval** *V.A. Gonzalez, T.J. Abregana, P.F. Almoro; National Institute of Physics, University of the Philippines (PH).* Reconstruction of an object wave front at infrared wavelength (1024 nm) using a speckle based phase retrieval technique is demonstrated experimentally. Correlation of the reconstructions with those obtained using digital holography confirm the effectiveness of our technique. [3531]
10:00 **Student presentation** **Three-dimensional particle manipulation in stereoscopic optical tweezers using complex non-diffracting elliptical beams** *C. Alpmann[1], R. Bowman[2], M. Woerdemann[1], M. Padgett[2], C. Denz[1]; [1]Westfälische Wilhelms Universität Münster, Institut für Angewandte Physik (DE), [2]University of Glasgow, Department of Physics and Astronomy (UK).* We demonstrate the generation of high quality Mathieu beams of various orders. The transversal field distributions of these non-diffracting beams enable us to create complex 3D particle structures in stereoscopic optical tweezers, which gives three-dimensional observation. [3469]	10:00 **Low divergence Terahertz photonic-wire laser** *M.I. Amanti, Gi. Scalari, F. Castellano, M. Beck , J. Faist; ETH Zurich, Institute for Quantum Electronics (CH).* Edge emitting, terahertz quantum cascade photonic-wire lasers, based on a third order Bragg grating are presented. Devices with a power consumption as low as 300 mW, with a single frequency output power of more than 1.5 mW in a single narrow spot are demonstrated. [3639]	10:00 **Student presentation** **Wire cavity photonic crystal hybrid III-V laser on silicon wire** *Y. Halioua[1,2], F. Raineri[1,3], A. Bazin[1], T.J. Karle[1], P. Monnier[1], I. Sagnes[1], G. Roelkens[2], R. Raj[1]; [1]Laboratoire de Photonique et de Nanostructures, (CNRS-UPR20) (FR), [2]Photonics Research Group, IMEC/Ghent University (BE), [3]Université Paris Diderot (FR).* We report laser emission from hybrid III-V nanocavities on silicon on insulator waveguide. The cavity is optically pumped by the surface laser emission is coupled into the SOI wire and collected at its output. [3625]	10:00 **Student presentation** **Observation of the differences between scalar and rigorous calculation at CGHs in Twyman-Green interferometers for lens testing** *W. Iff[1], S. Glaubrecht, N. Lindlein, J. Schwider; University of Erlangen, Chair of Optics, Institute of Optics, Information and Photonics (DE).* We investigate how differences between the scalar thin element approximation (TEA) and the rigorous calculation at computer generated holograms (CGHs) in Twyman-Green interferometers in null test configuration affect phase and intensity in the detector plane. The TEA and rigorous ray optics (RROM) are employed for the simulations. [3484]
10:15 **Student presentation** **Microscope-based orientation and sorting of biological objects with optical tweezers and forward scattered light** *B. Landenberger[1,2], A, Rohrbach[1]; [1]Lab for Bio- and Nano-Photonics, University of Freiburg (DE), [2]Centre for Biological Signalling Studies (bioss), University of Freiburg (DE).* An inverted microscope-based setup is presented that allows manipulation with optical forces, multi-dimensional tracking, multi-spectral observation, and analysis of biological objects ranging in size from single suspension cells to small embryos, consisting of thousands of cells. [3315]	10:15 **Student presentation** **A new material system for terahertz quantum cascade lasers: InGaAs/GaASb** *C. Deutsch[1], A. Benz[1], K. Unterrainer[1], P. Klang[2], H. Detz[2], M. Nobile[2], A.M. Andrews[2], W. Schrenk[2], G. Strasser[2]; [1]Vienna University of Technology, Photonics Institute (AT); [2]Vienna University of Technology, Center for Micro- and Nanostructures and Institute for Solid-State Electronics (AT).* We demonstrate terahertz quantum cascade laser devices based on the Aluminum free InGaAs/GaAsSb material system. Disk devices in a double-metal waveguide configuration show spectral emission between 3.6 and 4.1 THz and reach operating temperatures up to 105 K. [3543]	10:15 **High frequency GaAs nano-optomechanical disk resonator** *L. Ding[1], C. Baker[1], P. Senellart[2], A. Lemaitre[2], S. Ducci[1], G. Leo[1], I. Favero[1]; [1]Laboratoire Matériaux et Phénomènes Quantiques, Université Paris-Diderot, CNRS (FR), [2]Laboratoire Photonique et Nanostructures, LPN/CNRS (FR).* We present a high quality optical/mechanical GaAs disk resonator for cavity nano-optomechanics experiments. We measure giant optomechanical coupling rate (up to 10GHz/nm) and high frequency (up to GHz) mechanical modes, both resulting from the resonator nanoscale dimensions. Motional sensitivity of 10-17 m/√Hz is obtained. [3397]	10:15 **On-line 4D microscopy of non-periodic changing surfaces using high speed white light interference microscopy** *P.C. Montgomery, F. Anstotz, J. Montagna; Institut d'Electronique du Solide et des Systemes, Laboratoire Commun UdS-CNRS, UMR 7163 (FR).* A 4D (3D+t) real time interference microscopy system has been developed based on a high speed camera coupled with a FPGA processor. Real time 3D measurement at up to 25i/s allows the characterisation of changing microscopic surfaces. [3471]
10:30 **Student presentation** **Microfluidic systems combined with optical micromanipulations and spectroscopy for live-cell analysis and sorting** *Z. Pilát, A. Jonáš, O. Samek, J. Ježek, M. Šerý, P. Zemánek; Institute of Scientific Instruments of the ASCR, v.v.i., Academy of Sciences of the Czech Republic (CZ).* We have investigated a combination of optical trapping with microspectroscopic techniques and microfluidic chips for advanced biotechnological applications. [3486]	10:30 **Performance of a compact, continuous-wave terahertz source based on a quantum-cascade laser** *H. Richter[1], M. Greiner-Bär[1], S.G. Pavlov[1], A.D. Semenov[1], M. Wienold[2], L. Schrottke[2], M. Giehler[2], R. Hey[2], H.T. Grahn[2], H.-W. Hübers[3]; [1]German Aerospace Center (DLR), Institute of Planetary Research (DE); [2]Paul-Drude-Institut für Festkörperelektronik (DE); [3]Institut für Optik und Atomare Physik, Technische Universität Berlin (DE).* We report on the development of a compact, easy-to-use terahertz radiation source, which combines a quantum-cascade laser (QCL) with a compact, low-input-power Stirling cooler. [3377]	10:30 **Ultra-sharp edge filtering in nanotethered photonic wire evidenced by delay measurement** *A. Talneau[1], I. Sagnes[1] , R. Gabet[2], Y. Jaouen[2], H. Benisty[3]; [1]CNRS-Laboratoire de Photonique et de Nanostructures (FR), [2]TELECOM Paris Tech, [3]IOGS Laboratoire Charles Fabry, CNRS (FR).* Within a suspended InP photonic wire, the periodically spaced nanotethers holding the wire can behave as coupled resonators on a partially reflecting waveguide, creating an ultra-sharp filter edge. This complex resonant mechanism is investigated theoretically and evidenced experimentally using optical low coherence reflectometry. [3535]	10:30 **Student presentation** **3D reconstruction in digital holographic microscopy** *F. Joud[1], F. Verpillat[1], M. Atlan[2], M. Gross[1]; [1]Laboratoire Kastler Brossel, UMR 8552 CNRS ENS (FR), [2]Institut Langevin, ESPCI, 10 Rue Vauquelin (FR).* We describe an original method able to perform the holographic reconstruction in Digital Holographic Microscopy (DHM) without distortion of the 3D image in the longitudinal z direction. This method is well suited to reconstruct the 3D image the wavefield diffracted by an object. The reconstruction parameters can be calculated from the holographic data, without calibration of the setup. Reconstruction of the 3D wavefield diffracted by a 200 nm gold particles under TIR illumination is presented as an example. [3460]

10:45 - 11:15 coffee break (exhibition hall)

Room: Huygens	Amphithéâtre Fresnel	
TOM 5	**TOM 6**	**Notes**

10:00 **Student presentation**

Ultra-broad optical gain and two-colour amplified spontaneous emission in binary blends of insulated molecular wires

M.M. Mroz[1], S. Brovelli[2], T. Virgili[3], G. Sforazzini[4], A. Paleari[5], H.L. Anderson[4], F. Cacialli[2], G. Lanzani[1,6]; [1]Dipartimento di Fisica, Politecnico di Milano (IT); [2]London Centre for Nanotechnology, and Department of Physics and Astronomy, University College London (UK); [3]IFN-CNR c/o Politecnico di Milano, Dipartimento di Fisica (IT); [4]Department of Chemistry, University of Oxford, Chemistry Research Laboratory (UK); [5]Dipartimento di Scienza dei Materiali, Università di Milano-Bicocca (IT); [6]Center for Nano Science and Technology IIT@Polimi (IT).

Here, we show properties of conjugated polyrotaxanes combine into photonic application: ultra-broad band optical gain in a binary polymer blend that can be further exploited for two-colour lasing. We study the optical properties of a blend of polyfluorene and polyrotaxane by means ultrafast spectroscopy and ASE experiment. [3375]

10:00

Spectral and spatial transformation of a pulse probing a filament created in a crystalline target by femtosecond radiation

R.V. Volkov, A.B. Savel'ev; M.V. Lomonosov Moscow State University, Physical Department and International Laser Centre (RU).

The results on optical probing of a filament created in a KDP crystal by 50 fs pump pulses at the wavelength of 800 nm are presented. The Raman sidebands in the spectrum of the scattered 400 nm probe radiation are observed. Their spectral shift corresponds to an A_1 phonon excited during the pump pulse filamentation. [3446]

10:15

Composite PPV-nanoparticle distributed feedback lasers

F. Scotognella,[1] D.P. Puzzo,[2] M. Zavelani-Rossi,[1] R. Tubino,[3] G. Lanzani[1], G.A. Ozin[2]; [1]Dipartimento di Fisica, Politecnico di Milano (IT); [2]Department of Chemistry, University of Toronto (CA); [3]Dipartimento di Scienza dei Materiali, Università di Milano Bicocca (IT).

In this study, we have fabricated a poly (phenylene vinylene) (PPV) infiltrated nanoparticle one-dimensional photonic crystal and we have observed laser emission by pumping the PPV in this photonic structure with a pulse Ti:Sapphire laser. We have observed laser emission by single-photon and two-photon pumping. [3391]

10:15

High-energy amplification scheme for near-single-cycle pulses at 2 μm based on angular dispersion

J.A. Fülöp, T. Trinn, Gy. Tóth, J. Hebling; University of Pécs, Department of Experimental Physics (HU)

We show that energy-scalable optical parametric amplification is possible in LiNbO3 with extremely increased bandwidth in the infrared by using an angularly dispersed signal beam. This scheme allows amplification of near-single-cycles pulses. [3650]

10:30

Dye-doped polymer laser in self-formed waveguide with highly efficient Fabry-Perot cavity

K. Yamashita, M. Ito, S. Sugimoto, T. Morishita, K. Oe; Kyoto Institute of Technology, Department of Electronics (JP).

A polymer-based laser for integrated optoelectronics was fabricated with a self-written active waveguide technique. For this laser device, we have succeeded in fabrication of an efficient Fabry-Perot cavity, and a drastic reduction in the lasing threshold was achieved. [3119]

10:30

Generating ultra-short energetic pulses with cascaded soliton compression in lithium niobate crystals

B.B. Zhou[1], A. Chong[2], F.W. Wise[2], M. Bache[1], [1]Technical University of Denmark, DTU Fotonik (DK), [2]Cornell University, Dep. Applied and Engineering Physics (US).

By launching energetic femtosecond pulses in a lithium niobate crystal, the phase mismatched second-harmonic generation process compresses the 50 fs input pulse at 1250 nm to 30 fs through a soliton effect. [3371]

10:45 - 11:15 coffee break (exhibition hall)

TOM 1	TOM 2	TOM 3	TOM 4

11:15 - 12:00 **PLENARY TALK**

Trends in nanoplasmonics: smaller, faster, stronger

M.I. Stockman; Department of Physics and Astronomy, Georgia State University (US).

We consider latest developments in nanoplasmonics and its numerous applications. Nanoplasmonics deals with collective electron dynamics on the surface of metal nanostructures, which arises as a result of excitations called surface plasmons. The surface plasmons localize and concentrate optical energy in nanoscopic regions creating highly enhanced local optical fields. [3901]

[Room: Amphithéâtre Fresnel]

12:45 - 13:45 lunch break (exhibition hall)

13:45 - 15:15 **POSTER SESSION I** (exhibition hall) and **exhibition only time**

For the poster presentations please see pages 76 to 88.

15:15 - 17:35 GRAND CHALLENGES OF PHOTONICS — Room: Amphithéâtre Fresnel

Chairs: F. Laurell, KTH - Royal Institute of Technology (SE) & **P. Urbach**, Delft University of Technology (NL)

15:15

Introduction

15:20 **INVITED TALK**

Inkjet printing in device and materials discovery

G.E. Jabbour, Y. Yoshioka, H. Haverinen; University of Oulu (FI).

Inkjet printing can be powerful tool in device and materials discovery in many areas including electronics, photonics, biology, and medicine, to mention a few. In this talk we will present the use of inkjet printing approach in flexible electronics and photonics. In particular, we will discuss the use of inkjet to control oxidation/reduction reactions on a conducting/insulating surface in order to obtain various values of sheet resistivity, and how it relates to device fabrication. Moreover, we will show the power of this technique in generating combinatorial libraries of sheet resistivity that can be accessed at will, and specified at any desired location on the substrate with impressive accuracy. Such capability allows for the fabrication of various electrical elements such as variable resistors, strip heaters, etc.., monolithically integrated on the same substrate. It is also beneficial in image storage for security applications or identification on smart packages. Another area that recently benefited from the use of inkjet printing is displays. Recent work shows that inkjet printing technique is an indispensible approach in RGB patterning of quantum dots LEDs. In fact, use of inkjet allowed for the first time the demonstration of DC driven high density RGB pixel array (QVGA format). Time permitting; we will also discuss a simple inkjet process to develop highly conducting textiles based on PEDOT (polyethylenedioxythiophene). This is carried based on in-situ direct polymerization of ethylene dioxythiophene (EDOT) monomer via a small molecule oxidizer. The resulting fabric is highly conductive with sheet resistivity values less than 20 Ω/sq, durable, and washable. [3927]

15:50 **INVITED TALK**

Light in femtoseconds: the making of molecular movies with ultrashort lasers

L. Bañares, Departamento de Química Física, Facultad de Ciencias Químicas, Universidad Complutense de Madrid (ES).

The natural time scale for physical and chemical change in molecules is from tenths to hundreds of femtoseconds. Physical change in molecules is related among others with molecular vibration and energy relaxation. Chemical change deals with bond breaking and bond forming in chemical reactions. The last two decades have witnessed the advent and development of ultrafast laser technologies. One of the most recognized applications of these laser technologies to Chemistry has given rise to the birth of Femtochemistry, which is nowadays a scientific discipline by its own merits. Femtochemistry was awarded with the Nobel Prize in Chemistry in 1999 and the laureate was Prof. Ahmed H. Zewail (CalTech, Pasadena, US) who is the pioneer in the development of the field. In this contribution we will show recent experiments where fast molecular processes are directly visualized through a novel combination of ultrashort (femtosecond) lasers and (ion and photoelectron) imaging techniques. [3918]

17:35 - 18:00 coffee break

18:00 - 20:00 EOS Annual General Meeting & EOS Prize and Fellows Ceremonies (Room: Amphithéâtre Fresnel)

Open to all EOS members and EOSAM 2010 attendees.

TOM 5	TOM 6		

12:00-12:45 **PLENARY TALK**

Molecular control for organic photonics

D.D.C. Bradley, Department of Physics and Centre for Plastic Electronics, Imperial College London (UK).

This talk will focus on the influence of molecular structure (chemical and physical) on the optical properties of organic semiconductor materials. In particular, I will discuss approaches to enhancing the potential of organic materials for application in photonics. Recent results will be presented from work addressing materials development for electrically pumped organic lasers, a metamaterials inspired approach to optical structure fabrication and the use of organic gain media for plasmonic amplifier structures. [3912]

[Room: Amphithéâtre Fresnel]

12:45 - 13:45 Lunch break (exhibition hall)

13:45 - 15:15 **POSTER SESSION I** (exhibition hall) and **exhibition only time**

For the poster presentations please see pages 76 to 88.

15:15 - 17:35 GRAND CHALLENGES OF PHOTONICS — Room: Amphithéâtre Fresnel

Chairs: F. Laurell, KTH - Royal Institute of Technology (SE) & **P. Urbach**, Delft University of Technology (NL)

16:20 **INVITED TALK**

Light trapping in thin-film solar cells

A. Polman, Center for Nanophotonics, FOM-Institute AMOLF (NL).

In this presentation I will describe how light trapping in thin-film solar cell can be achieved using suitably engineered metal nanostructures. When integrated with thin-film solar cell designs, these can strongly increase the solar cell efficiency and reduce its thickness. I will review three light trapping geometries indicated schematically below. All designs use the controlled scattering and/or optical near field enhancement near due to the excitation of surface plasmons in metal nanoparticles to enhance the absorption of light in a thin-film solar cell. [3917]

16:50 **INVITED TALK**

Geometry and light

U. Leonhardt, School of Physics and Astronomy, University of St Andrews (UK).

The lecture explains how ideas of general relativity can become practically useful in electrical and optical engineering and how some of the elusive physics of the event horizon can be demonstrated in the laboratory. The lecture focuses on three key examples, invisibility cloaking, perfect imaging and horizons, that have one important theoretical aspect in common: they connect Maxwell's electromagnetism and Einstein's general relativity, light with geometry. [3916]

17:20
Discussion

17:35 - 18:00 coffee break

18:00 - 20:00 EOS Annual General Meeting & EOS Prize and Fellows Ceremonies (Room: Amphithéâtre Fresnel)
Open to all EOS members and EOSAM 2010 attendees.

Room: Lippmann

TOM 1

9:00 - 10:30
Micro- and nanotechnologies for biomedical applications
Session chair: A. Heisterkamp
Laser Zentrum Hannover e.V. (DE)

9:00 INVITED TALK
Laser-based nanotechnologies for biomedical applications
B.N. Chichkov, Laser Zentrum Hannover e.V., Nanotechnology Department (DE).
Our recent progress in the development of laser-based nanotechnologies for applications in photonics and regenerative medicine will be reported. Fabrication of nanophotonic components by two-photon polymerization (2PP) of photostructurable sol-gel materials will be discussed. 2PP allows the fabrication of two- and three-dimensional structures with a resolution well beyond the diffraction limit. The polymerization process is initiated when the beam of an ultrafast, infrared laser is tightly focused into the volume of a transparent, photosensitive material. Two-photon absorption takes place within the focal volume; by moving the focused laser beam within the material, fully 3D structures can be fabricated. Possible applications of this technique for the fabrication of photonic crystals, metamaterials, plasmonic components, and biomedical devices will be discussed. [3885]

9:30 Student presentation
Artificial biopolymer networks with optical trapped anchor points
D. Ruh, A. Rohrbach; Lab for Bio- and Nano-Photonics, University of Freiburg (DE).
Optical traps represent a versatile and flexible tool to manipulate many particles in parallel and in three dimensions. Therewith, it is possible to generate an array of anchorpoints for artificial polymer networks. In particular, microtubules play a key roll in cellular processes like cell division and mechanotransduction. We aim at building up synthetic biopolymer networks using time-multiplexed optical tweezers for both 3D force generation and measurements. [3278]

Room: Michelson

TOM 2

9:00 - 10:30
THz imaging II - far-field imaging
Session chair: P. Planken
Delft University of Technology (NL)

9:00 MASTER CLASS TALK
THz imaging systems
H. Roskos, Johann Wolfgang Goethe-University (DE).

Room: Foucault

TOM 3

9:00 - 10:30
Nano-antennas
Session chair. C. Sibilia
Università di Roma
"La Sapienza" (IT)

9:00 INVITED TALK
Nanoscale light control
L.(K.) Kuipers, Center for Nanophotonics, FOM Institute AMOLF (NL).
Nanoscale structures can exert a huge control over light fields. By tailoring the geometry it is possible to obtain desired optical properties. Here, we will highlight several new advances in the use of plasmonic structures and photonic crystals to control light fields. With a phase-sensitive, polarization-sensitive near/field microscope we map the vector fields of light at the nanoscale. [3632]

9:30
Impedance of a nanoantenna
J.J. Greffet, M. Laroche, F. Marquier; Laboratoire Charles Fabry, Institut d'Optique, Université Paris Sud (FR).
Antennas are widely used by electrical engineers to enhance the coupling between propagating waves and electric sources or detectors. It is thus tempting to develop an optical analog to tailor visible light emission or absorption by an atom or a molecule. [3586]

Room: Newton

TOM 4

9:00 - 10:30
Micro-optics for fabrication, measurement and interferometry II
Chair: S. Sinzinger
TU Ilmenau (DE)

9:00 INVITED TALK
Micro-optics system and SPAD array detectors for parallel photon timing applications
I. Rech[1], C. Cammi[1], A. Gulinatti[1], M. Ghioni[1], S. Cova[1], M. Taghizadeh[2], G. Buller[2]; [1]Politecnico di Milano, Dipartimento di Elettronica e Informazione (IT), [2]Heriot-Watt University (UK).
Over the past few years there has been a growing interest in monolithic arrays of single photon avalanche diodes (SPAD) for spatially resolved detection of faint ultrafast optical signals. SPADs implemented in CMOS -compatible planar technologies offer the typical advantages of microelectronic devices (small size, ruggedness, low voltage, low power, etc.). Furthermore, they have inherently higher photon detection efficiency than PMTs and are able to provide, beside sensitivities down to single-photons, very high acquisition speeds. In order to make SPAD array more and more competitive in time-resolved application it is necessary to face problems like electrical crosstalk between adjacent pixels, power dissipation and optical fill factor. [3419]

9:30
Nano-optical grating interferometer for SMART InspEction system High Speed and multifunctional testing of MEMS and MOEMS (SMARTIEHS)
U.D. Zeitner[1], M. Oliva[1], D. Michaelis[1], M. Józwik[2], M. Kujawińska[2]; [1]Fraunhofer Institute for Applied Optics & Precision Engineering (DE), [2]Warsaw University of Technology, Institute of Micromechanics and Photonics (PL).
We present a miniaturized interferometer concept based on nano-optical gratings in resonance domain. The design and fabrication of the different gratings as well as the assembly of the complex monolithic interferometer arrangement are described. [3413]

Room: Huygens

TOM 5

9:00 - 10:30
Organic photovoltaic: materials and devices
Session chair: W. Freude
Karlsruhe Institute of Technology (KIT) (DE)

9:00 INVITED TALK
Photogeneration and ultrafast dynamics of excitons and charges in polymer/fullerene/quantum dot blend films
L.D.A. Siebbeles; Optoelectronic Materials Section, Department of Chemical Engineering, Delft University of Technology (NL).
Photogeneration and decay of excitons and charges in the conjugated polymer poly(3-hexylthiophene) (P3HT) with PCBM or PbS quantum dots as electron acceptors were studied with ultrafast laser spectroscopy. Insights in the mechanism of charge carrier formation (via carrier multiplication) are discussed. [3295]

9:30
Real time studies during coating and post-deposition annealing in organic semiconductors for solar cell applications
M. Campoy-Quiles[1], A. Roigé[2], C. Müller[3], M. Schmidt[1], D. Nassyrov[1], I. Burgués[1], M.I. Alonso[1], J.O. Ossó[2], A.R. Goñi[1], O. Inganäs[3], M. Garriga[1]; [1]Science Material Institute of Barcelona (ICMAB-CSIC), Campus UAB (ES); [2]MATGAS 2000, AIE (ES); [3]Biomolecular and Organic Electronics, FM Linköpings University (SE).
The small -Van-der-Walls- interaction between organic molecules enables them to rearrange into a variety of film morphologies, including glassy and semi-crystalline phases, such that the final morphology strongly depends on the specific processing conditions and post-deposition treatments. Moreover, for the case of organic solar cells, the morphology at the nanoscale of donor acceptor mixtures has been found to be one of the key parameters influencing their performance. Understanding how to monitor and control the morphology is, therefore, a major issue in the field. [3882]

Amphithéâtre Fresnel

TOM 6

9:00 - 10:30
Spatial and spatiotemporal effects
Session chair: G. Steinmeyer
Max Born Institut (DE)

9:00
Spatial soliton formation in erbium doped lithium niobate driven by a self-induced fluorescence beam
M. Alonzo[1], F. Devaux[2], A. Toncelli[3], N. Argiolas[4], M. Bazzan[4], C. Sada[4], M. Chauvet[2], E. Fazio[1]; [1]Ultrafast Photonics Laboratory, Dipartimento di Energetica, Sapienza Università di Roma and CNISM (IT), [2]Département d'Optique, Institut FEMTO-ST, Université de Franche-Comté (FR), [3]Dipartimento di Fisica E. Fermi, Università di Pisa and NEST-CNR (IT), [4]Dipartimento di Fisica G.Galilei, Università di Padova and CNISM (IT).
We report experimental and numerical results about spatial optical soliton formation in erbium doped lithium niobate at 980nm. It will be shown that a self-induced fluorescence in green is responsible for light self-confinement. Luminescence role for space charge field stabilization and bending reduction will be analyzed. [3596]

9:15
Cavity solitons in a monolithic vertical-cavity laser with saturable absorber
S. Barbay, T. Elsass, K. Meunier, G. Beaudoin, I. Sagnes, R. Kuszelewicz; Laboratoire de Photonique et de Nanostructures, CNRS-UPR20 (FR).
We present experimental results showing the formation and manipulation of laser cavity solitons at a 80MHz rate in a monolithic and integrated vertical cavity laser with saturable absorber. Manipulation of dynamical states that pave the way to the observation of pulsed cavity solitons will also be presented. [3579]

9:30 INVITED TALK
Nematicons: self-steering self-confined light beams in liquid crystals
G. Assanto, A. Alberucci, A. Piccardi; NooEL – Nonlinear Optics and Opto-Electronics Lab, University Roma Tre (IT).
We introduce and illustrate power-dependent self-steering of spatial solitons in nematic liquid crystals, i.e. nematicons, demonstrating it in two cases, namely un-doped and dye-doped liquid crystals in planar cells. [3128]

Room: Maiman

TOM 7

8.45 - 10.30
Photonics for solar energy
Chairs: M.L. Calvo[1] & D.T. Moore[2]
[1]ICO President (ES); [2]ICO Elected Vice-President, Chair of t. ICO Committee f. Regional Development (US)

8:45 - 9.00
Introduction

9:00 INVITED TALK
Subwavelength photonics: A new waveguide principle for highly efficient planar waveguide components
P. Cheben[1], P.J. Bock[1,2], J.H. Schmid[1], J. Lapointe[1], S. Janz[1], D.-X. Xu[1], A. Densmore[1], A. Delâge[1], B. Lamontagne,[1] M.L. Calvo[3], T.J. Hall[2]; [1]Institute for Microstructural Sciences, National Research Council (CA); [2]Centre for Research in Photonics, University of Ottawa (CA); [3]Complutense University of Madrid, Ciudad Universitaria (ES).
We present a new type of micro-photonic waveguide based on the subwavelength grating effect. We demonstrate how these waveguides can be used to make compact and highly efficient photonic devices, including a fibre-chip coupler with an efficiency of 93% (0.3 dB) and a miniature planar waveguide spectrometer chip with an operation bandwidth of 170 nm with a device size of only ~100 mm x 160 mm. [3199]

9:30
Optical nanoantennas for high-efficient ultra-thin solar cells
S. Collin[1], C. Colin[1], C. Sauvan[2], I. Massiot[1], F. Pardo[1], N. Péré-Laperne[1], P. Ghenuche[1], N. Bardou[1], P. Lalanne[2], J.-L. Pelouard[1]; [1]Laboratoire de Photonique et de Nanostructures (LPN-CNRS) (FR); [2]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Univ. Paris-Sud (FR).
We propose new concepts for light trapping in ultra-thin solar cells. It is shown numerically that optical nano-antennas can lead to broadband absorption in 30nm-thick GaAs solar cells, with 17.5% energy conversion efficiency. [3488]

Notes

Room: Lippmann	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	**TOM 2**	**TOM 3**	**TOM 4**
9:45 **A soft-lithographic technique for replicating hydrophobic areas patterned by a femtosecond laser on PMMA** *C. De Marco[1], S.M. Eaton[2], S. Turri[1], M. Levi[1], R. Ramponi[2], G. Cerullo[2], R. Osellame[2]; [1]Politecnico di Milano, Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta" (IT), [2]IFN-CNR, Dipartimento di Fisica, Politecnico di Milano (IT).* We demonstrate that femtosecond laser ablated patterns of hydrophobic areas on a poly(methyl methacrylate) master can be replicated using a new solvent-resistant polymer. This simple and low cost method can be applied to obtain passive valves and mixers for handling fluids in microfluidic channels. [3620]	9:45 **Student presentation** **Terahertz time domain imaging of clay artefacts** *J. Labaune[1,2,3], J. Jackson[1], K. Fukunaga[3], M. Menu[2], G. Mourou[1]; [1]Ecole polytechnique, Institut de la Lumière Extrême (FR); [2]Cente de recherche et de restauration des musées de France (FR); [3]National Institute of Information and Communications Technology (JP).* Terahertz time-domain spectroscopy can be use to image optically opaque objects or detect different materials. In this presentation we propose to use terahertz to image in transmission and in reflection clay artefacts. [3442]	9:45 **Controlling light emission with optical antennas** *A. Devilez, B. Stout, N. Bonod; Institut Fresnel, Domaine Universitaire de Saint Jérôme (FR).* This talk is dedicated to the control through compact optical antennas of light radiated by single emitters. We will present the concept of metallo-dielectric antenna which permits to conceive compact, ultra radiative and highly directive antennas. [3356]	9:45 **Student presentation** **Time-resolved optical emission analysis and growth of $BiSr_2CaCu_2O_{8+\delta}$ thin films** *J.C. de Vero, J.F. Gabayno, J.R. Vitug, R.V. Sarmago, W.O. Garcia; National Institute of Physics, University of the Philippines-Diliman (PH).* Time-resolved optical emission spectroscopy (TROES) was performed during infrared pulsed laser deposition of $Bi_2Sr_2CaCu_2O_{8+\delta}$ thin films. TROES reported the presence of excited neutrals, ionized and excited species of BiSrCaCuO plasma. Smooth, highly caxis oriented films were obtained after heat treatment. [3202]
10:00 **Student presentation** **Two-dimensional dielectrophoretic particle trapping in a hybrid PDMS/crystal system** *M. Esseling, F. Holtmann, M. Woerdemann, C. Denz; Westfälische Wilhelms-Universität Münster, Institute for Applied Physics & Center for Nonlinear Science (CeNoS) (DE).* We present two-dimensional dielectrophoretic particle trapping on a photorefractive surface. Highly modulated electric fields are generated by structuring the material with an amplitude spatial light modulator. We demonstrate periodic and arbitrary alignment patterns in air and trapping in a microfluidic environment. [3374]	10:00 **Nondestructive terahertz pulse imaging for cultural heritage conservation: a survey** *J.B. Jackson[1] J. Labaune[1], I.N. Duling[2], J. White[2], L. D'Alessandro[3], M. Menu[4], G.A. Mourou[1], [1]ENSTA-École Polytechnique, Institute Lumière Extrême (FR); [2]Picometrix-Advanced Photonics, Inc (US); [3]University of Chicago Oriental Institute (US); [4]Center for Research and Restoration of the Museums of France (FR).* Terahertz pulsed imaging has been used to investigate a broad variety of cultural heritage-related objects including: drawings, papyrus texts, wood panels, frescoes, mosaics, marble and ceramics. [3560]	10:00 **Colloidal quantum dots as probes of excitation field enhancement in photonic antennas** *H. Aouani[1], S. Itzhakov[2], D. Gachet[1], E. Devaux[3], T.W. Ebbesen[3], H. Rigneault[1], D. Oron[2], J. Wenger[1]; [1]Institut Fresnel, Aix-Marseille Université, CNRSde St Jérôme (FR), [2]Department of Physics of Complex Systems, Weizmann Institute of Science (IL), [3]Institut de Science et d'Ingénierie Supramoléculaires, Université de Strasbourg, CNRS (FR).* Optical nanoantennas are essential devices to manipulate light at the nanoscale. Experimental characterization of such structures is highly needed to fully understand and optimize the antenna's design. We present here a novel approach to measure the antenna amplification by monitoring the transient emission dynamics of Qdots. [3263]	10:00 **Tomographic diffractive microscopy: towards high resolution 3D imaging in the multiple scattering regime** *Y. Ruan[1], E. Mudry[1], G. Maire[1], P. Chaumet[1], H. Giovannini[1], K. Belkebir[1], A. Talneau[2], A. Sentenac[1]; [1]Institut Fresnel, UMR 6133 CNRS, Aix-Marseille Université, Domaine Universitaire de Saint-Jérôme (FR), [2]Laboratoire de Photonique et de Nanostructures, CNRS (FR).* We have developed a tomographic diffractive microscope and a nonlinear inversion procedure to reconstruct the permittivity map of tridimensional objects in the multiple scattering regime, where linear scattering models cannot be applied, with a resolution well beyond the Rayleigh criterion. [3533]
10:15 **High speed tracking of protein bodies: revealing the transport mechanisms in living plant cells** *C. López-Quesada[1], M. Joseph[2], M. D. Ludevid[2], E. Martín-Badosa[1], M. Montes-Usategui[1]; [1]Universitat de Barcelona, Optical Trapping Lab - Grup de Biofotònica, Departament de Física Aplicada i Òptica (ES); [2]Centre de Recerca en Agrigenòmica - CSIC-IRTA (CRAG), Departament de Genètica Molecular (ES).* In this work, we present a fast speed tracking of vesicles, named protein bodies, which is addressed to study the nature of the intracellular transport mechanism in living tobacco cells. [4025]	10:15 **Application of terahertz spectral-imaging to cancer diagnosis** *M.-A. Brun[1], F. Formanek[1], M. Sekine[2], A. Yasuda[1], Y. Eishii[2]; [1]Life Science Laboratory, Advanced Materials Laboratories, Sony Corporation Tokyo Medical and Dental University (JP); [2]Department of Human Pathology, Tokyo Medical and Dental University Yushima (JP).* We report on terahertz (THz) time-domain spectroscopy (TDS) imaging of 10-µm thick histological sections. The links between cellular structures and specific THz information is investigated by comparing visible microscope images with segmented THz images. [3247]	10:15 **Student presentation** **Digital holography for the three-dimensional mapping of the light scattered by nanoantennas** *S.Y. Suck[1,3], S. Collin[2], N. Bardou[2], Y. De Wilde[1], G. Tessier[1]; [1]Institut Langevin, Laboratoire d'Optique, CNRS UMR 7587 (FR), [2]Laboratoire de Photonique et de Nanostructures (LPN-CNRS) (FR), [3]Fondation Pierre-Gilles de Gennes pour la Recherche (FR).* Full field digital heterodyne holography is used to study the scattered electromagnetic field of optical antennas. After a spectroscopic characterization, the three-dimensional scattering pattern of various gold nanoantennas was measured for wavelengths in and out of resonance. [3482]	10:15 **Student presentation** **A novel length measurement interferometer based on a femtosecond optical frequency comb introduced multi-pulse trains' interference** *D. Wei, S. Takahashi, K. Takamasu, H. Matsumoto; The University of Tokyo, Department of Precision Engineering (JP).* A novel executable interferometric scheme based on a femtosecond optical frequency comb (FOFC) introduced multi-pulse trains' interference is proposed to achieve length measurement of meter order with an accuracy of nanometer order. The result of the length measurement experiment will be presented. [3209]

10:30 - 11:00 coffee break (exhibition hall)

Room: Huygens	Amphithéâtre Fresnel	Room: Maiman	
TOM 5	**TOM 6**	**TOM 7**	**Notes**

9:45 **Student presentation**

The use of dynamic probes to study the drying and crystallization in P3HT:PCBM thin films

A.J. Pearson[1], T.Wang[1], A.D.F Dunbar[2], P.A. Staniec[1], P.E. Hopkinson[3], J.E. MacDonald[4], S. Lilliu[4], C. Pizzey[5], N.J. Terrill[5,6], A.M. Donald[3], A.J. Ryan[6], R.A.L. Jones[1], D.G. Lidzey[1]; [1]Department of Physics & Astronomy, University of Sheffield (UK); [2]Department of Chemical Engineering, University of Sheffield (UK); [3]Department of Physics, University of Cambridge (UK); [4]Department of Physics & Astronomy, Cardiff University (UK); [5]Diamond Light Source Ltd, Harwell Science Campus (UK); [6]Department of Chemistry, University of Sheffield (UK).

A combination of spectroscopic ellipsometry (SE) and grazing incidence x-ray scattering (GI-XS) are used to probe structure formation in thin films of an organic semiconductor blend *in-situ* during the film casting process. This information is vital for designing future processing routes which exploit the favourable properties of these materials. [3890]

10:00 **Student presentation**

Organic photodetectors based on squaraine/pcbm bulk-heterojunction

M. Binda[1], A. Iacchetti[1,2], D. Natali[1,2], M. Sampietro[1,2], L. Beverina[3]; [1]Politecnico di Milano, Dipartimento di Elettronica e Informazione (IT); [2]CNST-IIT at Politecnico di Milano (IT); [3]University of Milano-Bicocca, Department of Materials Science and INSTM (IT).

Organic photodetectors have been realized exploiting squaraine dyes in order to harvest the light in the near-infrared range of the spectrum. High quantum efficiency and fast response have been achieved by employing the squaraine dye in bulkheterojunction with [6,6] phenyl C61 butyric acid methyl ester. [3515]

10:15

Preparation of sub-micron structured films of conjugated polymers and their use for photovoltaic device applications

J. Farinhas[1], A. Charas[1], Q. Ferreira[1], R. Di Paolo[2], J. Morgado[1,3]; [1]Instituto de Telecomunicações (PT); [2]Centro de Química Estrutural, Instituto Superior Técnico (PT); [3]Departamento de Engenharia Química e Biológica, Instituto Superior Técnico (PT).

Cross-linked films of conjugated polymers with sub-micron structured surfaces are prepared from blends with polystyrene. These films are used to prepare photovoltaic cells and their performance is related to the dimensions of the polymer surface patterns. [3193]

10:00

Vortex lattices in the coherently pumped polariton microcavities

A.V. Gorbach, R. Hartley, D.V. Skryabin; Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK).

We propose a new class of vortex lattices supported by the parametric conversion of polaritons in wide aperture semiconductor microcavities operating in the strong coupling regime. We present numerical and analytical results confirming the existence and robustness of the polaritonic vortex lattices and discuss their melting scenarios. [3361]

10:15

Propagation effects in THZ generation by ionizing two-color laser pulses

C. Köhler[1], W. Kuehn[2], I. Babushkin[3], S. Skupin[1,4], L. Bergé[5], K. Reimann[2], M. Woerner[2], J. Herrmann[2], T. Elsaesser[2]; [1]Max Planck Institute for the Physics of Complex Systems (DE), [2]Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (DE), [3]Weierstraß-Institut für Angewandte Analysis und Stochastik (DE), [4]Friedrich Schiller University, Institute of Condensed Matter Theory and Optics (DE), [5]CEA-DAM, DIF (FR).

We present a combined theoretical and experimental study of spatio-temporal propagation effects in THz generation in gases using two-color ionizing laser pulses. (3+1)-dimensional simulation results agree well with experimental measurements and clarify the physical mechanisms responsible for THz emission. [3284]

9:45 **INVITED TALK**

Increased performance of thin film silicon photovoltaic modules through optical confinement strategies.

M. Fonrodona, J. Andreu; T-Solar Global, S.A., Technology Transfer Centre (ES).

The main objective of photovoltaic technology is cost reduction and the main driver for cost reduction is to increase efficiency. Better exploitation of light accomplished via optical confinement strategies is a clear road ahead to fulfill this goal. [3319]

10:15

Photonic structures to improve solar cells efficiencies

J. Le Rouzo, C. Alfonso, M. Amin Ali, D. Barakel, D. Duché, L. Escoubas, M. Gailhanou , L. Roussel, J-J. Simon; Aix-Marseille University, Institut Matériaux Microélectronique Nanosciences de Provence-IM2NP, CNRS-UMR 6242 (FR).

In order to significantly increase efficiencies of photovoltaic solar cells, optical and electrical performances must be simultaneously improved. Photonic structures such as photonic crystals or nanostructures are a very promising way to address this problem. [3459]

10:30 - 11:00 coffee break (exhibition hall)

TOM 1	TOM 2	TOM 3	TOM 4
			11:00 - 11:45 **PLENARY TALK** **Resonance waveguide gratings** *M. Kuittinen; Department of Physics and Mathematics, University of the Eastern Finland (FI).* Dielectric sub wavelength resonant waveguide gratings (RWGs) were designed and fabricated to act as reflectors. Furthermore, the usage of RWGs in enhancing of the second harmonic generation, the fluorescence signal and the Raman scattering was considered. [3395] **[Room: Amphithéâtre Fresnel]**
11:45 - 12:30 **PLENARY TALK** **Optofluidics** *D. Psaltis, Ecole Polytechnique Federale de Lausanne (EPFL) (CH).* Optofluidics refers to a class of adaptive optical circuits that integrate optical and fluidic devices. Familiar examples include liquid crystals and dye lasers. The introduction of liquids in the optical structure enables fine-tuning and reconfiguration of circuits so they can perform tasks optimally in a changing environment. We will discuss how the emergence of fluidic transport technologies at the micron and nanometer levels opens possibilities for novel adaptive optical devices. [3879] **[Room: Amphithéâtre Fresnel]**			

12:30 - 13:30 lunch break

13:30 - 15:00 **POSTER SESSION II** (exhibition hall) and **exhibition only time**
For the poster presentations please see pages 76 to 88.

15:00 - 15:45 **JOINT POST-DEADLINE SESSION** **Room:** Amphithéâtre Fresnel

Session Chair: **H.P. Herzig**, General Chair EOSAM 2010 & EOS President, Ecole Polytechnique Fédérale de Lausanne - EPFL IMT OPT (CH)

15:00
Introduction

15:05
Ultracompact silicon/polymer laser with an absorption-insensitive nano-photonic resonator
T. Stöferle[1], N. Moll[1], T. Wahlbrink[2], J. Bolten[2], T. Mollenhauer[2], U. Scherf[3], R.F. Mahrt[1]; [1]IBM Research – Zurich (CH); [2]Advanced Microelectronic Center Aachen (AMICA) AMO GmbH (DE); [3]Macromolecular Chemistry Group and Institute for Polymer Technology, Bergische Universität Wuppertal (DE).
Visible laser emission is observed from two silicon subwavelength-sized high index contrast gratings with embedded polymer gain material. The size of the laser is reduced by an order of magnitude compared to established designs based on photonic bandgap structures. This extends silicon photonics into the visible wavelength range. [4006]

15:15
All-optical switching in silica microspheres coated by nonlinear polymer
I. Razdolskiy[1], S. Berneschi[3,2], G. Nunzi Conti[2], S. Pelli[2], T.V. Murzina[1], G.C. Righini[2], S. Soria[2]; [1]Department of Physics, Moscow State University (RU); [2]IFAC-CNR, Institute of Applied Physics (IT); [3]Museo storico della Fisica e Centro Studi e Ricerche « E. Fermi » (IT).
Nonlinear Kerr switching of the whispering gallery modes (WGM) excited in silica microspheres covered by a nonlinear polymer are studied. The nonlinear switch of WGM of 2 GHz exceeds the thermally induced effect by nearly an order of magnitude in the vicinity of two-photon p-p* polymer transition at the pump radiation wavelength. [4005]

TOM 5	TOM 6	TOM 7	

12:30 - 13:30 lunch break

13:30 - 15:00 **POSTER SESSION II** (exhibition hall) and **exhibition only time**
For the poster presentations please see pages 76 to 88..

15:00 - 15:45 **JOINT POST-DEADLINE SESSION** **Room:** Amphithéâtre Fresnel

Session Chair: **H.P. Herzig**, General Chair EOSAM 2010 & EOS President,
Ecole Polytechnique Fédérale de Lausanne - EPFL IMT OPT (CH)

15:25
Amplified Spontaneous Emission from planar polymer waveguide under cw-pumping
M.M. Mroz[1], F. Scotognella[1], M. Zavelani-Rossi[1], G. Lanzani[1,2]; [1]Dipartimento di Fisica, Politecnico di Milano (IT); [2]Center for Nano Science and Technology of IIT@Polimi (IT).
We demonstrate amplified spontaneous emission (ASE) from MEH-PPV in a slab waveguide under cw-pumping. We observe line narrowing of the emission spectrum for pump intensities above 0.3 mW/cm^2. ASE, collected at the edge of the waveguide, is centred at 603 nm with a FWHM of 23 nm and shows high polarization contrast [4022]

15:35
Distance metrology for space missions using femtosecond laser pulses
Y.-J. Kim, Y. Kim, J. Lee, S. Hyun, B.J. Chun, S. Kim, K. Lee, S.-W. Kim; Ultrafast Optics for Ultraprecision Technology Research Group, KI for Optical Science and Technology, KAIST (KR).
The frequency comb of a femtosecond laser source provides a wavelength ruler that enables multi-wavelength light interferometry for real-time measurement of long distances. In addition, femtosecond laser pulses allow time-of-flight measurement with improved precision in comparison to conventional lasers. This unique remote ranging capability of femtosecond lasers is investigated for next-generation space missions deploying multiple satellites for synthetic aperture imaging. The position and orientation of each satellite is to be precisely measured and controlled with respect to the master satellite to realize formation flying in space. [4009]

Room: Lippmann

TOM 1

16:00 - 17:00
Perspectives on biophysical dynamics, kinetics and imaging
Session chair: H. Schmidt
University of California (US)

16:00 **Student presentation**
Following translation kinetics Using quantum-dots
D. Dulin[1], A. Le Gall[1], N. Soler[2], C. Gaudin[2], N. Westbrook[1], P. Bouyer[1], D. Fourmy[2], K. Perronet[1], S. Yoshizawa[2]; [1]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS et Université Paris Sud 11 (FR), [2]Laboratoire de Chimie et Biologie Structurales ICSN-CNRS (FR).
We present a study of the protein synthesis translation at the single molecule level. Kinetics of protein synthesis could be monitored from initiation to termination using an appropriate surface chemistry to attach ribosomes tagged with a quantum dot. [3489]

16:15 **Student presentation**
Photonic force based investigations of intracellular molecular motor dynamics
F. Kohler[1,2], A. Rohrbach[1]; [1]Lab for Bio- and Nano-Photonics, University of Freiburg (DE), [2]Centre for Biological Signalling Studies (bioss), University of Freiburg (DE).
We use photonic force microscopy (PFM) with 3D back focal plane interferometry to investigate different mechanical concepts of phagocytes to take up 1µm beads. One interesting concept of these cells is the usage of filopodia. Discrete steps several nm were measured during filopodia retraction likely belonging to molecular motors. [3312]

16:30 **Student presentation**
Interaction dynamics of colloidal particles in scanning line optical tweezers
B. Tränkle, A. Rohrbach; University of Freiburg, Lab for Bio- and Nano-Photonics (DE).
We have established a method for 3D tracking of diffusing spheres at high frequencies and nanometer precision. The dynamic interaction of at least 2 particles diffusing within a confined volume can be studied. [3245]

Room: Michelson

TOM 2

16:00 - 17:00
THz spectroscopy of organic and biological material
Session chair: K. Tanaka
Kyoto University (JP)

16:00 **INVITED TALK**
Terahertz measurements of the peptide dynamical transition
D.K. George[1], J.-Y. Chen[2], Y. He[3], A.G. Markelz[1]; [1]SUNY Buffalo, Physics, Buffalo (US); [2]Washington State University, Institute for Shock Physics (US); [3]SUNY Buffalo, Chemistry (US).
Temperature dependent terahertz time domain spectroscopy measurements are made on a series of biomolecules. The so called dynamical transition is present in peptides down to pentamers, but is no longer present for smaller peptides. The transition changes significantly with ligand binding to larger proteins. [3575]

16:30
Temperature dependence of the THz lattice modes in polyvinylidene fluoride and high-densitiy polyethylene
M. Reuter[1], S. Wietzke[1,2], C. Jansen[1,2], T. Jung[1], S. Chatterjee[1], M. Koch[1]; [1]Philipps-Universität Marburg, Fachbereich Physik (DE); [2]Technische Universität Braunschweig, Institut für Hochfrequenztechnik (DE).
Terahertz time-domain spectroscopy yields experimental evidence for strong interactions between the amorphous and the crystalline domains in semi-crystalline polymers. The thermal gradient of the lattice mode frequency shift changes at the glass transition that originally takes place in the amorphous domains. [3499]

Room: Foucault

TOM 3

16:00 - 17:00
Subwavelength waveguiding
Session chair: P. Lalanne
Institut d'Optique (FR)

16:00
Kerr shutter and power equalizer using polarization rotation in silicon waveguides
I.D. Rukhlenko[1], I.L. Garanovich[2], M. Premaratne[1], A.A. Sukhorukov[2], G.P. Agrawal[3], Y.S. Kivshar[2]; [1]Advanced Computing and Simulation Laboratory (AχL), Department of Electrical and Computer Systems Engineering, Monash University (AU), [2]Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University (AU), [3]Institute of Optics, University of Rochester (US).
We theoretically analyze nonlinear polarization rotation in silicon waveguides due to the Kerr-induced self- and cross-phase modulation (SPM and XPM). We derive analytical expressions for transmittance of the Kerr shutter and power equalizer operating in the continuous-wave (CW) regime and use them to optimize the transmittance. [3289]

16:15
Single polarization transmission in nano-wall supported silicon wire waveguide
W. Zhang, J.-r. Cheng, Y. Wang, Y.-d. Huang, J.-de Peng; Electronic Engineering Department, Tsinghua University (CN).
A novel nano-wall supported silicon wire waveguide is proposed. Theoretical analysis and experiment results demonstrate that it only supports quasi-TE mode transmission, showing its potential in low loss silicon based polarization integrate components. [3327]

16:30
Experimental demonstration of coupling to silicon photonic wires using a grating coupler formed by subwavelength structures
J.H. Schmid[1], P. Cheben[1], J. Lapointe[1], D. Bedard[1], R. Halir[2], Í. Molina-Fernández[2], S. Janz[1], A. Delâge[1], A. Densmore[1], B. Lamontagne[1], R. Ma[1], D.-X. Xu[1]; [1]Inst. for Microstructural Sciences, National Research Council (CA), [2]Dept. Ingeniería de Comunicaciones, ETSI Telecomunicación, Universidad de Málaga (SE).
We present experimental results on a novel fiber-chip grating coupler for silicon photonic wire waveguides. By using subwavelength grating structures, which act as an averaged effective medium inside the grooves of the diffraction grating, the grating strength can be varied continuously to optimize the mode overlap of the diffracted beam with the fiber mode. Grating couplers and photonic wire waveguides are fabricated in a single etch step. We have measured maximum fiber-to-photonic wire coupling efficiencies of approximately 40% for the transverse magnetic (TM) mode. [3344]

Room: Newton

TOM 4

16:00 - 17:00
Biological applications
Session chair: S. Pelli
Istituto di Fisica Applicata (IFAC-CNR) (IT)

16:00 **INVITED TALK**
Optical coherence tomography in medicine and art conservation
A. Kowalczyk; Institute of Physics, N. Copernicus University (PL).
Optical coherence tomography - its physical foundations, instrumentation and requirements to create cross sections of objects that weekly scatter and weakly absorb light is discussed. Applications in medicine and art conservation will be demonstrated. [3241]

16:30
Holographic mapping of blood flow from optical fluctuations measurements
B. Samson[1], C. Magnain[1], M. Gross[2], M. Atlan[1]; [1]Institut Langevin. Fondation Pierre-Gilles de Gennes, CNRS UMR 7587. INSERM U 979 (FR), [2]Laboratoire Kastler Brossel, UMR 8552 CNRS (FR).
We report laser Doppler blood flow imaging in the rat retina and in the mouse brain, with heterodyne holography. Sequential sampling of the beat of the reflected near infrared radiation against a frequency-shifted reference beam is made onto an array detector. Wide-field maps of optical fluctuation spectra at low radiofrequencies exhibit angiographic contrasts without requirement of exogenous marker. [3577]

Room: Huygens	Amphithéâtre Fresnel	Room: Maiman	
TOM 5	**TOM 6**	**TOM 7**	**Notes**
16:00 - 16:45 **Organic photovoltaics and spectroscoy of related materials** **Session chair. D. Lidzey** University of Sheffield (UK)	16:00 - 17:00 **Biological applications and imaging** **Session chair: F. Hache** CNRS/Ecole Polytechnique LOB (FR)	16:00 - 17:00 **New advanced photovoltaic devices** **Session chair: H. Michinel** Universidade de Vigo (ES)	
16:00 **Effects of local Coulomb field on charge generation in P3HT-based solid state dye-sensitized solar cells** *A. Abrusci[1], R. Sai Santosh Kumar[2] , A. Petrozza[2], H.J. Snaith[1]; [1]University of Oxford, Department of Physics (UK), [2]Center for Nano Science and Technology of IIT@PoliMI" (IT).* Currently, dye-sensitized solar cells (DSSC) are a realistic option for converting light to electrical energy. Hybrid architectures offer a vast materials library for device optimization, including a variety of metal oxides, organic and inorganic sensitizers, molecular, polymeric and electrolytic hole-transporter materials. In order to further improve the efficiency of solid-state hybrid solar cells, attention has been recently focused on using polymers such as poly(3-hexylthiophene) (P3HT), to replace the more commonly used spiro-MeOTAD, in order to enhance the absorption within thin films. [3394]	16:00 **Nonlinear optical imaging of collagen liquid crystals** *A. Deniset-Besseau[1], P. De Sa Peixoto[2], G. Mosser[2], M.-C. Schanne-Klein[1]; [1]Ecole Polytechnique, Laboratory for Optics and Biosciences; CNRS; INSERM U696 (FR), [2]Université Paris 6, Laboratoire de Chimie de la Matière Condensée; CNRS (FR).* We use nonlinear optical microscopy to characterize collagen liquid crystalline phases at the micrometer scale. Second Harmonic signals provide highly contrasted images of the collagen cholesteric organization due to the large hyperpolarizability of collagen triple helices. Application of this methodology proved relevant to characterize collagen biomimetic structures. [3316]	16:00 INVITED TALK **Improved photovoltaic performances of heterostructured tetrapod-shaped CdSe/CdTe nanocrystals using C60** *G. Gigli; National Nanotechnology Laboratory, Institute of Nanoscience CNR; Innovation Engineering Department, University of Salento; Italian Institute of Technology, IIT@Unile (IT).* Semiconductor nanocrystals (NCs) are promising building blocks for future-generation photovoltaic (PV) devices, such as all-inorganic NCs solar cells hybrid nanocrystal-polymer composite solar cells, and dye-sensitized solar cells. Colloidal inorganic NCs could offer processing, scale, and cost advantages of organics, while retaining the broadband absorption and superior transport properties of traditional PV semiconductors. Recently, considerable research has focused on the synthesis, shape control, and photophysics of heterostructured type II nanocrystals. Joining together in a single nanostructure two materials with a type II band gap offset can, in fact, induce spatial separation of photogenerated carriers within the nanostructure itself, with the electron residing in one material and the hole in the other one. [3583]	
16:15 **Control of amplified emission and photoconductivity in a polyfluorene-diarylethene blend** *S. Perissinotto[1], M. Garbugli[2], A. Ram S.K.S.M.[2], C. Bertarelli[1,3], M. Carvelli[4], K.S. Wong[5], G. Lanzani[1]; [1]Center for Nano Science and Technology - IIT@PoliMi (IT); [2]Politecnico di Milano, Department of Physics (IT); [3]Politecnico di Milano, Department of Chemistry, Materials and Chemical Engineering (IT); [4]Philips Research Labs (NL); [5]Hong Kong University of Science and Technology, Department of Physics (HK).* A novel system for amplified emission modulation based on a polyfluorene/diarylethene blend is shown. High sensitivity of Amplified Spontaneous Emission (ASE) is exploited to achieve strong emission modulation with a low intensity control signal. Moreover, the same system acts as photoconductivity switch based on the same principle. [3331]	16:15 **Two-photon microscopy: a new approach to measure oxygen and blood flow in the brain** *Y. Goulam Houssen[1], A. Parpaleix[1], J. Lecoq[1,2], M. Ducros[1], S. Vinogradov[3], S. Charpak[1]; [1]Laboratory of Neurophysiology and New Microscopies, INSERM U603, CNRS UMR 8154, University Paris Descartes (FR), [2]James H. Clark Center for Biomedical Engineering and Sciences, Stanford University (US), [3]Department of Biochemistry and Biophysics, University of Pennsylvania (US).* We present here a new technique based on two-photon microscopy and phosphorescence quenching of the oxygen sensor PtP-C343 [1], to measure oxygen partial pressure in deep vessels of the rodent brain. [3551]		
16:30 **Electron dynamics in thiophene based materials probed by two-photon photoemission** *E. Varene, I. Martin, C. Bronner, M. Wolf, P. Tegeder; Freie Universität Berlin, Fachbereich Physik (DE).* Semiconducting materials based on organic molecules or polymers are promising candidates for applications in electronic devices such as organic photovoltaic cells. It will be shown that time-resolved two-photon photoemission (TR-2PPE) is a valuable methode to probe their electronic structure and carrier dynamics. [3500]	16:30 **Ultrafast conformational dynamics studied by time-resolved circular dichroism** *F. Hache; Laboratoire d'Optique et Biosciences, Ecole Polytechnique - CNRS – INSERM (FR).* Time-resolved circular dichroism experiments have been carried out in a pump-probe experiment. Two techniques are proposed. The first one relies on the modulation of the probe polarization whereas the second one uses a Babinet-Soleil compensator. Utilisation of this technique is shown in Binaphthol and in Carboxy-myoglobin. [3326]	16:30 **Design, assembly, and testing of a spectral splitting solarconcentrator module** *E. Christensen[2], D.T. Moore[1,2], G.R. Schmidt[2], B.L. Unger[2]; [1]ICO Elected Vice-President, Chair of the ICO Committee for Regional Development (US); [2]University of Rochester (US).* This paper describes the design, assembly, and testing of a concentrating photovoltaic module which uses spectral splitting to achieve high system power efficiency. An efficiency of 37.5% was measured on a prototype module. [3588]	

Room: Lippmann — TOM 1

16:45
Image Improvement by a new Light Sheet Generating System in Ultramicroscopy
S. Saghafi[1,2], K. Becker[1,2], N. Jährling[1,2,3], H.-U. Dodt[1,2]; [1]Vienna University of Technology, FKE, Dept. of Bioelectronics (AT), [2]Center for Brain Research, Medical University of Vienna (AT), [3]Dept. of Neurobiology, University of Oldenburg (DE).
We developed improved light sheet generation optics, which provide longer Raleigh ranges, whilst retaining beam waists comparable to the standard system with one cylindrical lens and a slit aperture. Using the modified system we achieved a marked improvement in the resolution of ultramicroscopy reconstructions of representative biological specimens. [3633]

Room: Michelson — TOM 2

16:45
Higher order conformation of poly(3-hydroxyalkanoate)s studied by terahertz spectroscopy
H. Hoshina[1], Y. Morisawa[2], H. Sato[2], I. Noda[3], Y. Ozaki[2], C. Otani[1]; [1]RIKEN Advanced Science Institute (JP); [2]Kwansei Gakuin University (JP); [3]The Procter & Gamble Company (US).
Terahertz absorption spectra of Poly (3-hydroxybutyrate)s were measured. The orientation of the transition dipole moment was investigated by the polarization spectra. The temperature dependence of the spectra reflects the change in the hydrogen bonding distance of the crystalline structure. [3399]

Room: Foucault — TOM 3

16:45
Realization of three-arm hybrid coupler with long range surface plasmon polariton and dielectric waveguides
F. Liu, Y. Li, Z. Li, Y. Huang; Tsinghua University, Department of Electronic Engineering (CN).
The three-arm hybrid coupler, which comprised of the middle long range surface plasmon polariton waveguide (Au strip) and two outside dielectric waveguides (SiNx strip), was fabricated and the high efficient coupling has been observed. [3353]

Room: Newton — TOM 4

16:45 Student presentation
Application of cavity-enhanced direct frequency comb spectroscopy in the detection of biomarkers in exhaled breath
A. Reyes-Reyes[1], M.G. Zeitouny[1], N. Bhattacharya[1], S.T. Persijn[2], H.P. Urbach[1]; [1]Delft University of Technology, Optics Research Group (NL), [2]VSL (NL).
We discuss the cavity-enhanced direct frequency comb spectrometer developed in our laboratory. In particular we show how low concentrations (ppb) of different molecules present in the same gas sample can be simultaneously detected. Its capabilities make it a reliable tool in the analysis of human breath. [3508]

17:00 - 17:30 coffee break (Bar terrasse)

17:30 - 19:00 — Advanced and optimized photonics technology

Session chair: M. Ferrari
CNR-IFN, Istituto di Fotonica e Nanotecnologie (IT)

17:30 INVITED TALK
Wide field supercritical angle fluorescence microscopy
T. Barocca[1], K. Balaa[1], J. Delahaye[1], S. Lévêque-Fort[2], E. Fort[1]; [1]Institut Langevin, ESPCI ParisTech, CNRS UMR 7587, Université Pierre and Marie Curie, University Paris Diderot (FR), [2]Centre de Photonique biomédical and Institut des Sciences Moléculaires d'Orsay, FRE CNRS 3363 (FR).
We will present a new technique to observe cell adhesion phenomena and processes at membranes in living cells. This technique called supercritical angle fluorescence microscopy is based on fluorescence spatial filtering. It allows parallel wide field observation of in-depth cell imaging and membrane processes. [3556]

17:30 - 18:45 — Terahertz spectroscopy techniques and tools

Session chair: G. Gallot
Ecole Polytechnique (FR)

17:30 Student presentation
Multi-THz transients with electric fields exceeding 10 MV/cm in the single-cycle limit
F. Junginger[1], A. Sell[1], O. Schubert[1], B. Mayer[1], D. Brida[2], M. Marangoni[2], G. Cerullo[2], R. Huber[1], A. Leitenstorfer[1]; [1]University of Konstanz, Department of Physics and Center for Applied Photonics (DE); [2]Politecnico di Milano, ULTRAS-INFM-CNR, Dipartimento di Fisica (IT).
Broadband parametric amplification of 1.3-µm pulses in GaSe crystals provides intense single-cycle idler transients covering the window between 1 and 60 THz with peak electric field amplitudes exceeding 10 MV/cm. The temporal trace of the phasestable waveform is detected electro-optically. [3652]

17:45
Optimization of the electric field strength of THz sources based on optical rectification
J.A. Fülöp, L. Pálfalvi, G. Almási, J. Hebling; University of Pécs, Department of Experimental Physics (HU).
It is shown by calculations that the electric field strength of THz sources based on optical rectification of femtosecond pulses in LiNbO3 can be increased by up to an order of magnitude by optimizing the pump pulse duration and cooling the crystal. [3553]

17:30 - 19:00 — Nanoparticles

Session chair: C. Sibilia
Università di Roma "La Sapienza" (IT)

17:30
Magneto-optical interactions of light with thermal magnons localised on metal ferromagnetic nanorods
A.A. Stashkevich[1], Y. Roussigné[1], P. Djemia, Y. Yushkevich, S.M. Chérif[1], P.R. Evans[2], A.P. Murphy[2], W.R. Hendren[2], R. Atkinson[2], R.J. Pollard[2], A.V. Zayats[2]; [1]LPMTM CNRS (UPR 9001) (FR), [2]Centre for Nanostructured Media, Queen's University of Belfast (GB).
In this talk we report on the experimental observation of magneto-optical interaction involving thermal magnons localized on ferromagnetic nanorods using the Brillouin backscattering measurements. The experimental results are conformed by numerical simulations. [3587]

17:45 Student presentation
Amplitude and phase fields of photonic nanojets
M.-S. Kim[1], T. Scharf[1], H.P. Herzig[1], S. Mühlig[2], C. Rockstuhl[2]; [1]Ecole Polytechnique Fédérale de Lausanne (EPFL), Optics & Photonics Technology Laboratory (CH), [2]Friedrich-Schiller-Universität Jena, Institute of Condensed Matter Theory and Solid State Optics (DE).
We report on advanced 3D direct imaging of light fields emerging from a photonic nanojet. We used an interference microscope that allows observation of amplitude and phase at the highest resolution. For the first time cross polarization interferometry is used to characterize scattering properties of a nanojet sphere. [3318]

17:30 - 19:30 — Active Micro-optics & lasers

Session chair: R. Buczynski
University of Warsaw (PL)

17:30 INVITED TALK
Micro-optical sources for quantum communication in space
M. Jofre[1], A. Gardelein[1], G. Anzolin[1], M.W. Mitchell[1], V. Pruneri[1, 2]; [1]ICFO-Institut de Ciencies Fotoniques (ES), [2]ICREA-Institucio Catalana de Recerca i Estudis Avançats (ES).
We report on the development of novel high speed and brightness integrated photonic sources for quantum key distribution in very demanding environmental conditions, such as those encountered in space. [3358]

Room: Huygens	Amphithéâtre Fresnel	Room: Maiman	
TOM 5	**TOM 6**	**TOM 7**	**Notes**
	16:45 **Experimental and numerical analysis of image wavelength conversion with a hydrogen Raman shifter** *G.G. Manahan[1], M.L.Y. Torres-Mapa[1,2], W.O. Garcia[1]; [1]Univ. of the Philippines, National Institute of Physics (PH), [2]University of St. Andrews (UK).* We investigate the transfer of two dimensional image carried by the 2nd harmonics (532 nm) of the Nd:YAG laser to the first Stokes (683 nm) wavelength using a hydrogen Raman shifter. [3538]	16:45 **Dimpled planar lightguide solar concentrators** *B.L. Unger[2], G.R. Schmidt[2], D.T. Moore[1,2]; [1]ICO Elected Vice-President, Chair of the ICO Committee for Regional Development (US); [2]University of Rochester (US).* Lightguide concentrators show tremendous promise for thin form-factor, lightweight, and inexpensive replacements for the current generation of refractive and reflective solar concentrators. We propose a new type of structure for reducing optical losses and dramatically increasing the practical upper limit concon-centration within micro-structured lightguide concentrators. [3589]	
17:00 - 17:30 coffee break (Bar terrasse)			
17:30 - 18:45 **High-speed signal processing and ultra-fast phenomena** **Session chair: I. Siebbeles** Delft University of Technology (NL)	17:30 - 18:45 **Nonlinear lattices and waveguides** **Session chair: D. Skryabin** University of Bath (UK)	17:30 - 19:45 **ICO PRIZE AND GALILEO GALILEI AWARD CEREMONIES**	
17:30 **INVITED TALK** **High-speed signal processing with silicon-organic hybrid devices** *W. Freude, L. Alloatti, T. Vallaitis, D. Korn, D. Hillerkuss, R. Bonk, R. Palmer, J. Li, T. Schellinger, M. Fournier[1], J. Fedeli[1], W. Bogaerts[2], P. Dumon[2], R. Baets[2], A. Barklund[3], R. Dinu[3], J. Wieland[3], M.L. Scimeca[4], I. Biaggio[4], B. Breiten[5], F. Diederich[5], C. Koos, J. Leuthold; Karlsruhe Institute of Technology (KIT), Institute of Photonics and Quantum Electronics (IPQ) (DE); [1]CEA, LETI, Minatec (FR); [2]Photonics Research Group, Ghent University – IMEC (BE); [3]GigOptix Inc. (CH) & GigOptix Bothell (WA) (US); [4]Department of Physics, Lehigh University (US); [5]Lab. f. Organische Chemie, ETH Zürich (CH).* A silicon-organic hybrid (SOH) platform combines CMOS technology with nonlinear organic cover materials. While strong light confinement is provided by silicon, its free-carrier limitations are avoided. We show 40 Gbit/s electro-optic modulation, all-optical 170 Gbit/s OTDM demultiplexing, and 56 Gbit/s DQPSK wavelength conversion. [3601]	17:30 **INVITED TALK** **Solitonic supermodes and resonant radiation in subwavelength silicon-on-insulator waveguide arrays** *A.V. Gorbach[1], W. Ding[1], O.K. Staines[1], C.E. de Nobriga[1], G.D. Hobbs[1], W.J. Wadsworth[1], J.C. Knight[1], D.V. Skryabin[1], A. Samarelli[2], M. Sorel[2], R.M. De La Rue[2]; [1]Centre for Photonics and Photonic Materials, Department of Physics, University of Bath (UK), [2]Department of Electronics and Electrical Engineering, University of Glasgow (UK).* We report theoretical and experimental investigation of resonant radiation by solitonic supermodes in an array of three silicon-on-insulator subwavelenth waveguides. Adjusting the input pulse position across the array, we observe different patterns in the radiation spectra corresponding to the different superpositions of solitonic supermodes. [3347]	**For the ICO PRIZE AND GALILEO GALILEI AWARD CEREMONIES please see page 7.** **Notes**	

Room: Lippmann	Room: Michelson	Room: Foucault	Room: Newton
TOM 1	TOM 2	TOM 3	TOM 4
18:00 **Excitable particles in an optical torque wrench** *F. Pedaci[1], Z. Huang[1], M. van Oene[1], N. Dekker[1], S. Barland[2]; [1]Kavli Institute of NanoScience. Dep. of Bionanoscience (NL), [2]INLN (FR).* We study the rotational dynamics of a birefringent nano-fabricated particle trapped in an optical torque wrench, and demonstrate both experimentally and theoretically the *excitability* of the system in a vicinity of a critical point. The excitable particle can be used as a non-linear local sensor for single perturbation events. [3695]	18:00 **Measuring thin-film parameters using a standard terahertz time-domain spectroscopy set up** *Y. Laamiri, F. Garet, J.-L. Coutaz; IMEP-LAHC, UMR CNRS 5130, University of Savoie (FR).* We determine the refractive index and absorption coefficient of micron-thick films by standard terahertz time-domain spectroscopy thanks to the excitation of electromagnetic resonances (guides modes, surface plasmons) in periodic structures (metallic hole arrays, grating waveguide couplers) on which the films are deposited. [3668]	18:00 **Laser action in self-assembled microcavities of CdSe/CdS core/shell colloidal quantum rods with suppressed Auger recombination** *M. Zavelani-Rossi[1], M.G. Lupo[2], R. Krahne[3], L. Manna[3], G. Lanzani[1,2]; [1]National laboratory for ultrafast and ultraintense optical science ULTRAS INFM-CNR, Dipartimento di Fisica Politecnico di Milano (IT), [2]Center for Nano-Science and Technology, IIT@POLIMI (IT), [3]Fondazione Istituto Italiano di Tecnologia (IT).* We present colloidal core/shell CdSe/CdS quantum rods (QRs) with suppressed nonradiative Auger recombination and long living gain. Moreover we show that these QRs self-assemble in micro-resonators, upon simple droplet deposition. We demonstrate single-mode low-threshold laser action from these microcavities. [3444]	18:00 **All optical switching of liquid crystal infiltrated polymeric structures** *D.E. Lucchetta, F. Vita, G. Veroli, F. Simoni; Università Politecnica delle Marche, Dipartimento di Fisica ed Ingegneria dei Materiali e del Territorio (FIMET), Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (CNISM-MATEC) (IT).* In this work we report the fabrication techniques and the characterization of an all optical switching device driven by an optical field in presence of a static external electrical field. A new high sensitive detection technique has been developed and new experimental geometries used in order to achieve the maximum level of performances. [3881]
18:15 **Poynting singularities, relationship between intensity distribution and other characteristics of vector field** *I. Mokhun, K. Kharitonova, Y. Galushko, Y. Viktorovskaya, Chernivtsi University (UA).* Poynting singularities and their networks in the heterogeneously polarized vector field are considered. It is shown that intensity distribution may be used as characteristic, which joins ("cements") all parameters of optical field. [3605]	18:15 **Fresnel losses in terahertz computed tomography** *A. Younus[1], P. Mounaix[1], S. Salort[2], J.P. Caumes[2], B. Recur[3], J.P. Domenger[3], P. Desbarats[3], E. Abraham[1]; [1]CPMOH, University Bordeaux 1 (FR), [2]ALPhANOV Centre Technologique Optique et Lasers, [3]LABRI, Université de Bordeaux/CNRS (FR).* A pulsed-terahertz source and a continuous millimeter wave emitter have been separately employed to visualize the internal structures of opaque 3D samples. By applying a filtered backprojection algorithm, computed terahertz tomography has been performed to reconstruct the cross-sections. Especially, phantoms have been used to investigate the diffraction and refraction losses. [3654]	18:15 **Two-photon interference with the emission of electrically tuneable remote quantum dots** *A.J. Bennett[1], R.B. Patel[1,2], I. Farrer[2], C.A. Nicoll[2], D.A. Ritchie[2], A.J. Shields[1]; [1]Toshiba Research Europe Limited, Cambridge Research Laboratory (GB), [2]Cavendish Laboratory, Cambridge University (GB).* We have developed a device in which the emission energy of single quantum dots can be Stark-shifted 25meV. We use this system to tune transitions in remote quantum dots to the same energy and observe two-photon interference with their emission. [3299]	18:15 **Non-mechanical variable apertures based on intrinsic conductive polymers** *S. Roth[1], M. Ignatowitz[1], P. Müller[2], W. Mönch[2], E. Oesterschulze[1]; [1]Physics of Nanostructures and Technology, Department of Physics, University of Kaiserslautern (DE), [2]Laboratory for Micro-optics, Department of Microsystems Engineering (IMTEK), University of Freiburg (DE).* A variable aperture stop design without moving mechanical parts is presented. The system relies on the unique absorption and transmission behaviour of redox active electro chromic polymers. By that, purely electrically controlled circular apertures were realised. [3539]
18:30 **Student presentation** **Lens design for optimized trapping optics** *A. Oeder, C. Bauer, S. Stoebenau, S. Sinzinger, TU Ilmenau, IMN MacroNano® (DE).* We present the design and fabrication of an optimized integrated system for optical tweezing. The powerful simulation algorithms of conventional lens design software are used to provide data for a simulation tool for the optical forces thus allowing the optimization of the system. We present examples of compact trapping modules. [3594]	18:30 **Student presentation** **Phase modulation detection in DAST crystal for THz time domain spectroscopy system at 1.55 µm wavelength** *M. Martin[1], J. Mangeney[1], P. Crozat[1], P. Mounaix[2]; [1]IEF, UMR CNRS 8622, Univ. Paris-Sud (FR); [2]CPMOH, UMR CNRS 5798, Université Bordeaux I (FR).* We report on the detection of THz pulses in DAST electro-optic crystal using phase modulation detection scheme. THz time-domain spectroscopy system using 1.55 µm wavelength femtosecond pulses and phase modulation technique is achieved with a detection bandwidth of 4.3 THz. [3548]	18:30 **Student presentation** **Optical manipulation and fast tracking of nanorods** *M. Griesshammer, A. Rohrbach; Lab for Bio- and Nano-Photonics, University of Freiburg (DE).* A great challenge in nanotechnology is the controlled assembly of tiny building blocks (BB) into nano-systems with designed functionality. A predestinated candidate that meets the requirements of grabbing, moving and releasing BB are optical tweezers. We engineer methods for observing and steering of nanorods with optical tweezers. [3317]	18:30 **Liquid crystal micro-cells: collective fabrication of individual micro-cells** *O. Castany, L. Dupont; Optics Department, Telecom Bretagne, UMR CNRS 6082 (FR).* We developed a micro technology process which enables the fabrication of microscopic individual liquid crystal cells. With a dimension close to 500 µm, they are the smallest independent cells manufactured to this day and can be placed on several kinds of substrates. One of our goals is to use these micro-cells for the fabrication of tunable VCSEL chips. [3427]

Room: Huygens	Amphithéâtre Fresnel	Room: Maiman	
TOM 5	**TOM 6**	**TOM 7**	Notes

18:00
High-performance modulators for optical communications realized with a commercial side-chain DR1-PMMA electro-optic copolymer
S. Michel, J. Zyss, I. Ledoux-Rak, C.T. Nguyen; Ecole Normale Supérieure de Cachan, Institut d'Alembert, Laboratoire de Photonique Quantique et Moléculaire (FR).
We report the high performance of electro-optic modulators made of a commercial side-chain electro-optic copolymer DR1-PMMA. The best figure of merit displays 3.84 V.cm at 1.55 µm wavelength which has never been observed in a modulator realized with a commercial electro-optic polymer. [3634]

18:00 Student presentation
Complex nonlinear photonic lattices based on families of nondiffracting beams
M. Boguslawski, P. Rose, C. Denz; Institut für Angewandte Physik and Center for Nonlinear Science (CeNoS), Westfälische Wilhelms-Universität Münster (DE).
In this contribution, we present a novel approach in the field of optically induced photonic lattices. Based on an evolved variant of phase-engineered lattice waves, we are able to generate nondiffracting light distributions with miscellaneous advanced geometries. This allows for the optical induction of reconfigurable nonlinear Bessel, parabolic, Mathieu, and even quasi-periodic photonic structures. [3485]

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Please see page 7.

Notes

18:15 Student presentation
Nanoscale imaging of photovoltaics blends using an ultrafast confocal microscope
G. Grancini[1], D. Polli[1], J. Cabanillas Gonzales[2], G. Cerullo[1], G. Lanzani[3]; [1]Politecnico di Milano, Dipartimento di Fisica (IT); [2]IMDEA, UAM, Modulo C-IX (ES); [3]Center for Nano Science and Technology of IIT@POLIMI (IT).
We introduce a novel instrument combining femtosecond pump-probe spectroscopy and confocal microscopy. We apply the system to map the spatial distribution of charge separation and recombination dynamics in photovoltaic blends made of Donor-Acceptor Bulk Heterojunctions. [3348]

18:15
Mobile light bullets in modulated photonic lattices
I.L. Garanovich[1], M. Matuszewski[1,2], A.A. Sukhorukov[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]Instytut Fizyki PAN (PL).
We predict that stable mobile spatio-temporal solitons can exist in arrays of periodically curved optical waveguides. We find two- and three-dimensional light bullet solutions using variational formalism. Stability of the light bullets is confirmed by the direct numerical simulations which show that the bullets can freely move across the arrays. [3249]

18:30
Ultrafast sensitization dynamics of Er (III) near-infrared emission in coordination compounds with organic ligands
F. Quochi[1], F. Artizzu[2], M. Saba[1], M. L. Mercuri[2], P. Deplano[2], A. Mura[1], G. Bongiovanni[1]; [1]Dipartimento di Fisica, Università di Cagliari, SLACS-INFM/CNR (IT); [2]Dipartimento di Chimica Inorganica e Analitica, Università di Cagliari (IT).
We investigate near-infrared sensitization dynamics of Er(III) complexes with organic ligands by means of transient photoluminescence and absorption spectroscopy. We demonstrate that sensitization time scales of 100 ps result in efficiencies of ~80%, thereby making it possible to reach erbium population inversion threshold. [3225]

18:30
Nonlinear Guidonics - functionalized waveguide arrays for all optical control of guided light on chip
N. Belabas Plougonven, C. Minot, A. Levenson, J.-M. Moison; CNRS - LPN UPR 20 (FR).
Following from optics or electronics, structured arrays of coupled waveguides perform a wide range of functions in the linear domain. Beyond this linear extensive toolbox, we design and model a first nonlinear demonstrator : a double-barrier-like waveguide array perfoming threshold-less gating of the incoming beam. [3510]

End of TOM 5

Room: Lippmann

TOM 1

18:45
Optimal 3D single-molecule localization for double-helix super-resolution microscopy
S. Quirin, S. Rama Prasanna Pavani, G. Grover , R. Piestun; Department of Electrical, Computer and Energy Engineering, University of Colorado (US).
A Double-Helix PSF microscope for optimal single-molecule 3D localization is demonstrated. The post-processing algorithms attain optimal estimation by a combination of wave-optical processing and statistical analysis. The result is the most precise wide-field 3D localization on a per photon basis. [4020]

End of TOM 1

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Room: Foucault

TOM 3

18:45 Student presentation
Three dimensional tracking of gold colloids by digital holography
F. Verpillat[1], F. Joud[1], M. Atlan[2], M. Gross[1], P. Desbiolles[1]; [1]Laboratoire Kastler Brossel, École Normale Supérieure (FR), [2]Institut Langevin, ESPCI (FR).
We present in this abstract a digital holographic microscopy setup combining heterodyne detection and off-axis configuration to track gold nanoparticles in 3D. This technique can image the amplitude or phase of the whole light field in 3D avoiding any mechanical scanning. [3429]

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Room: Newton

TOM 4

18:45 Student presentation
Identification of the fundamental modes in whispering gallery micro cavities by using coupler-induced resonance shifts
Y. Candéla[1], J.-B. Jager[2], G. Lin[1,3], V. Lefèvre-Seguin[1], J. Hare[1]; [1]Laboratoire Kastler Brossel, ENS, UPMC, CNRS (FR), [2]CEA Grenoble INAC/SP2M/SINAPS Minatec (FR), [3]Department of Physics, Xiamen University (CN).
We demonstrate an alternative method to identify the radial order of Whispering Gallery Modes in optical microcavities. It is based on the shift and broadening induced by an evanescent coupler device. This method is first assessed for small spheres by comparison with Mie theory and then extended to on-chip microtoroids. [3567]

19:00 Student presentation
Coupled micro cavities: harnessing the outside-cavity modes for lasing, sensing, and wavefront detection
S. Popov[1], N. Innocenti[1], L. Dong[1], S. Sergeyev[2], A.T. Friberg[1,3,4]; [1]School of Information and Communication Technology, Royal Institute of Technology (SE), [2]Optics research group, Waterford Institute of Technology (IE), [3]Department of Applied Physics, Aalto University (FI), [4]Department of Physics and Mathematics, University of Joensuu(FI).
Coupled micro cavities of hexagonal shape demonstrate interesting properties: high fill-factor for resonance modes inside the cavity and enhancement of the optical field outside the cavity. Resonance performances of such micro-optical devices are numerically investigated in this report. [3552]

19:15 Student presentation
Controlling the directional emission of holey organic micro lasers
I. Gozhyk[1], N. Djellali[1], D. Owens[2], S. Lozenko[1], M. Lebental[1], J. Lautru[1], C. Ulysse[3], B. Kippelen[2], J. Zyss[1]; [1]Ecole Normale Supérieure de Cachan, CNRS UMR 8537, Laboratoire de Photonique Quantique et Moléculaire (FR), [2]Georgia Institute of Technology, Center for Organic Photonics and Electronics, School of Electrical and Computer Engineering (US), [3]Laboratoire de Photonique et Nanostructures, CNRS UPR20 (FR).
We report on measurements of the far-field pattern modification of stadium-shaped organic microlasers by introducing circular vacancies within the cavity. The optimal size and positions of these vacancies were obtained by Monte-Carlo style numerical ray simulations and a good agreement was obtained with experiments. [3338]

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Room: Michelson
TOM 2

9:00 - 10:45
THz solid-state spectroscopy
Session chair: R. Huber
Universität Konstanz (DE)

9:00 **Student presentation**
Ultrabroadband THz study of the femtosecond phonon and quasiparticle dynamics in superconducting $YBa_2Cu_3O_{7-\delta}$
M. Porer[1], A. Pashkin[1], M. Beyer[1], K.W. Kim[1,2], C. Bernhard[2], X. Yao[3], Y. Dagan[4], R. Hackl[5], A. Erb[5], J. Demsar[1,6], A. Leitenstorfer[1], R. Huber[1]; [1]Department of Physics and Center for Applied Photonics, University of Konstanz (DE); [2]Department of Physics, University of Fribourg (CH); [3]Department of Physics, Shanghai Jiao Tong University (CN); [4]Department of Physics, University, Tel Aviv University (IL); [5]Walther-Meissner-Institut (DE); [6]Complex Matter Department, Josef Stefan Institute (SI).
We probe the THz conductivity of optimally doped bulk $YBa_2Cu_3O_{7-\delta}$ after 12-fs excitation and trace quasiparticles and specific lattice modes simultaneously. A novel lineshape analysis of the apex oxygen vibration allows us to monitor the ultrafast phonon occupation and find direct evidence for strong electron-lattice coupling. [3653]

9:15 **Student presentation**
Ultrafast electron dynamics and transport in CdS nanocrystals studied by time-resolved THz spectroscopy
Z. Mics[1], H. Němec[1], I. Rychetský[1], P. Kužel[1], P. Němec[2], P. Malý[2]; [1]Academy of Sciences of the Czech Republic, Institute of Physics (CZ); [2]Charles University in Prague, Department of Chemical Physics and Optics (CZ).
Measurement and Monte-Carlo simulations of THz photoconductivity spectra in nanocrystalline films revealed a strong coupling between adjacent nanocrystals. Investigation of ultrafast dynamics shows that the coupling is stronger for electrons with high excess energy and it weakens as the electrons relax to the bottom of the conduction band. [3414]

9:30
Mechanisms of ferroelectric phase transitions: terahertz spectroscopy of soft modes
P. Kužel; Institute of Physics AS CR (CZ).
The dielectric response to terahertz waves of many materials exhibiting ferroelectric phase transition provides unique information about its origin and driving mechanisms. The issue will be discussed within the frame of recently obtained results in perovskite $BaTiO_3$ and $SrTiO_{-3}$ single crystals and (strained) thin films and multilayers. [3404]

Room: Foucault
TOM 3

9:00 - 10:45
Plasmonics
Session chair: A. Hartschuh
Ludwig-Maximilians-Universitaet (DE)

9:00 **INVITED TALK**
Nanoplasmonic enhancement of light–matter interaction
S.V. Gaponenko; B. I. Stepanov Institute of Physics, National Academy of Sciences of Belarus (BY).
A general consideration of nanoplasmonic enhancement of light–matter interaction is proposed in terms of incident field concentration and density of states concentration providing a rationale for huge enhancement factors allowing for single molecule detection by Raman spectroscopy. [3294]

9:30
Optical near field absorption at a metal tip studied by pulsed laser assisted atom probe
A. Vella, F. Vurpillot, J. Houard, B. Deconihout; Groupe de Physique des Matériaux UMR 6634 CNRS (FR).
We investigate the wavelength and polarization dependence of the absorption of a subwavelength tip illuminated by an ultrashort laser pulse using laser assisted atom probe tomography. We show that it is possible to localize the absorption at the tip apex even for excitation wavelength far from the plasmonic resonance. [3293]

Room: Newton
TOM 4

9:00 - 10:45
Simulation and theory
Session chair: N. Lindlein
University of Erlangen-Nürnberg (DE)

9:00 **INVITED TALK**
Photonic metamaterials
M. Wegener; Institut für Angewandte Physik, Institut für Nanotechnologie, and DFG-Center for Functional Nanostructures (CFN) Karlsruhe Institute of Technology (KIT) (DE).
We review our recent experimental progress on three-dimensional photonic metamaterial structures made by direct-laser-writing technology. Examples are gold-helix metamaterials and three-dimensional invisibility cloaking structures. [3031]

9:30 **Student presentation**
Determination of the optical properties of a magnetically driven liquid lens by ray tracing
T. Schultheis[1], L. Spani-Molella[1], E. Reithmeier[1,2]; [1]Leibniz Universität Hannover, Center for optical technologies (DE), [2]Leibniz Universität Hannover, Institute of measurement and automatic control (DE).
Liquid lenses can be tuned in their (global) surface shape. We determine the optical properties (e.g. distortion values) of a lens as a function of the adjusted surface shape. The possibility to vary the focal length by a liquid volume displacement through a magnetically driven ferrofluidic piston in a micro channel is presented. [3592]

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Amphithéâtre Fresnel — TOM 6

9:00 - 10:45
Parametric sources and effects
Session chair: P.-F. Brevet
Université Claude Bernard Lyon 1 (FR)

9:00 Student presentation
A frequency-stabilized signal-resonant optical parametric oscillator for spectroscopic breath analysis
E. Andrieux, A. Rihan, T. Zanon-Willette, P. Kumar, M. Cadoret, J.-J. Zondy; Laboratoire Commun de Métrologie, LNE-CNAM, LNE-INM, Conservatoire National des Arts et Métiers (FR).
We report on a widely tunable continuous-wave single-frequency signal-resonant optical parametric oscillator (SRO), delivering up to 1.8 W of idler power between 3 µm and 4 µm. This SRO will be used for multi-species trace gas sensing based on cavity ring-down spectroscopy. [3332]

9:15
6 W cw second-harmonic power at 532 nm in external cavity with periodically-poled MgO:LiTaO$_3$
I. Ricciardi, M. De Rosa, A. Rocco, P. Ferraro, P. De Natale; INO-CNR, Istituto Nazionale di Ottica, Sezione di Napoli, and LENS, European Laboratory for Nonlinear Spectroscopy (IT).
We report on cavity-enhanced cw second harmonic generation in a periodically poled $LiTaO_3$ crystal, achieving a maximum power of 6.1 W of green light at 532 nm with 8.0 W of fundamental power. Onset of competing nonlinearities can lead to a deterioration of the performance of the locked cavity. [3451]

9:30 INVITED TALK
Octave-spanning tunable frequency combs on a chip
P. Del'Haye[1], T. Herr[1], E. Gavartin[2], R. Holzwarth[1], T.J. Kippenberg[1,2]; [1]Max Planck Institute für Quantenoptik (DE), [2]Ecole Polytechnique Fédérale de Lausanne (EPFL) (CH).
We demonstrate direct full-octave spanning frequency comb generation via four-wave mixing in continuous wave laser pumped microresonators for the first time. The generated comb lines are fully tunable over more than one free spectral range. [3884]

Room: Maiman — TOM 7

9:00 - 10:45
Optical design and processing for photovoltaic concentrators
Session chair: A. Consortini
University of Florence, IT

9:00 INVITED TALK
Ultrafast all-optical signal processing how and why?
I. Glesk; University of Strathclyde, EEE Department (UK).
Demand for fast and secure high capacity networks is growing. Currently offered solutions are hampered by the reappearance of electronic bottleneck. It is believed that to fully utilize transmission bandwidth of optical networks ultrafast all-optical signal processing may need to by implemented. Such approaches will be discussed. [3207]

9:30
Time-dependent spectroscopy on Nd^{3+}- and Er^{3+}-doped fluorochlorozirconate glasses
U. Skrzypczak[1], M. Miclea[1], J.A. Johnson[2], B. Ahrens[3], G. Seifert[4], S. Schweizer[1,3]; [1]Centre for Innovation Competence SiLi-nano®, Martin Luther University of Halle-Wittenberg (DE), [2]Department of Materials Science and Engineering, University of Tennessee Space Institute (US), [3]Fraunhofer Center for Silicon Photovoltaics (DE), [4] Institute of Physics, Martin Luther University of Halle-Wittenberg (DE).
The influence of $BaCl_2$ nanocrystals on the radiative and non-radiative decay processes in rare-earth doped fluorozirconate-based glasses is investigated using time-resolved optical spectroscopy. [3541]

Room: Lippmann — WS

9:00 - 10:40
Workshop on Entrepreneurship and Business Innovation in PhD Education
Session chair: R. Baets
Epixnet C/O Ghent University - IMEC (BE)

9:00
Opening

9:10 INVITED TALK
Introductory talk
H. Lefèvre, Vice-President and Chief Scientific Officer, iXCore S.A.S. (FR).
The introduction will comment on the paradox that the issue of combining doctoral education and innovation would even be raised: how can that have happened?

9:30 KEYNOTE TALK
Entrepreneurship for scientists and engineers
D.T. Moore; Rudolf & Hilda Kingslake Professor of Optical Engineering, Professor of Optics, Biomedical Engineering and Business Administration, Vice-Provost for entrepreneurship, University of Rochester (US).
At the University of Rochester, we understand entrepreneurship to mean the transformation of an idea into an enterprise that creates value - economic, social, cultural, or intellectual. More than a discrete set of business skills or practices, entrepreneurship is a calling that can be pursued in many realms of experience and achievement. Entrepreneurship is a way of thinking, an approach to problems, an attribute of mind, and even a trait of character. It is a science and an art; entrepreneurship is a primary way in which a free society grows and improves not only its economy, but its cultural and social life as well. This talk will discuss a new M.S. degree in Technical Entrepreneurship and Management, which is specifically oriented to scientists and engineers. [3896]

Notes

Room: Michelson	Room: Foucault	Room: Newton
TOM 2	TOM 3	TOM 4
9:45 **Terahertz dielectric and magnetic response near magnetic phase transition in a hexagonal multiferroic $YMnO_3$** *C. Kadlec[1], P. Kužel[1], S. Kamba[1], M. Mostovoy[2], R.V. Pisarev[3]; [1]Institute of Physics AS CR (CZ); [2]Zernik Institute for Advaced Materials, University of Groningen (NL); [3]Ioffe Physical Technical Institute, Russian Academy of Sciences (RU).* Time-domain terahertz spectroscopy is used to retrieve simultaneously dielectric and magnetic properties of hexagonal $YMnO_3$. A soft magnon in antiferromagnetic (AFM) phase and an additional broad excitation in the dielectric spectra at a similar frequency were observed. We interpret the latter as a consequence of a magneto-elastic coupling. [3389]	9:45 **Metallic optical nanostructures: a solution for planar integrated sensors on waveguides** *M. Roussey, Q. Tan, A. Cosentino, H.P. Herzig; Ecole Polytechnique Fédérale de Lausanne (EPFL), Institut de Microtechnique, Optics & Photonics Technology Laboratory (CH).* We study the optical properties of two different metallic nanostructure arrays for lable-free sensing applications. The sensors are optimized to detect refractive index (RI) variations. The optical interaction between light and analyte is enhanced by field localization in the metallic cavity. [3453]	9:45 **Student presentation** **Effective medium theory for calculating reflectance from metal-and-dielectric multilayered structure** *S. Kameda, A. Mizutani, H. Kikuta; Osaka Prefecture University, School of Engineering (JP).* Light reflectance from metal-and-dielectric multilayered structure (MDMS) was calculated by the effective medium theory (EMT). MDMS has a cylindrical dispersion surface. This property is applied to boundary conditions for deriving Fresnel's equation. The calculated reflectance agreed well with results by numerical simulation. [3381]
10:00 **Enhancement of carrier scattering rate near the Mott density in photo-excited semiconductors** *S. Tani[1,2], M. Nagai[1], K. Tanaka[1,2,3]; [1]Department of Physics, Graduate School of Science, Kyoto University (JP); [2]CREST, Japan Science and Technology Agency (JP); [3]Institute for Integrated Cell-Material Sciences, Kyoto University (JP).* We report on the dynamics of electron-hole plasma near the Mott-density by timeresolved THz time-domain spectroscopy with visible pump pulse. Enhancement of the damping constant has been observed clearly. [3363]	10:00 **Control of luminescence through plasmonic nanostructures** *P.M. Adam, P. Viste, J. Plain, R. Jaffiol, P. Royer; Institut Charles Delaunay-Université de technologie de Troyes, CNRS FRE 2848, Laboratoire de Nanotechnologie et d'Instrumentation Optique (FR).* Enhancement or quenching of molecules or quantum dots luminescence can be achieved with controlled plasmonic nanostructures. Isolated or coupled plasmonic nanoparticles can either exhibit large local fields or/ and increase the quantum yield of fluorophores. [3432]	10:00 **Field of view extension using satellite pinhole cameras** *E. Logean[1], T. Scharf[1], H.P. Herzig[1], M. Rossi[2]; [1]EPFL IMT OPT (CH), [2]Heptagon (CH).* An approach to extend the field of view of a miniaturised imaging system is introduced. This innovative approach uses multiple optical systems working in parallel and image post-processing. As an example, a module consisting of a central single micro-lens camera and additional pinhole cameras was fabricated. [3303]
10:15 **Electron mobility and dynamics in dye-sensitized ZnO and TiO_2 nanocrystals studied using time-resolved terahertz spectroscopy** *H. Němec[1], J. Rochford[2], O. Taratula[2], E. Galoppini[2], P. Kužel[1], T. Polívka[3], A. Yartsev[4], V. Sundström[4]; [1]Institute of Physics AS CR (CZ); [2]Rutgers University, Chemistry Department (US); [3]University of South Bohemia, Institute of Physical Biology (CZ); [4]Department of Chemical Physics, Lund University (SE).* Ultrafast dynamics and charge transport in dye-sensitized semiconductors was studied by time-resolved spectroscopy in the visible and terahertz spectral regions. Electron-cation complex fundamentally affecting both processes was found in dye-sensitized ZnO nanoparticles. [3310]	10:15 **Student presentation** **Energy transfer between nanostructured silver surfaces and materials for organic photovoltaics** *R. Dunbar[1], M. Handloser[2], P. Altpeter[1], A. Hartschuh[2], L. Schmidt-Mende[1]; [1]Ludwig-Maximilians University, Hybrid Nanostructures, Dept. of Physics (DE), [2]Ludwig-Maximilians University, Nano-optics, Dept. of Chemistry (DE).* High resolution optical microscopy and photoluminescence measurements have been used to probe the energy transfer between localised surface plasmons and a semiconductor. As a model system, we have investigated an array of thin (50-150nm) silver ridges in a matrix of an organic semiconductor, poly(3-hexylthiophene). [3463]	10:15 **Imaging by a nonparaxial Light Sword Optical Element** *Z. Jaroszewicz[1], K. Kakarenko[2], A. Kołodziejczyk[2], M. Makowski[2], K. Petelczyc[2], M. Sypek[2]; [1]Institute of Applied Optics and National Institute of Telecommunications (PL); [2]Warsaw University of Technology, Faculty of Physics (PL).* Preliminary simulation results based on a new approach allowing for modelling of incoherent and nonparaxial imaging show that the nonparaxially designed Light Sword Optical Element exhibits better lateral imaging resolution and a relatively more uniform quality across the whole range of the imaging space than any other elements with extended depth of focus of the same parameters known to date. [4010]

Notes	Amphithéâtre Fresnel TOM 6	Room: Maiman TOM 7	Room: Lippmann WS
		9:45 **Transparent conducting oxides in photovoltaics** *J.O. Carneiro, M.F.M. Costa, V. Teixeira; University of Minho, Physics Center (PT).* In this communication a brief description of the optics photonics and transparent conducting oxides (TCOs) materials research on photovoltaic (PV) devices will be presented. In addition, the Portuguese PV market will be discussed as well as the latest technologies in the PV market and its main applications. [3243]	
	10:00 **AlGaAs microcylinders for difference frequency generation in the Mid-IR** *A. Taormina[1], I. Sobkowicz[1], L. Ding[1], J. Claudon[2], J.-M. Gérard[2], S. Ducci[1], I. Favero[1], G. Leo[1]; [1]Laboratoire Matériaux et Phénomènes Quantiques, CNRS-UMR 7162, Université Paris Diderot (FR), [2]CEA-CNRS group « Nanophysique et Semiconducteurs », CEA/INAC/SP2M (FR).* We have designed and fabricated a CW source based on difference frequency generation (DFG) in an AlGaAs microcylinder, where two near-IR whispering gallery modes (WGMs) generate a mid-IR WGM. Its preliminary optical characterization discloses promising perspectives for this new archetype of integrated emitter. [3536]	10:00 **A novel broad-band back-side reflector for thin silicon solar cells** *J. Gjessing[1,2,3], A.S. Sudbø[4,2], E.S. Marstein[1,4]; [1]Institute for Energy Technology (NO), [2]University Graduate Center at Kjeller (NO), [3]University of Oslo, Department of Physics (NO), [4]University of Oslo, Faculty of Mathematics and Sciences (NO).* Efficient light trapping is necessary if Si-wafer thickness is to be reduced without compromising efficiency. In this work we propose a back-side 2D periodic structure with exceptional light trapping properties. We find through numerical simulations that the efficiency of our design exceeds that of ideal Lambertian light trapping. [4023]	10:00 INVITED TALK **Embedded business development in academic photonics research** *D. Delbeke, Ghent University (BE).* Turning his/her research results into a commercial or societal product can be very stimulating and satisfactory for a PhD-student. Moreover, it might open the route to continue his/her research in another context when the PhD-trajectory is finished. Timing, involvement and guidance are key issues to enable this direct impact of the PhD research. However, the impact on his/her research activities must be minimal. Embedded business development might be the right approach. An embedded business development manager can pro-actively identify technological opportunities. The embedded business development manager can stimulate, involve and engage the PhD-students and elaborate the business case without interfering with their research activities and can prepare them to step in the business case when the fundamental research oriented PhD trajectory is finished. This technology transfer model is implemented at Ghent University. Plateau clusters laboratories and research groups of Ghent University to unite their expertise in the development of innovative photonic solutions, implemented by an embedded business developer. The modus operandi of Plateau will be discussed and concretized by example of "Caliopa", a silicon photonics spin-off of Ghent University. [3909]
	10:15 Student presentation **A pump-resonant signal-resonant optical parametric oscillator for radiometric applications** *A. Rihan, E. Andrieux, T. Zanon-Willette, P. Kumar, M. Cadoret, S. Briaudeau, M. Himbert, J.-J. Zondy; Institut National de Métrologie, Conservatoire National des Arts et Métiers (FR).* We report on the characterization of a widely tunable continuous-wave pump-resonant signal-resonant optical parametric oscillator (PRSRO) delivering 10 to 50 mW over an octave mid-IR wavelength range (1.7 -3.5 µm). Such a device will be used for radiometric applications. [3369]	10:15 **The organ of vision threshold characteristics application for energy effective light-optic systems iterative estimation by visibility level** *S.M. Gvozdev[1], O.K. Kusch[1], V.A. Storozheva[1], A.S. Shevchenko[2]; [1]«VNIISI», Moscow, Moscow power engineering institute (RU); [2]N. Novgorod state technical university (RU).* The algorithm of energy effective light-optic systems iterative calculation by visibility level is introduced in the article. This calculation is made on the base of multichannel model of organ of vision using threshold color spatial-frequency functions. [3666]	

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Room: Michelson	Room: Foucault	Room: Newton
TOM 2	TOM 3	TOM 4
10:30 Student presentation **Broadband Terahertz pulse propagation in subwavelength size quantum cascade laser waveguides** *M. Martl[1], J. Darmo[1], D. Dietze[1], C. Deutsch[1], A. Benz[1], M. Brandstetter[1], K.Unterrainer[1,2,3], P. Klang[2], A.M. Andrews[2], W. Schrenk[3], G. Strasser[2,3], E. Gornik[2,3]; [1]Vienna University of Technology, Photonics Institute (AT); [2]Vienna University of Technology, Institute of Solid State Physics (AT); [3]Vienna University of Technology, Center for Micro- and Nanostructures (AT).* Terahertz quantum cascade lasers are studied by Terahertz time-resolved spectroscopy. A coupling scheme for the coupling of broadband Terahertz pulses into the subwavelength cavity of a double metal quantum cascade laser is presented. The coupled pulses are then used for an investigation of optical properties of the gain material. [3523]	10:30 **Local and non-local effects in the second harmonic generation from gold nanoparticles evidenced by the interference between the selected dipolar and octupolar plasmons** *G. Bachelier, J. Butet, I. Russier-Antoine, Ch. Jonin, E. Benichou, P.F. Brevet; Laboratoire de Spectrométrie Ionique et Moléculaire, Université Claude Bernard Lyon1 – CNRS (UMR 5579) (FR).* Second Harmonic Generation from spherical gold nanoparticles is studied both theoretically and experimentally. Using a new interference effect between the dipolar and octupolar plasmons, observed in a specific configuration, we show how the local and non-local response arising from the surface and bulk sources can be quantitatively evaluated. [3498]	10:30 **Calculation of ray's propagation in gradient optical glasses** *A.I. Milanich[1,2]; [1]Institute of General Physic Russian Academy of Science (RU), [2]Moscow Institute of Physic and Technology (MIPT) (RU).* This article discloses a new method for calculation of ray propagation in gradient glasses. It simplifies calculations and even reduces some cases to analytical forms. [3025]
10:45 - 11:15 coffee break (Bar terrasse)		

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Amphithéâtre Fresnel	Room: Maiman	Room: Lippmann
TOM 6	**TOM 7**	**WS**
10:30 **HVPE growth and characterization of GaP on different substrates and patterned templates for frequency conversion devices** *V. Tassev[1], D. Bliss[1], C. Lynch[1], M. Snure[1], G. Bryant[1], R. Peterson[2], R. Bedford[2], C. Yapp[3], W. Goodhue[4], K. Termkoa[4]; [1]Air Force Research Laboratory, Sensors Directorate (US), [2]Air Force Research Laboratory, Sensors Directorate (US), [3]Solid State Scientific Corporation (US), [4]University of Massachusetts, Photonic Center (US).* Hydride vapor phase epitaxy was used to grow GaP on orientation patterned templates for quasi phase matched frequency conversion devices. To meet requirements for efficient device operation a process to produce high quality GaP at fast growth rates was developed. The successful replication of template patterns was demonstrated. [3287]	10:30 **Optical bistability phenomenon in the systems of energy controlling** *C.Yu. Zenkova; Optics and Spectroscopy Department, Chernivtsi National University (UA).* The influence of outside factors, such as temperature, polarization of the probing laser beam, the size of the magnetic field, on the formation of the multilevel measuring and controlling energy system has been analyzed. The use of the optical bistability (OB) phenomenon, as an alternative mechanism for creating such systems, has been proposed. [3187]	10:20 **Project management and entrepreneurship in photonics at the graduate level** *O. Fry[1], M. Catoire[1], L. Sarger[2]; [1]Bordeaux Unitec technopole, [2]University of Bordeaux 1 (FR).* For more than 6 years, training in entrepreneurship has been implemented at the Master level for physics degree at the Bordeaux 1 university. Close collaboration between technical advisors and experts in business development has enabled a specific program where graduate students explore the various paths to market of university's proprietary research outcomes. This module has proven it's potential to efficiently prepare business models and business plans. It has been applied to the MILMI (ATLANTIS) Photonics graduate school of Bordeaux during a specific weeklong summer school. Almost 20 graduate students from Europe and US, already in charge of (or involved in) a mature project have been trained to analyze the effective potential for a business creation. Methods and results will be exposed and discussed.
10:45 - 11:15 coffee break (Bar terrasse)		

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Notes	Room: Michelson TOM 2	Room: Foucault TOM 3	Room: Newton TOM 4
	12:00 - 12:45 **PLENARY TALK** **Terahertz dynamics of condensed matter: from the quantum limit to ultrahigh fields** *A. Leitenstorfer, University of Konstanz, Department of Physics and Center for Applied Photonics (DE).* Recent studies on ultrafast dynamics of solids and nanostructures using few-cycle multi-terahertz pulses are presented. Phase-locked excitation transients with peak amplitudes beyond 1 V/Å are combined with uncertainty-limited electro-optic detection, resulting in an advanced access to the quantum properties of both condensed matter and light fields. [3615] **[Room: Amphithéâtre Fresnel]**		
	12:45 - 13:45 lunch break		
	13:45 - 15:00 **THz systems and facilities** **Session chair: R. Holzwarth** Max-Planck-Institute for Quantum Optics (DE)	13:45 - 16:15 **High-resolution imaging** **Session chair: S. Gaponenko** National Academy of Sciences of Belarus (BY)	13:45 - 16:00 **Gradient index and guided optics** **Session chair:** **C. Gómez-Reino Carnota** Universidad de Santiago de Compostela (ES)
	13:45 **INVITED TALK** **THz systems based on 1.55 µm Telecom technologies** *B. Sartorius, R. Dietz, H. Künzel, H. Roehle, D. Stanze, M. Schell; Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut (DE)* This paper summarizes key developments for exploiting 1.5 µm telecom technologies for terahertz applications. Photoconductive antennas and photodiode based photomixers are fabricated and used to assemble fibre coupled terahertz systems. Operation up to 4 THz (pulsed) and 2 THz (CW) is demonstrated. [3309]	13:45 **INVITED TALK** **High-resolution optical microscopy of nanotubes and nanowires** *C. Georgi, M. Böhmler, N. Hartmann, A. Hartschuh; Department Chemie & CeNS, LMU (DE).* We used tip-enhanced near-field optical microscopy to probe the local spectroscopic properties along single nanotubes and nanowires with sub 20 nm spatial resolution. Coupling to the field-enhancing metal tip is shown to increase both excitation and radiation rates of the nanostructures leading to an angular redirection of emission. [3527]	13:45 **INVITED TALK** **Laser beam shaping by active GRIN media** *M.T. Flores-Arias, A.I. Gomez-Varela, C. Gomez-Reino; "Microoptica y Optica GRIN" Group, Applied Physics Department, Faculty of Physics, Universidade de Santiago (ES).* We present laser beam shaping by an active GRIN material regarded as homogenization and beam transforming system. Effects of gain or loss in GRIN materials are taken into account by using complex refractive index. Condition for conversion of an input laser beam into an output uniform beam is achieved. [3359]

Notes	Amphithéâtre Fresnel	Room: Maiman	Room: Lippmann
	TOM 6	TOM 7	WS

11:15 - 12:00 **PLENARY TALK**

Is this the beginning of a new age in green photonics?

M. Lebby; Translucent Inc. (US).

We may not have seen it, we may not have felt the impact, but green photonics has been quietly growing in our lives over the past decade. Engineers and scientists have always designed for efficiency in mind when they researched or built products. It is only in the recent few years, that our community has realized the bigger picture, and global impact of green photonics. Engineers and scientists will still strive for energy efficiency, cleaner solutions and improved health in their designs, except now, along with a larger percentage of the population, they focus more of their design in areas that impact beyond the actual product design itself. It is now a case of designing photonics for a greener world. Over the past half decade, the topic has become topical, political, and to some extent even cultural. [3360]

[Room: Amphithéâtre Fresnel]

12:45 - 13:45 lunch break

13:45 - 15:15

Coherent effects, quantum effects, and chaos

Session chair: A.T. Friberg

Aalto University (FI)

13:45

Semiconductor integrated source of quantum light at room temperature

A. Orieux[1], X. Caillet[1], A. Lemaître[2], P. Filloux[1], I. Favero[1], G. Leo[1], S. Ducci[1]; [1]Laboratoire Matériaux et Phénomènes Quantiques, UMR 7162, CNRS, Université Paris Diderot Paris 7 (FR), [2]Laboratoire de Photonique et Nanostructures, CNRS-UPR20 (FR).

We demonstrate an integrated source of counterpropagating twin photons at 1.55 µm emitting around 10^{-11} pairs/pump photons. The indistiguishability of the photons of a pair is measured via a Hong-Ou-Mandel experiment showing a visibility of 85%. Several features of the device for quantum information applications are discussed. [3387]

13:45 - 16:30

Novel technologies for high performance solar concentrators

Session chair: J.-P. Huignard

Consultant in Photonics (FR)

13:45 **INVITED TALK**

Novel nonimaging designs of compact optics with the SMS method

J.C. Miñano[1,2], P. Benítez[1,2], J. Chaves[2], L. Jiayao[1], J. Infante[1]; [1]Universidad Politécnica de Madrid, Cedint (ES); [2]LPI (US).

New ultra-thin SMS optical designs are presented. They are formed by discontinuous sections working in parallel (multichannel) to provide the desired optical function. Each channel is defined by the smooth surfaces in between discontinuities. [3335]

13:45 - 16:15

Workshop on entrepreneurship and business innovation in PhD education

13:45 **INVITED TALK**

From PhD to CEO ?

M. Mariton, President, AFOP and President and CEO, Horiba Jobin Yvon (FR).

Based on personal experience from PhD years and first job at CNRS, french national research centre, to the position of CEO of a multinational technology company, the presentation will try to present a balanced view of the so-called "gap" in between research and industry, pointing to several possible bridges waiting to be explored. The innovation process will be discussed, showing key conditions of success and how human skills can prove decisive. The talk will conclude with some ideas for would-be CEOs today engaged on a PhD track, as well as indications on how academic curriculum and institutional processes could be enriched to encourage entrepreneurial projects. [3897]

Notes	Room: Michelson TOM 2	Room: Foucault TOM 3	Room: Newton TOM 4
	14:15 **Electric field detection of coherent synchrotron Terahertz radiation** *I. Katayama[1], H. Shimosato[2], M. Bito[2], K. Furusawa[2], M. Adachi[3,4], M. Shimada[5], H. Zen[3,4], S. Kimura[3,4], N. Yamamoto[6], M. Hosaka[6], M. Katoh[3,4], M. Ashida[2,7]; [1]Yokohama National University, IRC (JP); [2]Osaka University, Graduate School of Engineering Science (JP); [3]Institute of Molecular Science (IMS), UVSOR (JP); [4]SOKENDAI (JP); [5]High Energy Accelerator Research Organization (JP); [6]Nagoya University, Department of Engineering (JP); [7]PRESTO, Japan Science and Technology Agency (JP).* We have demonstrated electric field detection of coherent synchrotron THz radiation in a storage ring. The measured electric field directly reflects the femtosecond modulation of electron density in bunches created with laser bunch slicing technique, and enables us to retrieve the profile of electron density distribution in the bunches. [3403]	14:15 **Strong modification of the fluorescence lifetime of a dipole emitter by multiple scattering in a disordered medium** *R. Pierrat, R. Carminati; Institut Langevin, ESPCI ParisTech, CNRS UMR 7587 (FR).* We numerically study the fluorescence decay rate statistics of a dipole emitter embedded in a strongly scattering medium. In the multiple scattering regime, the probability of observing a decrease of the decay rate (increase of the lifetime) is substantial. Signatures of recurrent scattering are also visible in the behavior of the averaged decay rate. [3341]	14:15 **Fabrication and characterisation of ion-implanted waveguides in Er-doped tellurite glasses: effects of dose, energy and annealing** *S. Pelli[1], I. Bányász[2], T. Lohner[3], M. Fried[3], P. Petrik[3], N.Q. Khanh[3], Z. Zolnai[3], A. Watterich[2], M. Bettinelli[4], A. Speghini[4], G. Nunzi-Conti[1], S. Berneschi[1,5], G.C. Righini[1]; [1]"Nello Carrara" Inst. of Applied Physics (IFAC-CNR), MDF-Lab, (IT), [2]Research Inst. of Solid State Physics and Optics of the Hungarian Academy of Sciences, Dept. of Crystal Physics, (HU), [3]Research Institute for Technical Physics and Materials Science of the Hungarian, Academy of Sciences (HU), [4]University of Verona, Scientific & Technological Dept. (IT), [5]Museo Storico della Fisica e Centro di Studi e Ricerche "Enrico Fermi" (IT).* The fabrication process of waveguides in erbium doped tellurite glasses by N^+ ion implantation is presented. The characterisation of the samples has been carried out by the analysis of the effective indexes of the modes supported by the waveguides as a function of the irradiation and annealing parameters. [3657]
	14:30 **New concepts for continuous wave and quasi time domain THz systems** *C. Brenner, M.R. Hofmann; Ruhr-Universität Bochum, Photonik und Terahertztechnologie (DE).* We present a hybrid THz system which is capable to bridge the gap between pulsed THz generation and difference frequency generation. Furthermore we discuss new concepts for THz spectroscopy without a mechanical delay-line and the THz generation by optical downconversion without complex laser sources. [3571]	14:30 **Student presentation** **Measuring and exploiting the transmission matrix in optics** *S.M. Popoff, G. Lerosey, R. Carminati, M. Fink, A.C. Boccara, S. Gigan; Institut Langevin, ESPCI ParisTech, CNRS UMR 7587, ESPCI (FR).* We introduce a method to measure the transmission matrix of a complex medium. This matrix exhibits statistical properties in good agreement with random matrix theory and allows light focusing and imaging through the random medium. [3558]	14:30 **Swift ion irradiation Lithium niobate waveguides with optical losses under 0.5 dB/cm** *M. Jubera[1], J. Villarroel[1], M. Carrascosa[1], A. García-Cabañes[1], M.L. Crespillo[2], A. Zabot[2], J. Olivares[2,3]; [1]Universidad Autónoma de Madrid, Dept. Física de Materiales (ES), [2]CMAM, Universidad Autónoma de Madrid (ES), [3]I. Optica, Consejo Superior de Investigaciones Científicas (ES).* We have investigated the propagation losses of lithium niobate waveguides fabricated by swift ion irradiation (SHI). The influence of the temperature of the post-irradiation annealing has been studied. From the analysis propagation losses less than 0.5 dB/cm has been obtained for TE and TM modes. [3514]

Notes	Amphithéâtre Fresnel TOM 6	Room: Maiman TOM 7	Room: Lippmann WS
	14:00 **System for second generation Quantum Key Distribution in the frequency domain** *J.-M. Merolla[1], J. Cussey[1], I. Mbodji[1], L. Olislager[2], K. Phan Huy[1], S. Massar[3]; [1]Institut FEMTO-ST UMR 6174, Département Optique (FR), [2]Université Libre de Bruxelles, Département OPERA (BE), [3]Université Libre de Bruxelles, Laboratoire d'information quantique (BE).* We present a new architecture based on sidebands generation using standard electro-optic modulators and RF components to perform Quantum Key Distribution (QKD) using entangled photons. Stable non-classical interference in the frequency domain with visibility better than 98% has been realized using a fully automated system. [3340]		14:15 INVITED TALK **Case Study: Creating and Sustaining an Entrepreneurial Research Environment at the Applied Optics Group @ NUI Galway** *U. Murphy, Applied Optics Group, National University of Ireland, Galway (IE).* The Applied Optics Group was formed in October 2002 in the National University of Ireland, Galway, with the support of Science Foundation Ireland. The group is part of the School of Physics in the Optics Cluster with the National Centre for Laser Applications and the recently established Biophotonics Group. The group currently has approximately 35 researchers, approximately 40% of whom are PhD students. The group is led by a Principal Investigator, and has an administrator/education outreach officer, and a Director of Industry and External Relations. Our research programme covers a wide variety of topics in applied optics and imaging science, including smart optics, adaptive optics, optical scattering and propagation, and engineering optics. In 2006, the Principal Investigator operation to the principle of "forgiveness rather than permission" created a new role of "Industry Outreach Officer", and I, Una Murphy was recruited to this position. A case study will be presented on the development and maintenance of a continuously evolving industry portfolio, the nurturing of an entrepreneurial ethos, the creation of an environment to stimulate and support innovation, and the enabling of a capability to commercialise. The experience of a PhD student in this dynamic research environment ill be explored. [3655]
	14:15 **Reconstruction of the PDC high gain spatial profile via broadband sum frequency mixing of twin beams** *O. Jedrkiewicz, J.-L. Blanchet, P. Di Trapani; CNISM and Università degli Studi dell'Insubria, Dipartimento di Fisica e Matematica (IT).* We present experimental measurements of the parametric down-conversion (PDC) high gain spatial profile obtained via up-conversion of the twin beams broadband radiation thanks to a near field imaging technique using off-axis parabolic mirrors. [3546]	14:15 Student presentation **Broad light harvesting in a solid-state dye-sensitized solar cell via Förster resonant energy transfer** *N. Humphry-Baker[1], K. Driscoll[1], A. Rao[1], H.J. Snaith[2], R.H. Friend[1]; [1]Cavendish Laboratory, University of Cambridge, Department of Physics, Cambridge (UK), [2]Clarendon Laboratory, University of Oxford, Department of Condensed Matter Physics (UK).* Energy relay dyes have shown to broaden light harvesting in dye-sensitized solar cells (DSCs). We incorporate a light-absorbing, hole-transporting conjugated polymer (P3HT) into sensitized TiO_2 with a zinc phthalocyanine dye (TT1) and show that there is highly efficient Förster resonant energy transfer from from the P3HT to the dye. [3503]	
	14:30 **Electro-optic phase dynamics for chaos communication field experiments at 10Gb/s** *L. Larger, R. Lavrov, M. Jacquot; FEMTO-ST, UMR CNRS 6174, University of Franche-Comté, Optics Department (FR).* An efficient and highly controllable chaotic oscillator has been designed. It involves electro-optic phase modulation, and non local nonlinear delayed feedback. State of the art optical chaos communication was demonstrated through two field experiments, at 10Gb/s over more than 100km, involving optical amplifiers and dispersion compensation modules. [3342]	14:30 **Energy-efficient light-optic regulation of light-color environment in closed spaces of space vehicles** *S.M. Gvozdev, N.D. Sadovnikova, A.A. Livencova, VNISI, Moscow (RU).* In the study the light-color environment regulation according the program Mars 500 with isolation of the person in the closed space is considered. Regulation to be made on the basis of multichannel model of an organ of vision. The received results show the possibility to create an operated energy effective illumination system for working efficiency and comfort increase. [3665]	14:35 **PhD study in optical design and intellectual property** *I.L. Livshits, S.C. Stafeev, V.N. Vasilev; Saint-Petersburg State University of Informational Technologies Mechanics and Optics, Engineering center "Optica" (RU).* The goal of our publication is to show attractiveness of optical design field for PhD students as it is the first step of developing any optical device and one of the most creative jobs in optical engineering. International Optical Design Seminar is given as example of motivation for PhD students to invent new solutions in optical design. [3629]

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Room: Michelson

TOM 2

14:45
THz activities at the electron storage ring MLS of the PTB
G. Ulm[1], A. Hoehl[1], R. Müller[1], A. Serdyukov[1], J. Feikes[2], M. Ries[2], G. Wüstefeld[2]; [1]Physikalisch-Technische Bundesanstalt (PTB) (DE); [2]Helmholtz-Zentrum Berlin für Materialien und Energie (DE).
We report the status of the Metrology Light Source (MLS) as a source of powerful, stable, and pulsed THz radiation. Additionally we show results from the commissioning of the beamlines, the experimental stations, and first measurements in the THz spectral range. [3433]

End of TOM 2

Notes

Room: Foucault

TOM 3

14:45 **Student presentation**
Beam reshaping based on the Light Wheel phenomenon
R. Pollès[1,2], A. Moreau[1,2], M. Mihailovic[1,2], G. Granet[1,2]; [1]Clermont Université, Université Blaise Pascal (FR), [2]CNRS, UMR6602 (FR).
A lamellar structure designed to support a localized mode called Light Wheel is used to reshape a beam. An analytical model is proposed to describe this very thin beam expander and to characterize the profile of the transmitted beam. [3329]

15:00 **Student presentation**
Surface enhanced raman scattering of gold nanostructures: Role of dipolar and multipolar localized surface plasmons
N. Guillot[1], B. Frémaux[1], S. Ben Amor[1], H. Shen[2], O. Peron[3], T. Toury[2], E. Rinnert[3], M. Lamy de la Chapelle[1]; [1]Université Paris XIII, Laboratoire CSPBAT (FRE 3043), UFR SMBH (FR), [2]Université de technologie de Troyes, Laboratoire de Nanotechnologie et d'instrumentation Optique, Institut Charles Delaunay, FRE 2848 (FR), [3]IFREMER, Service Interfaces et Capteurs, Département Recherches et Développements Technologiques (FR).
Considering only the electromagnetic contribution of Surface Enhanced Raman Scattering (SERS), we investigate arrays of gold nanoparticles designed through electron beam lithography and lift off techniques. [3611]

15:15 **Student presentation**
Microscopy with self-reconstructing beams
F.O. Fahrbach[1,2], A. Rohrbach[1,2]; [1]University of Freiburg, Centre for Biological Signalling Studies (bioss) (DE), [2]University of Freiburg, Laboratory for Bio- and Nano-Photonics (DE).
Interaction of holographically shaped self-reconstructing beams with scattering media is analyzed. An increase in information content of images of extended inhomogeneous media by reduction of artefacts arising from scattering and by increase of penetration depth was found and quantitatively analyzed. [3320]

Room: Newton

TOM 4

14:45
Guidonic beams: Routing of collective waves in functionalized waveguide arrays
N.B. Plougonven, C. Minot, S. Bouchoule, I. Sagnes, A. Levenson, J.M. Moison; CNRS - LPN UPR 20 (FR).
We develop a linear extensive toolbox to engineer the propagation of light in functionalized arrays of coupled waveguides. We demonstrate experimentally routing of beams at interfaces in our novel metamaterial thus paving the way towards all optical signal processing. [3509]

15:00 **Student presentation**
3D waveguides and grating couplers fabricated with gray-scale E-beam lithography
L. Dong[1], S. Popov[1], A.T. Friberg[1,2,3]; [1]School of Information and Communication Technology, Royal Institute of Technology (SE), [2]Department of Applied Physics, Aalto University (FI), [3]Department of Physics and Mathematics, University of Joensuu (FI).
Gray scale electron-beam lithography is applied to prototype 3D waveguides and grating output couplers in SU-8 simply and accurately. The lag effect in reactive ion etching of Silicon-on-insulator gratings is avoided here. Both positive- and negative-height relief features can be easily fabricated in one step process. [3408]

15:15
Modelling of active Nd-doped Silicon Rich Silicon Oxide waveguides for optically pumped laser cavities
Y.G. Boucher, J. Charrier, P. Pirasteh, Y. Dumeige; Université Européenne de Bretagne, FOTON UMR CNRS 6092 (FR).
In the frame of a simple model based on the rate equation formalism, we derive the main steady-state properties of optically pumped Nd-doped Silica resonant structures embedded with Silicon nanoclusters. [3376]

Notes

Amphithéâtre Fresnel

TOM 6

14:45
The calculation of the number of degrees of freedom of ideal (2-dimensional) bandlimited, aberrated and partially coherent images. A proof of Gabor's famous conjecture.
B.J. Hoenders; University of Groningen, Zernike Institute for Advanced Materials (NL).
We proof the conjecture of D. Gabor concerning the Number of Degrees of Freedom of an Image (NDFI). This constructive proof is based on the explicit calculation of the number of statistically independent image sampling points and solves therefore the optimal sampling problem. The NDFI for aberrated and partially coherent images are also calculated. [3627]

15:00
Purely spatial quantum correlations and entanglement of twin photons in type 2 spontaneous parametric down conversion
F. Devaux, J. Mougin–Sissini, E. Lantz; Institut FEMTO-ST, Département d'Optique P.M Duffieux CNRS-UMR n°6174, Université de Franche-Comté (FR).
We have measured sub-shot-noise quantum correlations of spatial fluctuations in the far-field image of the parametric fluorescence created in a type 2 β-barium-borate nonlinear crystal. Imaging is performed in photon counting regime with an electronmultiplying CCD camera. Purely spatial quantum entanglement is also investigated. [4013]

End of TOM 6

Notes

Room: Maiman

TOM 7

14:45
Scattering and absorption properties of carbon nanohorns-based nanofluids
L. Mercatelli[1], G. Zaccanti[2], F. Martelli[2], P. Di Ninni[2], E. Sani[1], P. Sansoni[1], D. Jafrancesco[1], D. Fontani[1], S. Barison[3], C. Pagura[3], F. Francini[1]; [1]National Institute of Optics, National Council of Research (IT), [2]Dept. Physics and Astronomy, University of Florence (IT), [3]IENI, National Council of Research (IT).
Fluids in which nanometer-sized particles are suspended have been recently proposed as direct absorbers in solar thermal collectors. The optical properties as absorption and scattering coefficients of carbon nanohorns based nanofluids are investigated with the utilization of a simple and precise technique. [3161]

15:00 INVITED TALK
Technology drivers for an acceleration of PV development
J.-P. Joly; INES (Institut National de l'Energie Solaire) (FR).
PV cost reduction will be driven by innovations. This presentation will focus on where those innovations should com from and what should be the contribution of the optical community. [3099]

15:30
Using Nd:LSB microchip laser pulses for location of jointed different fibres
J.A. Modupeh Hodasi , P.K. Buah-Bassuah; Laser and Fibre Optics Centre (LAFOC), Physics Department, University of Cape Coast (GH).
We report on the preliminary study of the use of Nd:LSB microchip laser to measure the length of optical fibres. Pulses of 3.1ns at a wavelength of 1.062nm are backscattered from within the optical fibre and the time of arrival of the reflected signal is used to locate the point of mechanical splicing of a single-mode fibre to a multimode fibre, and therefore, we are able to calculate within the range of centimetres, the length of the single-mode fibre as 467.55m, and that of the multimode fibre to be 14.80m. [3908]

15:45
Optical testing bench for intraocular lens characterization
F. Alba-Bueno, F. Vega, M. S. Millán; Universidad Politécnica de Cataluña, Departamento de Optica y Optometría (ES).
The optical imaging quality and other important features of intraocular lenses can be tested in an optical bench specifically designed for this purpose. The setup meets the current ISO standard. It allows wavefront sensing, spectral characterization and the simulation of model eyes with diverse aberrations. [3903]

16:00 INVITED TALK
Rare earth doped glasses as down-converters to improve Si-based solar cell efficiency (please see page 75)

Room: Lippmann

WS

14:55 INVITED TALK
Involving doctoral students in the innovation-entrepreneurship study track at Institut d'Optique
F. Capmas, Institut d'Optique – Graduate School (FR).
Institut d'Optique has opened an "innovation-entrepreneurship" study track in its master degree cursus in Optical Engineering. In the introduction to this presentation, the cursus organisation will be highlighted and some successful cases will be pointed out. Next, the challenge of associating doctoral students to the scheme will be addressed and some options that have been identified will be described. [4000]

15:15 - 16:15
Panel discussion
Moderation: P. Chavel
Institut d'Optique (FR)

End of Workshop

Notes

Notes	Room: Foucault TOM 3	Room: Newton TOM 4
	15:30 **Student presentation** **Optical superresolution in TIRF-microscopy using structered illumination** *P. von Olshausen[1,2], A. Rohrbach[1]; [1]Lab for Bio- and Nano-Photonics, University of Freiburg (DE), [2]Centre for Biological Signalling Studies (bioss), University of Freiburg (DE).* Combining total internal reflection fluorescence microscopy with structured illumination enables superresolution imaging with high contrast. The Optical resolution can be increased by more than a factor of two due to the coupling of evanescent waves to the transducing substrate. [3314]	15:30 **Micro-optics applications in high-power laser systems** *Th. Graf[1], A. Voss[1], B. Weichelt[1], D. Blazquez-Sanchez[1], M.M. Vogel[1], A. Austerschulte[1], M. Abdou Ahmed[1], A. Popp[1], A. Killi[2], S. Unger[3], J. Kirchhof[3], H. Bartelt[3] ; [1]Institut für Strahlwerkzeuge (IFSW), Universität Stuttgart (DE), [2]TRUMPF Laser GmbH & Co KG(DE), [3]Institut für Photonische Technologien (IPHT) (DE).* We report on different applications of micro-optics for the generation and the transport of laser radiation with high beam quality in the kW power range. This includes aspherical mirrors to improve the beam quality of thin-disk lasers and guided wave optics for the transport and the brilliance conversion in optical fibers. [3286]
	15:45 **Student presentation** **Properties of asymmetric scanning near field optical microscopy probes** *V. Lotito[1,2], U. Sennhauser[1], C. Hafner[2]; [1]EMPA, Swiss Federal Laboratories for Materials Testing and Research, Electronics/Metrology Laboratory (CH), [2]ETH Zurich, Laboratory of electromagnetic fields and microwave electronics (CH).* By introducing asymmetries in a fully metal-coated scanning near field optical microscopy probe, we obtain a strong near field localization under linearly polarized excitation. This effect, essential for high resolution applications, is achievable in axisymmetric structures only under a cumbersome radially polarized excitation. [3261]	15:45 **Student presentation** **Collimation of VCSEL beam using a nanostructured GRIN micro lens** *J.M. Nowosielski[1,2], R. Buczyński[1,2], F. Hudelist[1], A.J. Waddie[1], M.R. Taghizadeh[1]; [1]Heriot-Watt University, School of Engineering and Physical Sciences (UK), [2]University of Warsaw, Faculty of Physics (PL).* In this paper we show numerically that a nanostructured Gradient Index (nGRIN) micro lens can be utilized for collimation of a beam generated by a VCSEL, characterised by a half-width of 1.53µm. The refractive index gradient of the nanostructured GRIN micro lens is very high resulting in a lens thickness of 65.8µm. [3227]
	16:00 **Controlling molecular organization towards the realization of nanoscale light sources** *C. Fiorini-Debuisschert, I. Berline, L. Douillard, F. Charra; CEA-IRAMIS, SPCSI, Nanophotonics Laboratory (FR).* Using the electric field present inside a Scanning Tunnelling Microscope (STM) junction, we demonstrate the possibility to create a very local non-centrosymmetry via molecular orientation under the tip. We show this can be used to get localized light emission through second harmonic generation (SHG). [3368]	
	End of TOM 3	**End of TOM 4**

Notes

Room: Maiman

TOM 7

16:00 INVITED TALK

Rare earth doped glasses as down-converters to improve Si-based solar cell efficiency

M. Ferrari[1], G. Alombert Goget[1], C. Armellini[1], A. Chiappini[1], A. Chiasera[1], S. Berneschi[2], S. Pelli[2], G.C. Righini[2], M. Bregoli[3], A. Maglione[3], G. Pucker[4], G. Speranza[4]; [1]CNR-IFN, Istituto di Fotonica e Nanotecnologie, CSMFO Lab (IT), [2]CNR-IFAC, Istituto di Fisica Applicata Nello Carrara, MDF Lab (IT), [3]Optoelettronica Italia S.r.l. (IT), [4]FBK (IT).

The solar cells efficiency may be improved by better exploitation of the solar spectrum, making use of the down-conversion mechanism. In this lecture, attention is focused on the assessment of the energy transfer efficiency between the Tb3+ and Yb3+ ions in sol-gel derived SiO2-HfO2 glass ceramic planar waveguides. [4002]

End of TOM 7

Notes

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TOM 1 — POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 — exhibition hall

TOM1_3540_01
Simple dual calibration for optical tweezers
A. Le Gall[1], D. Dulin[1], N. Westbrook[1], K. Perronet[1], K. Visscher[2]; [1]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS et Université Paris Sud 11 (FR); [2]Department of Physics, University of Arizona (US).
We hereby present a simple method to calibrate simultaneously the trap stiffness of an optical trap and the coefficient calibration factor of the quadrant photodiode using an acousto-optic deflector.

TOM1_3609_02
A new nanosensor for polycyclic aromatic hydrocarbons detection in marine environment
N. Thioune[1], C. David[1], S. Ben-Amor[1], N. Guillot[1], H. Shen[2], O. Peron[3], E. Rinnert[3], T. Toury[2], M. Lamy de la Chapelle[1]; [1]Université Paris XIII, Laboratoire CSPBAT (FRE 3043), UFR SMBH (FR); [2]Université de technologie de Troyes, Laboratoire de Nanotechnologie et d'instrumentation Optique, Institut Charles Delaunay (FR); [3]IFREMER, Service Interfaces et Capteurs, Département Recherches et Développements Technologiques (FR).
In this work we report an accurate synthesis of a SERS nanosensor based on nanoscale gold structures obtained by Electron Beam Lithography, suitable for environmental analysis.

TOM1_3610_03
A Raman study of MMP2 and MnSOD, two pathology biomarkers
C. David[1], C. D'Andrea[2], B. Fazio[2], O.M. Maragò[2], P.G. Gucciardi[2], M. Lamy de la Chapelle[1]; [1]Université Paris 13, Laboratoire CSPBAT, UFR SMBH (FR) ; *[2]CNR Istituto per i Processi Chimico-Fisici* (IT).
Here we present a complete Raman analysis of MMP2 and MnSOD proteins using multiwavelength-excitation.

TOM1_3496_04
3D translational and orientational optical control of multiple rod-shaped bacteria
F. Hörner[1], M. Woerdemann[1], S. Müller[2], B. Maier[2], C. Denz[1]; [1]Institute of Applied Physics, Westfälische Wilhelms-Universität, Münster (DE); [2]Institute for Molecular Cell Biology, Westfälische Wilhelms-Universität (DE).
We demonstrate translational and orientational optical control of rod-shaped bacteria. Our approach utilizes holographic optical tweezers (HOT) and enables for the first time full rotational control of multiple bacteria with respect to any arbitrary axis.

TOM1_3354_05
Spectral and polarization properties of amino-acid's crystal layers
O.V. Angelsky, S.B. Yermolenko, P.V. Ivashko; Chernivtsi National University (UA).
The qualities of the polarization-correlation structure of the images of thin film of aminoacid are researched. The samples of 22 aminoacid were used in the experiment on the modified micropolarimeter. Research methods are Mueller matrices polarimetry and spectropolarimetry in 200 - 25 000 nm.

TOM1_4024_06
Study of thermodamage to Neuroblastoma NG108 cells due to manipulation with optical tweezers
I. Verdeny, A-S. Fontaine, A. Farré, M. Montes-Usategui, E. Martín-Badosa; University of Barcelona, Optical Trapping Lab – Grup de Biofotònica (BiOPT), Department of Applied Physics and Optics (ES).
We report the preliminary results of a study on cell thermodamage due to manipulation with optical tweezers (cw Ytterbium laser fiber at 1064 nm) as a result of a photon absorption phenomenon. This work provides evidence of optical damage upon Neuroblastoma NG108 cells with optical tweezers, even at the innocuous wavelength of 1064 nm.

TOM 1 — POSTER SESSION II: Thursday, 28 October, 13:30-15:00 — exhibition hall

TOM1_3455_07
Cascaded acousto-optical deflectors for optical trapping
J.-C. Kastelik[1,2,3], S. Dupont[1,2,3], M. Pommeray[1,2,3], J. Gazalet[1,2,3]; [1]Université Lille Nord de France (FR), [2]UVHC, IEMN-DOAE (FR) ; [3]CNRS, UMR 8520 (FR).
A new configuration of two cascaded wide-band paratellurite acousto-optic deflectors is proposed. Key parameters of the device and experimental validations are presented. Such a deflector can be used as a part of an optical trapping system.

TOM1_3604_08
New method of elementary heterogeneously polarized field modeling
I. Mokhun, K. Kharitonova, Y. Galushko, Y. Viktorovskaya; Ukraine, Chernivtsi University (UA).
The new approach for modeling of elementary field cells with heterogeneous polarization and controlled number of polarization singularities is proposed. The cells may be obtained by the superposition of specially formed orthogonally linearly polarized waves.

TOM1_3537_09 Student presentation
Holographic optical tweezers for real-time manipulation
M. Nývlt, M. Škereň, P. Fiala; Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (CZ).
The holographic optical tweezers (HOT) are capable of a real-time optical micromanipulation of multiple objects in 3D. The optical traps are created by diffraction of light on the dynamic synthetic Fresnel type holograms, which can be computed using the CUDA enabled graphic processing unit (GPU).

Notes

TOM 2 **POSTER SESSION I:** Wednesday, 27 October, 13:45-15:15 **exhibition hall**

TOM2_3595_01
THz imaging with planar Goubau lines
T. Akalin, I. Türer, G. Ducournau, J-F. Lampin; IEMN, Lille1 University (FR).
In this work, we introduce an application at terahertz (THz) frequencies of planar Goubau lines (G-lines). We are focused on THz near-field imaging systems up to 1 THz. These systems are designed to fill the lack of high-sensitive imaging components for the gap between microwave and optical band.

TOM2_3645_02
TeraHertz dectection by field effect transistors: From non resonant to resonant detection
S. Boubanga-Tombet[1], F. Teppe[2], W. Knap[2], T. Otsuji[1]; [1]Tohoku University (JP), [2]Université Montpellier 2 (FR).
The experiments on the dc current influence on non-resonant Terahertz plasma wave detection in InGaAs/InAlAs multi-channel High Electron Mobility Transistor (HEMT) are reported. We show that the observed transformation of detection regime takes place because the current reduce plasma waves damping increasing the quality factor of the HEMT channel cavity.

TOM2_3440_03 Student presentation
Near-field THz imaging in pulsed mode: sub-wavelength resolution and enhanced scattering
S. Popov[1], L. Dong[1], S. Sergeyev[2], A.T. Friberg[1,3,4]; [1]School of Information and Communication Technology, Royal Institute of Technology (SE), [2]Optics research group, Waterford Institute of Technology (IE), [3]Department of Applied Physics, Aalto University (FI), [4]Department of Physics and Mathematics, University of Joensuu (FI).
Application of scanning near-field microscopy technique in the THz range demonstrates enhanced scattering in far-field region and increased resolution of the scanned image. We develop a rigorous numerical model which can properly describe both these phenomena.

TOM2_3450_04
Optical pulse modulation of THz-quantum cascade lasers
S. Saito[1], N. Sekine[2], I. Hosako[2], [1]KARC, National Institute for Information and Communications Technology (JP), [2]National Institute for Information and Communications Technology (JP).
THz-Quantum Cascade Lasers (THz-QCLs) are expected as light sources for high-speed communication because their potential of high-speed modulation is predicted by theory. We have built a THz-QCL modulation measurement system by optical pulse synchronized to current pulse and the reduction of output was observed.

Notes

TOM2_3426_05 Student presentation
Terahertz artificial resonant interface layers
D. Dietze, J. Darmo, M. Martl, K. Unterrainer; Vienna University of Technology, Photonics Institute (AT).
Planar metamaterials, so-called metasurfaces, can efficiently be described by a modified transfer matrix formalism that takes into account anisotropic, conductive interfaces. This method is applied for evaluation of the transmission of THz pulses through different metasurface geometries.

TOM2_3410_06
Absorbance increment of ethanol gas molecule mixed with Air in Terahertz region
J. Hamazaki, S. Saito, I. Hosako; National Institute of Information and Communications Technology (JP).
Characteristics of absorption spectra of pure ethanol gas and ethanol gas mixed with air were investigated to examine the use of ethanol gas as a terahertz alcohol sensor. Our result showed that absorbance of ethanol gas mixed with air was ~1.3 times greater than that of pure ethanol gas.

TOM2_3409_07 Student presentation
Electric field tuning of hard phonon modes in strained $SrTiO_3$ films
V. Skoromets[1], C. Kadlec[1], P. Kužel[1], S. Kamba[1], J. Schubert[2]; [1]Institute of Physics, Academy of Sciences of the Czech Republic (CZ), [2]Institute of Bio and Nanosystems, Research Center Jülich (DE).
We investigate 100-nm-thick epitaxial monolayer of $SrTiO_3$ grown by pulsed laser deposition on (110)-oriented $DyScO_3$ using far infrared and THz time-domain spectroscopy. A tunability of high-frequency polar phonons in $SrTiO_3$ is demonstrated upon dc electric bias applied to an electrode structure deposited on the film surface.

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TOM2_4016_08
Strong spectral dependence of response on probe height modulation in terahertz scanning probe microscope
V.N. Trukhin[1,3], N.N. Zinov'ev[1], A.V. Andrianov[1], L.L. Samoilov[1,3], A.O. Golubok[2,3], I.D. Sapozhnikov[2], M.L. Felsztyn[2] , V.A. Bykov[4]; [1]Ioffe Physical Technical Institute of RAS (RU); [2]Institute for Analytical Instrumentation of RAS (RU); [3]NRU ITMO, Photonics and OIT Dep. (RU); [4]"Nanotechnology MDT" Company (RU).
We report results of spectral studies of terahertz response in an apertureless differential-type terahertz near-field scanning probe microscope (THz SPM). Strong modification of the spectral response by probe height modulation has been discovered. THz "approach curves" taken for different test materials were analyzed.

TOM2_4015_09
Terahertz emission from air excited by tightly focused femtosecond laser pulses
V. Vaičaitis, V. Smilgevičius, V. Jarutis; Vilnius university Laser Research Center (LT).
Phase relations between focused bichromatic laser pulses inducing terahertz radiation from gaseous media have been analysed. In addition to the phase terms obtained using plane-wave approximation, the yet unreported phase difference term, which in most cases can be as large as $\pi/2$, has been found.

TOM2_4011_10
Amplified Stimulated Terahertz Emission at Room Temperature from Optically Pumped Graphene
S. Boubanga-Tombet[1], S. Chan[2], A. Satou[1,4], T. Watanabe[1], V. Ryzhii[3,4], T. Otsuji[1,4]; [1]Research Institute of Electrical Communication, Tohoku University (JP); [2]NanoJapan Program, Rice University and Department of Materials Science & Engineering, University of Pennsylvania (US); [3]Computational Nano-Electronics Laboratory, University of Aizu (JP); [4]JST-CREST (JP).
We experimentally observe amplified stimulated emission of terahertz electromagnetic radiation at room temperature from exfoliated graphene on SiO2/Si substrate by optical-pump/terahertz-probe spectroscopy with a femtosecond-pulsed laser operating in the optical communication band.

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TOM 2 **POSTER SESSION II:** Thursday, 28 October, 13:30-15:00 **exhibition hall**

TOM2_3306_121Terahertz signatures for security and safety applications
H. Essen, M. Haegelen, P. Warok, R. Sommer, A. Wahlen, C. Wagner; Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR), Dep. Millimeterwave Radar and High Frequency Sensors (MHS) (DE).
Imaging Terahertz sensors for security and safety applications are rapidly developing. Radar characteristics for humans and small items have been collected using a 220 GHz radar in tower-turntable configuration and applying ISAR imaging techniques.

TOM2_3285_12
A nematic mixture with high Terahertz anisotropy
N. Vieweg, M.K. Shakfa, M. Koch; Department of Physics, Philipps University Marburg (DE).
We determine the THz properties of the nematic mixture BL037 using terahertz time domain spectroscopy and find the highest THz birefringence reported so far for a liquid crystal. The frequency dependence of the material parameters and their temperature dependence is studied.

TOM2_3259_13 Student presentation
Refractive Gaussian-to-Tophat T-ray beam shaper
R. Kleindienst[1], L. Moeller[2], S. Sinzinger[1] ; [1]Technische Universität Ilmenau, IMN MacroNano®, Fachgebiet Technische Optik (DE), [2]Bell Laboratories, Alcatel-Lucent (US).
We describe the design and fabrication of an efficient, refractive Gaussian-to-tophat beam shaper (GTBS) for T-rays (THz waves). The produced intensity distributions are measured and compared with corresponding wave-optical simulations, which allows for the verification of the applied design rules and fabrication methods.

TOM2_3184_14
Development of Terahertz-diapason coherent radiation sources with pumping by TEA CO_2-lasers
G.A. Baranov[1], P.V. Tomashevich[1], V.V. Khukharev[1], V.A. Gorobets[2], B.F. Kuntsevich[2], V.O. Petukhov[2], Yu.I. Malakhov[3]; [1]NIIEFA named after D.V. Efremov (RU), [2]Institute of Physics of National Academy of Science of Belarus (BY), [3]International Science and Technology Center (RU).
In the report there are presented results of researches directed to creation of effective Terahertz sources of radiation with pumping by TEA CO_2 laser. In particular, for generation of high-power Terahertz radiation we suggest to use TE CS_2 laser with optical pumping.

TOM2_3636_15
Concept of multi-terawatt picosecond CO_2 Laser for investigation of the laser radiation interaction with a matter
G.A. Baranov[1], V.V. Khukharev[1], A.V. Vasilev[1], S.M. Kotov[1], P.V. Tomashevich[1], Yu.I. Malakhov[2]; [1]D.V.Efremov Institute (NIIEFA) (RU), [2]International Science and Technology Center (RU).
In this report building and application questions of picosecond terawatt CO_2 laser facilities are presented. The main attention is paid to the intermediate water capacitor integrated into the gas-discharge chamber. The main results of experimental investigations of characteristics of 10 TW CO_2-laser components are briefly stated.

TOM2_3185_16
Development and creation of the International facility for study of CO_2-laser radiation and matter interaction (ISTC Project # 3961)
G.A. Baranov[1], V.V. Khukharev[1], P.V. Tomashevich[1], Yu.I. Malakhov[2]; [1]NIIEFA named after D.V. Efremov (RU), [2]International Science and Technology Center (RU).
In the report there is presented a description of the ISTC Project №3961 «Development and creation of the International facility for study of CO_2-laser radiation and matter interaction». The facility will be built on the base of solid-state or CO_2 master oscillator and wide aperture high-pressure CO_2-amplifier. Different schemes of the MO are described and compared. In a case of CO_2 master oscillator picoseconds Nd:YLF laser with pulse length of 6 psec and energy of 2 mJ at 0.527 μ wavelength provides control on elements of systems for forming picoseconds CO_2 impulse. As a result of the Project completion a picoseconds facility with multiple-pass pre-amplifier will be created.

TOM2_3248_17
All-fiber Terahertz imager based on 1.5 μm technology
F. Formanek, M.-A. Brun, A. Yasuda; Life Science Laboratory, Advanced Materials Laboratories, Sony Corporation Tokyo Medical and Dental University (JP).
We report on a compact all-fiber terahertz (THz) time-domain spectroscopy imager employing a single 1.5 μm erbium-doped fiber laser with dual output to illuminate InGaAs/InAlAs photoconductive antennas through polarization maintaining optical fibers with alternated group velocity dispersions.

TOM2_3385_18
Frequency generation in the THz domain using a mode-locked Quantum-Dash Laser
A. Lagrost[1], M. CostaeSilva[1], M. Gay[1], L. Bramerie[1], P. Besnard[1], A. Shen[2], G.H. Duan[2]; [1]UEB, CNRS FOTON (FR), [2]Alcatel-Thales III-V lab (FR).
We propose a simple method to generate an optical clock up to 1.4 THz using a Quantum Dash mode-locked laser. The jitter of the generated frequency is less than 150 fs. The quality at 170 GHz is assessed through BER measurements.

TOM2_3905_19 Student presentation
Spatial and spectral properties of small area THz generation for sub-wavelength microscopy
F. Buccheri[1,2] , M. Pecciantì[2,3], A. Busacca[1], T. Ozaki[2], R. Morandotti[2]; [1]DIEET-Department of Electrical, Electronic and Telecommunications Engineering, University of Palermo (IT); [2]Ultrafast Optical Processing, INRS-EMT (CA), [3]Institute for Chemical and Physical Processes, CNR, "Sapienza" University (IT).
A highly localized terahertz (THz) source is a promising candidate for sub-wavelength microscopy, due to its superior radiation power throughput with respect to others near-field techniques. Here, we report on the spatial and the spectral near-field properties of our highly localized THz source.

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TOM 3 | POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 | exhibition hall

TOM3_3566_01
THz Metamaterials and Plasmonic Waveguides
T. Akalin[1], W.-C. Chen[2], I. Türer[1], W. Padilla[2]; [1]IEMN, Lille 1 University, (FR), [2]Boston College, (US).
We will present the different topologies for THz filters with the use of planar Goubau lines. These waveguides highly confine the THz electromagnetic waves which propogate like a surface plasmon. Optimized excitations will be presented. For the filters, we will particularly study the approach with resonators along the Goubau line. Some structures will require cascading several resonators in order to reach a desired rejection level at given frequencies. We will present filters with a minimum number of resonators i.e. only one. Electromagnetic simulation results show clearly two resonances with two different resonators at 0.25THz and 0.3THz. The substrates used have low permittivity. We will also discuss on plasmonic waveguides based on corrugated planar Goubau lines.

TOM3_3352_02
Optical properties of Au nanorods oriented parallel to each other
K. Awazu[1], X. Wang[1], T. Komatsubara[2], S. Ishihara[3]; [1]Photonics Research Institute, National Institute of Advanced Science and Technology (JP), [2]Tandem Accelerator Complex, University of Tsukuba (JP), [3]Department of Engineering Synthesis, The University of Tokyo (JP).
Pairs of Au nanodisks 40nm in diameter were fabricated in silica by EB lithography with changing interparticle distance. Au nanoparticles oriented parallel to each other can be elongated in SiO_2 by irradiation with 110-MeV Br^{10+}. The peak of the plasmon resonance was shifted to the blue as the major to minor axis ratio increased.

TOM3_3618_03
High resolution spectroscopy of an atomic vapourconfined in an opal of glass nanospheres
I. Maurin[1,2], P. Ballin[1,2], Athanasios Laliotis[1,2], D. Bloch[1,2]; [1]Laboratoire de Physique des Lasers, Université Paris 13 (FR), [2]Laboratoire de Physique des Lasers, CNRS (FR).
In the spirit of our systematic investigation of resonant atomic vapour (Cs vapour) in micro-and nano-cells (1D confinement), we investigate the behaviour of a vapour confined in the nanometric interstitial regions of an opal made of glass spheres (3D confinement). Sub-Doppler lines are observed in preliminary experiments.

TOM3_3478_04
Gradient echo all-optical multiplexor
F. Carreño, M.A. Antón; Escuela de Óptica, Universidad Complutense de Madrid (ES).
We analyze the storage and retrieval of two trains of weak pulses in an ensemble of tripod-like atoms subject to a longitudinal varying magnetic field. An auxiliary and far detuned coupling field transfers the incoming pulse onto the channels of the system. The time reversion of the magnetic field releases the pulses from the medium.

TOM3_3493_05 Student presentation
Optimized sub-wavelength grating mirror design for mid-infrared wavelength range
C. Chevallier, F. Genty, N. Fressengeas, J. Jacquet; LMOPS, EA 4423, Supélec/ Université Paul Verlaine (FR).
We present the design of a sub-wavelength grating mirror optimized for integration in mid-IR VCSEL. The definition of a quality factor adapted to VCSEL requirements and maximized by an optimization algorithm allowed us to obtain a polarization selective and high reflectivity structure showing several percent of tolerance.

TOM3_3443_06 Student presentation
Fabrication of slot waveguide cavity for sensing application
A. Cosentino, Q. Tan, M. Roussey, H.P. Herzig; Ecole Polytechnique Fédérale de Lausanne (EPFL), Institut de Microtechnique, Optics & Photonics Technology Laboratory (CH).
The fabrication of a slot waveguide cavity oriented to sensing application is demonstrated. The choice of materials and the development of the process flow steps, including E-beam lithography (EBL) and metal lift-off of a single thin layer, are illustrated and discussed to obtain 30 nm width slots in a thin gold layer.

TOM3_3613_08 Student presentation
Quantum Well Solar Cells based on Semiconductor Superlattice
S. Fara[1], P. Sterian[2], L. Fara[2], M. Lancu[1]; [1]IPA SA, RES Department (RO), [2]Politehnica University of Bucharest, Faculty of Applied Science (RO).
This paper deals with modelling of semiconductor superlattice, as a key point in the development of new quantum well solar cells. It includes a comparative study of the transmission coefficients as determined by the shape of the hetero-structure interface for different possible applications.

TOM3_3545_09 Student presentation
Mechanico-optical modulator based on a metal nanowire array
D. Fedyanin, A. Arsenin; Moscow Institute of Physics and Technology, Laboratory of Nanooptics and Femtosecond Electronics, Department of General Physics (RU).
We propose a novel mechanico-optical modulation technique. It is based on the nanowire array deposited above the thin metal film. Changing the distance between the nanowire array and the film, we can control the intensity of the surface plasmon polariton (SPP).

TOM3_3638_10
Optical properties of coupled and non coupled quantum structures embedded in thin films
Y.J. Chen[2], F. Flory[1,2], C.C. Lee[3], L. Escoubas[2], J.J. Simon[2], P. Torchio[2], J. Le Rouzo[2], H. Derbal-Habak[2]; [1]Ecole Centrale Marseille, [2]Paul Cézanne University (FR), [3]Thin Film Technology Center, National Central University (TW)
A simple way to calculates the discrete energy levels of electrons in multiple quantum wells is presented. The absorption band of semiconductor quantum structures is deduced. The model to calculate the complex refractive index of materials including quantum dots is then described. First measurements are presented.

TOM3_3325_11 Student presentation
Microscopy with Self-Reconstructing Beams: A Perspective on Novel Illumination Schemes and Applications
C. Gohn-Kreuz, A. Rohrbach; University of Freiburg, Laboratory for Bio- and Nano-Photonics (DE).
Based on the concept of Microscopy with Self-Reconstructing Beams several methods are proposed which aim at an increase of image quality and contrast when imaging within strongly scattering media. Besides the examination of object matched illumination other advanced illumination schemes will be investigated.

TOM3_3612_12 Student presentation
SERS optimization of gold nanocylinder arrays: Influence of the surrounding medium and application for Polycyclic Aromatic Hydrocarbons detection
N. Guillot[1], H. Shen[2], S. Ben Amor[1], C. David[1], O. Peron[3], E. Rinnert[3], T. Toury[2], M. Lamy de la Chapelle[1]; [1]Université Paris XIII, Laboratoire CSPBAT (FR), [2]Université de technologie de Troyes, Laboratoire de Nanotechnologie et d'instrumentation Optique, Institut Charles Delaunay (FR), [3]IFREMER, Service Interfaces et Capteurs, Département Recherches et Développements Technologiques (FR).
This study describes the effect of the surrounding medium on the SERS efficiency using nanolithographied substrates designed through electron beam lithography and lift off techniques.

TOM 3 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM3_3630_13 Student presentation
Localized Surface Plasmons on gold nanostructures: Scattering evolution with the nanostructures size
N. Guillot[1], S. Ben Amor[1], H. Shen[2], T. Toury[2], M. Lamy de la Chapelle[1]; [1]Université Paris XIII, Laboratoire CSPBAT (FR), [2]Université de technologie de Troyes, Laboratoire de Nanotechnologie et d'instrumentation Optique, Institut Charles Delaunay (FR).
This study describes the scattering behaviour of gold nanoparticles designed through electron beam lithography and lift off techniques with variable diameters. We compare the scattering contribution to the extinction spectrum experimentally and theoretically.

TOM3_3569_14 Student presentation
Controlled Embedding of Nanoparticles in Light Emitting Diodes
O.T.A. Janssen, H.P. Urbach; Delft University of Technology (NL).
We present a theoretical study on nanoparticles embedded in light emitting diodes (LEDs) to enhance light extraction. The particle size and position are optimized with a method based on the reciprocity theorem. 2D and 3D LED designs with and without photonic crystal structures are investigated.

TOM3_4018_15
Laser - driven precipitation and modification of silver nanoparticles in soda-lime glass
M.Grabiec[1], A.Wolak[1], O.Veron[2], J.Ph. Blondeau[2], N.Pellerin[3], S.Pellerin[3], K.Dzierżęga[1]; [1]M. Smoluchowski Institute of Physics, Jagiellonian University (PL); [2]PRISME Institute EA 4229, Université d'Orléans (FR) ; [3]GREMI - Site de Bourges, Université d'Orléans (FR).
The interest in composite materials with embedded metal nanoparticles (MNPs) has grown considerably because of their numerous applications in different fields of science and technology such as optical elements, nanophotonic devices or biomedical sensing and labeling. These applications are based on unique optical properties of MNPs dominated by coherent oscillations of conduction band electrons in response to the electromagnetic field of light.

Notes

TOM 3 POSTER SESSION II: Thursday, 28 October, 13:30-15:00 exhibition hall

TOM3_3621_16
High temporal resolution of the ring down of SOI wire racetrack resonators
T.J. Karle[1], F. Raineri[1,3], F. Bordas[1], I. Sivan[1], S. Ali[1], Y. Halioua[1,2], G. Roelkens[2], R. Raj[1]; [1]Laboratoire de Photonique et de Nanostructures (FR), [2]IMEC/Ghent University (BE), [3]Universite Paris VII (FR).
The temporal ringdown of Silicon-on-Insulator racetrack resonators is measured for input pulses of duration 150fs using a parametric amplification technique. This allows us to study the coupling between the bus waveguide and the racetrack. A cavity round trip time of 660fs and Quality Factor of 9500 are determined.

TOM3_3624_17
Improved Thermal Dissipation in InP Wire Photonic Crystal Laser on Silicon by Addition of Diamond Nanoparticles in Polymer Bonding Layer
A. Bazin[1], Y. Halioua[1,2], P. Monnier[1], F. Bordas[1], T.J. Karle[1], S. Perruchas[3], T. Gacoin[3], H. Girard[3], I. Sagnes[1], R. Raj[1], F. Raineri[1,4]; [1]Laboratoire de Photonique et de Nanostructures (FR), [2]Photonics Research Group, Department of Information Technology, Ghent University (BE), [3]Groupe de Chimie du Solide, Ecole Polytechnique (FR), [4]Université Paris-Diderot (FR).
Incorporation of diamond particles in the BCB bonding layer of a hybrid system composed of III-V device on SOI leads to increased thermal dissipation.

TOM3_3221_18
Analysis of the 3D degree of polarization of highly focused light fields
R. Martínez-Herrero, J. Fernández; Departamento de Óptica, Facultad de Ciencias Físicas, Universidad Complutense de Madrid (ES).
On the basis of the angular plane-wave spectrum of the light field, the 3D Stokes parameters (defined in terms of the Gell-Mann matrices) are applied to investigate the 3D degree of polarization of the field at the focal region of a high focusing optical system.

TOM3_3179_19
Transverse beam width of radially-polarized light fields propagating through high-focusing optical systems
R. Martínez-Herrero[1], P.M. Mejías[1], Á. Manjavacas[2]; [1]Departamento de Óptica, Facultad de Ciencias Físicas, Universidad Complutense de Madrid (ES), [2]Instituto de Óptica, CSIC (ES).
On the basis of a formal analogy with the irradiance moments, used as ISO standards for the paraxial beam-width, analytical definitions are proposed for the width associated to both the transverse and the longitudinal components of nonparaxial radially-polarized fields propagating through high-focusing systems.

TOM3_3667_20
Optical antimatter and its detection using holographic microscopy
V. Mocella[1], G. Coppola[1], P. Dardano[1], G. Di Caprio[1], I. Rendina[1], S. Cabrini[2]; [1]National Research Council–Inst. for Microelectronics and Microsystems (IT),[2] Molecular Foundry, Lawrence Berkeley National Laboratory (US).
In this paper we analyze the very special properties of an heterostructures composed by complementary media. Theory and experimental results obtained at near infrared light wavelength (λ =1.55 μm) are presented. Holographic set-up give a step forward in optical analysis of such a special metamaterial. It is proven that a divergent input source is transformed into a strongly collimated beam in-plane, vertically well confined. An extremely directive beam in far field is produced out-of-plane, coupled with diffraction order of the grating of alternating complementary media.

TOM3_3279_21
Morphology-dependent resonances in 2D nanoparticles. Effects on extraordinary transmission in subwavelength slits
F.J. Valdivia-Valero, M. Nieto-Vesperinas; Instituto de Ciencia de Materiales de Madrid (ES).
We address different sets of either dielectric or metallic nanocylinders in front of a subwavelength metallic slit. Next, we extend this study to photonic crystals close to gratings of such slits. The effects on light transmission and localization in the system when morphology-dependent resonances are excited in the particles, are analysed.

Notes

TOM 3 POSTER SESSION II: Thursday, 28 October, 13:30-15:00 exhibition hall

TOM3_3282_22
Optical forces on small magnetodielectric particles
M. Nieto-Vesperinas[1], R. Gomez-Medina[1], J.J. Saen[2]; [1]Instituto de Ciencia de Materiales de Madrid (ES), [2]Departamento de Física de la Materia Condensada, Universidad Autónoma de Madrid (ES).
We present the theory of optical forces on small particles with both electric and magnetic response to the light field, immersed in an arbitrary non-dissipative medium, due to a generic incident electromagnetic field. This permits us to establishing conclusions for any sign of this medium refractive index.

TOM3_3212_23 Student presentation
Excitonic Fine Structure in Zincblende Colloidal Quantum Dots and Its Influence on the Optical Properties
G. Raino[1], T. Stöferle[1], I. Moreels[2], R.K. Čapek[2], Z. Hens[2], R.F. Mahrt[1]; [1]IBM Research (CH), [2]Physics and Chemistry of Nanostructures, Ghent University (BE).
We present a hot-injection approach to make zincblende CdSe quantum dots with a diameter tunable between 1.5 and 4nm. Continuous-wave and time-resolved photoluminescence spectroscopy was applied to investigate their size-dependent electronic properties. At low temperatures, the exciton fine structure of the first excited state was significantly enhanced, which allows an accurate measurement of the exchange energy splitting and the hot exciton relaxation.

TOM3_3428_24
Thermo-optical properties of embedded silver nanoparticles
M. Rashidi-Huyeh[1], M. Shirdel[1], B. Palpant[2]; [1]University of Sistan and Baluchestan, Physics department (IR), [2]Laboratoire de Photonique Quantique et Moléculaire, UMR 8537 CNRS (FR).
We present here the two contributions of intra- and interband transitions to the thermooptical properties of silver nanoparticles. The results show that the thermo-optical properties around the surface plasmon resonance frequency are principally due to the intraband contribution.

TOM3_3544_25
Modeling and practical realization of 2D nanohole arrays in metallic substrates
I. Richter, P. Kwiecien, L. Štolcová, J. Proška, J. Fiala; Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering (CZ).
The modeling and practical realization of 2D nanohole arrays in metallic substrates is presented and discussed. For the reliable numerical simulations, our Fourier modal method has been used and applied. As the applicable method for practical realization, we have applied the concept of self-arranged templates and subsequent electroplating.

TOM3_3470_26
An intuitive model of light scattering by sub-λ metallic surfaces
H. Liu[1], P. Lalanne[2]; [1]Key Laboratory of Optoelectronic Information Science and Technology, Institute of Modern Optics, Nankai University (CN), [2]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS (FR).
We present a simple and intuitive model for analyzing the optical response of metallic surfaces patterned by arbitrary 1D arrays of sub-wavelength (sub-λ) structures. In the present microscopic approach, the near-field response close to the surface is composed of a linear combination of elementary hybrid waves, which are shown to solely depend on the frequency and to be merely independent of the incident illumination and of the scatterer geometry.

TOM3_3396_27
Laser nano- and microstructuring of glass-carbon surface
T.N. Sokolova, Y.V. Chebotarevsky, I.A. Popov; Saratov State Technical University, Educational-Research Lab. Of Laser Technics&Technology (RU).
Paper describes a complex of laser technologies for glass-carbon plate processing. The range of laser technologies for glass-carbon plate processing is applied: scribing, milling, cleaning and structuring.

TOM 4 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM4_3661_01
Dispersion managment in nonlinear photonic crystal fibres with nanostructured core
R. Buczynski[1,2], D. Pysz[2], A. Filipkowski[2], I. Kujawa[2], A.J. Waddie[3], M.R. Taghizadeh[3], R. Stepien[2]; [1]Faculty of Physics, University of Warsaw (PL), [2]Institute of Electronic Materials Technology (PL), [3]School of Engineering and Physical Sciences, Heriot-Watt University (UK).
A sub wavelength structure of the core of photonic crystal fibre can modify its dispersion characteristic and significantly shift its zero dispersion wavelengths. An air-glass photonic crystal fibre with structured core is developed and successfully used for super continuum generation.

TOM4_3641_02 Student presentation
Focusing Properties of Multifractal Zone Plates
A. Calatayud[1], J.A. Monsoriu[1], F. Giménez[2], W.D. Furlan[3]; [1]C. Tecnologías Físicas, Univ. Politéc. Valencia (ES), [2]I.U.M.P.A. Univ. Politéc. Valencia (ES), [3]Dpto. Óptica, Universidad de Valencia (ES).
We present Multifractal Zone Plates (MFZPs) as a new family of diffractive lenses whose structure is based on the combination of Fractal Zone Plates (FZPs) of different orders. It is shown that MFZPs improve the axial resolution and also give better performance than FZPs.

TOM4_3651_03 Student presentation
Generalizing the Devil's Lenses
A. Calatayud[1], W.D. Furlan[2], A. Pons[2], O. Mendoza-Yero[3], J.A. Monsoriu[1]; [1]C. Tecnologías Físicas, Univ. Politéc. Valencia (ES), [2]Dpto. Óptica, Universidad de Valencia (ES), [3]I. Noves Tec. de la Imatge, Universitat Jaume I (ES).
We present the Generalized Devil´s Lenses (GDLs) as a new family of fractal diffractive lenses. This generalization allows us, for instance, to increase the number of foci of a conventional Devil´s Lens while keeping the self-similarity property within the axial irradiance.

TOM4_3491_04
Dual band optical equaliser for multiplexed transmissions
S. Dupont[1,2,3], J.C. Kastelik[1,2,3], M.S. Sahli[1,2,3], J. Gazalet[1,2,3]; [1]Univ Lille Nord de France (FR), [2]UVHC, IEMN-DOAE, (FR), [3]CNRS, UMR 8520 (FR).
An optical equaliser working both for 1300 nm and 1550 nm fibre transmission bands has been designed and characterised: real time equalisation is fully automatic and a single operation step is necessary to get equalisation. A full dynamic of 20 dB can be obtained over the entire CWDM band with optical polarisation insensitivity. The operation principle is based on the assembly two acousto-optic cells in cascade.

TOM4_3367_05 Student presentation
Gaussian Beam Divergence Effects on Crosstalk in Coherence Multiplexed System
S. Elwardi[1,2], M. Zghal[2], B.E. Benkelfat[1]; [1]Institut Télécom, Télécom SudParis SAMOVAR UMR INT-CNRS 5157 (FR), [2]Engineering School of Communications of Tunis, Sup'Com (TN).
In this paper, we study the effects of the transverse properties of a Gaussian beam on coherence multiplexed system. We show that the divergence of a Gaussian beam introduces an additional crosstalk between light fields.

TOM4_4021_06
Single-step nanostructures printing in azopolymeric materials
I. Apostol[1], V. Damian[1], N. Hurduc[2]; [1]National Institute for Lasers, Plasma and Radiation Physic (RO); [2]Technical University of Iasi, Department of Natural and Synthetic Polymers (RO).
Photonic processing of micro and nanointegrated structures based on photoinduced conformational changes of the azobenzene functionalized polymer films is presented. We have obtained surface relief modulation of azopolymeric films from 6-10 nanometers to hundreds of nanometers as a function of the irradiation conditions.

TOM 4 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM4_3388_07 Student presentation
Hybrid triplets with diffractive optical elements used for imaging
J. Hopp, P. Fiala; Faculty of Nuclear Sciences and Physical Engineering, Department of Physical Electronics, Czech Technical University (CZ).
We propose a method for optical design of hybrid triplets, e.g. optical systems containing one diffractive optical element (DOE) and two other classical lenses. This method relies on utilization of the aplanatic condition.
The aplanatic condition was taken as a main optimizing criterion for the design of phase functions of diffractive optical elements during the optimization procedure. The phase function of the diffractive element can be arbitrary. Several hybrid optical systems, particularly hybrid triplets, were designed and analyzed by this method.

TOM4_3522_08 Student presentation
Femtosecond multi-wavelength Bragg grating waveguides in pure fused silica
W. Horn, J. Herrmann, C. Denz; Institut für Angewandte Physik and Center for Nonlinear Science, Westfälische Wilhelms-Universität (DE).
We fabricate femtosecond direct written straight and curved waveguides with multiple integrated Bragg gratings at different wavelengths around 1.5 µm. We simulate and measure the transmission, dispersion, and group delay properties of the system with the transfer matrix method and the phase modulation technique, respectively.

TOM4_3449_09
Experimental Comparison of Acrylamidebased and Polygrama photopolymers for Optical Holography
M. Květoň[1], P. Fiala[1], A. Havránek[2]; [1]Faculty of Nuclear Sciences and Physical Engineering, Department of Physical Electronics, Czech Technical University in Prague (CZ), [2]Faculty of Mathematics and Physics, Department of Macromolecular Physics, Charles University, Faculty of Mathematics and Physics (CZ).
Characteristics of acrylamidebased and Polygrama (SM-532TR S1) photopolymer recording materials for optical holography have been experimentally studied. The curves, that describe the growth of a diffraction grating in a realtime, have been measured for different exposition conditions and compared.

TOM4_3364_10 Student presentation
Triangles, periodic orbits, and organic microlasers
C. Lafargue[1], N. Djellali[1], I. Gozhyk[1], S. Lozenko[1], C. Ulysse[2], M. Lebental[1], A. Grigis[3], J. Zyss[1]; [1]Laboratoire de Photonique Quantique et Moléculaire, Ecole Normale Supérieure de Cachan, CNRS UMR 8537 (FR), [2]Laboratoire de Photonique et de Nanostructures, CNRS UPR20, Route de Nozay (FR), [3]Laboratoire Analyse, Géométrie et Applications, Université Paris 13, CNRS UMR 7539 (FR).
The existence of at least one periodic orbit in some triangles is still an open question from a mathematical point of view. We used organic microlasers to address this issue with an experimental method based on the emitting spectra.

TOM4_3467_11
Fast evaluation of the PSF for Fresnel zone plate imaging in transmission X-ray microscopy
O. Mendoza-Yero[1], G. Mínguez-Vega[1], R. Navarro[2], J. Lancis[1], V. Climent[1]; [1]Department of Physics, Universitat Jaume I (ES), [2]Faculty of Sciences, ICMA, CSIC-University of Zaragoza (ES).
We introduce a suitable analytical approach for the evaluation of the PSF of a zone plate typically used in transmission X-ray microscopes (TXM). The computation time is quite reduced in comparison with the formalism based on the Lommel functions. Numerical computations generate accurate results for 3D imaging.

TOM4_3517_12 Student presentation
Opto-fluidic apertures and shutters with the potential for an integrated electrowetting actuation
P. Müller[1], A. Kloss, H. Zappe, W. Mönch; [1]Department of Microsystems Engineering (IMTEK), University of Freiburg (DE).
Relying on the high optical absorption of aqueous pigment dispersions, we demonstrate tunable optical apertures and shutters of high contrast. Our very flexible fabrication process uses dry film resist and full wafer bonding to define microfluidic structures and allows integrated electrowetting actuation.

TOM4_3311_13
Optical data storage induced by superresolution focal volume through focusing a radially polarized beam
X. Li, M. Gu; Centre for Micro-Photonics, Faculty of Engineering and Industrial Sciences, Swinburne University of Technology (AT).
Multilayer sub diffraction optical recording has been experimentally demonstrated with an achieved capacity of 0.76 Terabits/cm3 by focusing a radially polarized beam. This was achieved by increasing the annular aperture to optimize the volume of the focal spot, therefore leading to an enhanced storage density limit.

TOM 4 POSTER SESSION II: Thursday, 28 October, 13:30-15:00 exhibition hall

TOM4_3528_14
Red blood cells statistic under UV-VIS radiation monitored by digital holographic microscopy
M. Mihailescu, I.A. Paun, E.I. Scarlat; "Politehnica" University from Bucharest, Department of Physics (RO).
In the present work, a statistic on UV-VIS irradiated/not irradiated blood samples is reported. The study address on mature and immature red blood cells weights in the total number, as revealed by their dimensions and shapes monitored by digital holographic microscopy (DHM) technique.

TOM4_3518_15
Digital holographic microscopy for vapour etching micro-lens characterization
M. Mihailescu[1], M. Pelteacu[2], A. Sobetkii[3]; [1]Phys. Depart. "Politehnica" Univ. from Bucharest (RO), [2]S.C. Optoelectronica (RO), [3]OPTICOAT SRL (RO).
In this paper, a simple and low-cost technique to fabricate spherical micro-lenses in glass is presented. A multi-steps profile is obtained based on several masks made using e-beam lithography and several chemical processes. The continuous profile obtained after warming up at the optimum temperature, is analyzed using digital holographic microscopy. We investigated the influence of the distance between sample and the microscope objective in the contrast of the recorded holograms and in the digital reconstruction of the object image.

TOM4_3662_16
Micro and nanoscale patterning of polymers for micro-optics
P. Obreja, D. Cristea, A. Dinescu, R. Rebigan; National Institute for R&D in Micro technologies (IMT-Bucharest) (RO).
Polymer materials are used in optoelectronic devices, due to their refractive index and very low optical loss. The paper presents micro and nanoscale patterning techniques in multilayer resists for fabrication of the micro-optical components with 3D complex shape in polymeric optical resins.

TOM4_3584_17
Self-enhancement and angular properties of vector and scalar gratings in organic glasses
A. Ozols, V. Kokars, P. Augustovs, Dm. Malinovskis, K. Traskovskis, E. Zarins; Faculty of Material Science and Applied Chemistry, Riga Technical University (LV).
Self-enhancement of vector and scalar holographic gratings recorded in different organic molecular glasses have been experimentally studied. Diffraction efficiency (DE) angular dependence of these gratings was also studied and compared with theoretical calculations.

TOM4_3600_18
New types of holographic diffraction gratings
N.K. Pavlycheva; Kazan State Technical University by name A.N. Typolev (RU).
Two types of aberration correction holographic diffraction gratings are described. It is the diffraction gratings recorded by the aspheric wave fronts and the concave transmission holographic diffraction gratings. Particular optical schemes for spectrographs and their aberration characteristics are considered.

TOM4_3258_19
Micro-fabrication of Graded Filters
A. Piegari[1], A. Sytchkova[1], J. Bulir[2]; [1]ENEA, Optical Coatings Group(IT), [2]Institute of Physics, Academy of Sciences (CZ).
Traditional optical components could be substituted, in specific measurement instruments, by miniaturized optical filters to reduce the instrument dimension and weight. Graded thin-film filters offer a tool for a possible miniaturization. Both fabrication and characterization of these small-dimension filters will be discussed.

TOM 4 POSTER SESSION II: Thursday, 28 October, 13:30-15:00 exhibition hall

TOM4_3302_20 Student presentation
Hartmann wave front sensor for EUV Lithography
A. Polo, F. Bociort, S.F. Pereira, H.P. Urbach; Optics Research Group, Department of imaging Science and Technology, Delft University of Technology (NL).
We describe our initial work on Hartmann Wave Front Sensor (HWS) as an instrument for detection of wave front aberration in a Extreme Ultraviolet Lithography system (EUVL). We present a mathematical model of this system which demonstrates the feasibility and the possible advantage in term of dynamic range and accuracy of this technique compared to interferometric techniques.

TOM4_3188_22
Multilevel lens let arrays in precise Hartmann-Shack wave front sensing of laser beam
F.A. Starikov[1], V.V. Atuchin[2], M.O. Koltygin[1], S.M. Kulikov[1], A.N. Manachinsky[1], Yu.I. Malakhov[3], N.V. Pilipenko[1], I.S. Soldatenkov[2], S.A.Sukharev[1]; [1]Russian Federal Nuclear Center –VNIIEF (RU), [2]Institute of Semiconductor Physics, SB RAS (RU), [3]International Science and Technology Center (RU).
Diffractive multilevel micro lens arrays fabricated in fused quartz substrates by deep UV photolithography and wet chemical etching are used in the Hartmann-Shack wave front sensor for precise reconstruction of the laser beam wave front.

TOM4_3386_24
Extended Nijboer-Zernike (ENZ) Based Characterization of a Microscope Objective
A. Wiegmann[1, 2], S. van Haver[1], S.F. Pereira[1], A.J.E.M. Janssen[3]; [1]Delft University of Technology, TNW-IST, Optics Research Group (NL), [2]Physikalisch-Technische Bundesanstalt (DE), [3]Department EE and EURANDOM, Eindhoven University of Technology (NL).
We present through-focus intensity measurements for a 20x microscope objective with a numerical aperture of NA=0.4. The aberrations of the microscope objective are retrieved using the extended Nijboer-Zernike approach.

TOM4_3307_21
Design of a Fourier transform micro-spectrometer by means of thermally actuated grating light valve in a waveguide structure
M. Riahi; Shahid Beheshti University (IR).
By locating several rectangular holes, a grating can be made in a waveguide. The holes are filled with a liquid with high depends of refractive index to temperature. By changing temperature by applying current to a thin-film heater, the efficiency and the 0th order of diffraction which is coupled into the output port is changed. Fourier transform of the output intensity, shows the spectrum of the input light.

TOM4_3189_23
Spiral phase plates and generation of high-quality optical vortex
F.A. Starikov[1,2], V.V. Atuchin[3], Yu. V. Dolgopolov[1], M.O. Koltygin[1], A.V. Kopalkin[1, 2], S.M. Kulikov[1], A.N. Manachinsky[1], Yu.I. Malakhov[4], I.S. Soldatenkov[3], S.A. Sukharev[1]; [1]Russian Federal Nuclear Center –VNIIEF (RU), [2]Sarov State Phys.&Tech. Institute of NRNU MEPhI (RU), [3]Institute of Semiconductor Physics, SB RAS (RU), [4]International Science and Technology Center (RU).
Generation of vortex laser beam (LG01 mode) of good quality is performed with the help of the multilevel spiral phase plates fabricated by kinoform technology.

TOM4_3998_25
Applications for microstructured optics at Carl Zeiss
M. Helgert, R. Steiner, M. Burkhardt, T. Glaser, A. Pesch, O. Sandfuchs, L. Erdmann, A. Deparnay, M. Cumme, A. Gatto; Carl Zeiss Jena GmbH (DE).
Microstructured optical elements are of increasing importance for sophisticated solutions in scientific optical instruments. An overview about several application fields is given in connection with specific examples.

TOM 5 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM5_3438_01 Student presentation
Three-dimensional photonic crystals doped with rotaxinated-conjugated polymers
F. Di Stasio[1], L. Berti[2], D. Comoretto[2], S.O. McDonnell[3], H.L. Anderson[3], F. Cacialli[1]; [1]Department of Physics and Astronomy, and London Centre for Nanotechnology, University College London (UK); [2]Università degli Studi di Genova, Dipartimento di Chimica e Chimica Industriale (IT); [3]Chemistry Research Laboratory, Department of Chemistry, University of Oxford (UK).
We prepared polystyrene artificial opals infiltrated with a water soluble conjugated polymer threaded through cyclodextrin macrocycles. The optical properties of the doped opals are studied with a view to application of these systems to laser devices. For diluted solutions a clear effect of the photonic band gap is observed.

TOM5_3439_02 Student presentation
Highly polarized emission from oriented self-standing films of conjugated polymers
F. Di Stasio[1], P. Korniychuk[2], S. Brovelli[1], P. Uznanski[2], S.O. McDonnell[3], G. Winroth[1], H.L. Anderson[3], A. Tracz[2], F. Cacialli[1]; [1]Department of Physics and Astronomy, and London Centre for Nanotechnology, University College London (UK); [2]Center of Molecular and Macromolecular Studies (PL); [3]Chemistry Research Laboratory, Department of Chemistry, University of Oxford (UK).
Highly oriented polyvinyl alcohol films doped with conjugated polyelectrolytes are presented here. Steady-state and time-resolved spectroscopy reveal that the photoluminescence is strongly polarized (~95%) along the orientation axis. An application of these films as polarizing filters is proposed.

TOM5_3424_03
Single crystals versus nanocrystals in hybrid organic-inorganic photovoltaics
O.P. Dimitriev[1], V.V. Kislyuk[1,2], D.O. Grynko[1], P.S. Smertenko[1], A.F. Singaevsky[1], Yu.P. Piryatinsky[3], A.A. Pud[4], M. Fahlman[5]; [1]Institute of Semiconductor Physics (UA); [2]Taras Shevchenko Kyiv National University (UA); [3]Institute of Physics (UA); [4]Institute of Bioorganic Chemistry and Petrochemistry (UA); [5]Linkoping University (SE).
Photovoltaic (PV) responses from hybrid organic-inorganic interfaces are shown to have different origin depending on whether bulk single crystals giving rise to the flat geometry of the hybrid interface or nanocrystals with the bulk heterojunctions are used. Examples are given for hybrid structures based on Si and some II-VI crystals.

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TOM 5 — POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 — exhibition hall

TOM5_3473_04
Linear and cyclic porphyrin hexamers as low energy gap emitters in near infra-red light-emitting diodes
O. Fenwick[1], J. Binas[1], J. Sprafke[2], D. Kondratiuk[2], F. di Stasio[1], H.L. Anderson[2], F. Cacialli[1]; [1]Department of Physics and Astronomy and London Centre for Nanotechnology, (UK); [2]Department of Chemistry, University of Oxford, Chemistry Research Laboratory, (UK).
We present near infra-red light-emitting diodes incorporating porphyrin hexamers as emitters in blends with F8BT. We have studied both linear and cyclic hexamers and obtain near infra-red emission from the linear hexamer with an external quantum efficiency (EQE) of 0.1±0.01 %. We also investigate the optical properties of such blends.

TOM5_3476_06
Near infra-red light-emitting diodes and infra-red sensitised solar cellsincorporating selenium doped conjugated polymers
O. Fenwick[1], D. Breusov[2], S. Yilmaz[2], S. Allard[2], U. Scherf[2], F. Cacialli[1]; [1]Department of Physics and Astronomy and London Centre for Nanotechnology (UK); [2]Bergische Universität Wuppertal, Fachbereich C – Mathematik und Naturwissenschaften, Makromolekulare Chemie und Institut für Polymertechnologie (DE).
We present devices based upon two selenium doped polymers, BS and TBST, which emit in the near infra-red (NIR) part of the spectrum. In blended devices, we obtain NIR emission (peak 800-900 nm) with external quantum efficiencies up to 0.3±0.1 %. In photovoltaic devices, we achieve 1.2±0.1 % power conversion efficiency.

TOM5_3479_07 Student presentation
A low energy gap polymer for near infrared light-emitting diodes
P. Li[1], O. Fenwick[1], S. Yilmaz[2], D. Breusov[2], S. Allard[2], U. Scherf[2], F. Cacialli[1]; [1]London Centre for Nanotechnology and Department of Physics and Astronomy, University College London (UK); [2]Bergische Universität Wuppertal, Fachbereich C – Mathematik und Naturwissenschaften, Fachgebiet Makromolekulare Chemie und Institut für Polymertechnologie (DE).
Low energy gap polymer Ph-pyrazine-CPDT has been synthesized for applications in near-infrared light-emitting diodes. The absorption spectra, electroluminescence and current-light-voltage characteristics are investigated. Light emission peaking at 957 nm has been obtained

TOM5_3525_05
Comparison of the heat exchange between a Wollaston wire probe and a resistively heated AFM probe
G.M. Lazzerini, O. Fenwick, F. Cacialli; Department of Physics and Astronomy and London Centre for Nanotechnology, University College London (UK).
With a view to of thermal lithography applications we make use of finite element analysis to model the heat exchange between two different kinds of probe and a polymer substrate on quartz. A commercial AFM tip and a Wollaston wire probe are compared by looking at the effect of their shape on the total heat exchange and the lithographic pattern resolution.

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TOM 5 — POSTER SESSION II: Thursday, 28 October, 13:30-15:00 — exhibition hall

TOM5_3148_08
Nonconventional properties of dyes in polytetrafluoroethylene matrix
K. Grytsenko[1], S. Schrader[2], O. Tolmachev[3], Yu. Slominski[3], V. Barachevsky[4], O. Kobeleva[4]; [1]Institute of Semiconductor Physics, Department of the Optoelectronics of the Semiconductor Molecular Systems (UA); [2]University of Applied Sciences Wildau (DE); [3]Institute of Organic Chemistry, Department of Dye Color (UA); [4]Photochemistry Center of the Russian Academy of ScencesY(RU).
Thin films of polytetrafluoroethylene (PTFE) filled with squaraine, stillbene, polymethine and photochromic spiropyran at various concentrations, were obtained by co-deposition in vacuum. PTFE matrix enhances many useful properties of dyes, including stability to action of external factors.

TOM5_3151_10
Tuning the optical properties of Au nanoparticles embedded in PTFE film
V. Ksenzou[1], S. Schrader[1], H. Beyer[1], K. Grytsenko[2], S. Enouz-Vedrenne[3], G. Garry[3]; [1]University of Applied Sciences Wildau (DE); [2]Institute of Semiconductor Physics, Department of the Optoelectronics of the Semiconductor Molecular Systems (UA); [3]THALES Research & Technology France, Campus Polytechnique (FR).
Gold-filled polyterafluoroethylene (PTFE) films filled with gold (Au) nanoparticles (Np) were deposited in vacuum. The Au Nps size and optical properties of their ensemble can be tuned by varying deposition conditions, Au concentration, annealing temperature or power of laser treatment.

TOM5_3418_12 Student presentation
Fluorescence quenching in gold / Rh 6G nanoassemblies: an analysis of nanoparticles concentration
L. Dong[1], J. Hu[1,2], F. Ye[1], S. Popov[1], A.T. Friberg[1,3,4], M. Muhammed[1]; [1]School of Information and Communication Technology, Royal Institute of Technology (SE); [2]ZhejiangUniversity, Center for Optical and Electromagnetic Research (CN); [3]Department of Applied Physics, Aalto University (FI); [4]Department of Physics and Mathematics, University of Joensuu (FI).
Depending on size and concentration, nanoparticles can supress dye lasing properties due to increased quenching of the excited molecules. Here we report experimental results of the fluorescence degradation depending on the nanoparticles concentration.

TOM5_3520_09 Student presentation
Measurement of phthalocyanine binding kinetics with surface plasmon resonance method
M. Karjalainen[1], V. Chukharev[2], N.V. Tkachenko[2], J. Lekkala[1]; [1]Tampere Technical University, Automation Science and Engineering (FI); [2]Tampere University of Technology, Department of Chemistry and Bioengineering (FI).
In this paper, we study an expedient way to monitor the binding kinetics of phthalocyanines, with surface plasmon resonance. Differences in binding were evaluated and compared with simulations in order to obtain new information about the binding process.

TOM5_3619_11 Student presentation
Tetrapropyl-tetraphenyl-diindenoperylene derivative as alternative donor for organic solar cells
J. Meiss[1], M. Hummert[1], C. Schuenemann[1], M. Hermenau[1], W. Tress[1], G. Lackner[2], K. Leo[1], M. Riede[1]; [1]Institut für Angewandte Photophysik, Technische Universität Dresden (DE), [2]Institut für Materialwissenschaft, Fakultät Ingenieurwissenschaften - Abteilung Bauwissenschaften, Universität Duisburg-Essen (DE).
We show a diindenoperylene derivative (P4-Ph4-DIP) as alternative green donor for heterojunction organic solar cells (OSC). Devices with C60 as acceptor display very high fill factors > 76% and open circuit voltages of 0.99V. OSC are characterized by current voltage, EQE and ageing measurements, and material properties are studied.

TOM5_3323_13
Photoelectrical and optical properties of thermocleavable polythiophenes
J. Toušek[1], J. Toušková[1], Z. Remeš[2], S.A. Gevorgyan[3], F.C. Krebs[3]; [1]Charles University in Prague, Faculty of Mathematics and Physics, Department of Macromolecular Physics (CZ); [2]Institute of Physics of the Academy of Sciences of the Czech Republic (CZ); [3]Technical University of Denmark, Risø National Laboratory for Sustainable Energy (DK).
The surface photovoltage (SPV) method was applied to three different thermocleavable polythiophenes, namely P3MHOCT, P3CT and PT to find the diffusion length of photogenerated excitons. Optical absorption and reflection spectra needed for the evaluation were also measured.

TOM 6 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM6_3345_01 Student presentation

Monitoring micrometer-scale collagen organization in tendon upon mechanical strain by use of second harmonic generation microscopy

I. Gusachenko[1], Y. Goulam Houssen[1], G. Latour[1], V. Tran[2], J.-M. Allain[2], M.-C. Schanne-Klein[1]; [1]Ecole Polytechnique, Laboratory for Optics and Biosciences (FR); [2]Ecole Polytechnique, Solid Mechanics Laboratory (FR).

We combined polarization-resolved nonlinear optical microscopy and tensile experiments to visualize the microscopic structure of rat-tail tendon while measuring mechanical properties. For that purpose, we took advantage of intrinsic second harmonic generation in fibrillar collagen to image the crimp pattern and measure the tissue anisotropy during loading cycles.

TOM6_3563_02 Student presentation

Hyper Rayleigh Scattering : a means for investigating the growth mechanism of nanocrystals with quadratic optical properties in reverse micellar solution route synthesis

M. El Kass[1], L. Houf,[1] C. Joulaud[1], R. Le Dantec[1], Y. Mugnier[1], C. Galez[1], D. Fontvieille[2], B. Vincent[3], R. Hadji[3], D. Rouxel[3]; [1]Laboratoire Systèmes et Matériaux pour la Mécatronique, Université de Savoie (FR); [2]UMR CARRTEL (INRA/ Université de Savoie), Laboratoire de Microbiologie Aquatique (FR); [3]Institut Jean Lamour, UMR CNRS 7198, Nancy Université (FR).

The proposed contribution shows that Hyper Rayleigh Scattering measurements can be a very valuable tool for monitoring the synthesis on nanocrystals with quadratic optical properties during their formation when using a reverse micellar route.

TOM6_3190_03

SBS of the Laguerre-Gaussian LG_1^1 laser mode

F.A. Starikov[1,2], V.A. Bogachev[1], Yu.V. Dolgopolov[1], V.V. Feoktistov[1,2], G.G. Kochemasov[1], A.V. Kopalkin[1,2], N.V. Maslov[1], S.M. Kulikov[1], S.N. Nosov[1,2], S.A. Sukharev[1]; [1]Russian Federal Nuclear Center –VNIIEF (RU); [2]Sarov State Phys.&Tech. Instutute of NRNU MEPhI (RU).

The phase *transformation* rather than *conjugation* at stimulated Brillouin scattering (SBS) of the Laguerre-Gaussian vortex LG_1^1 laser mode directly focused into the SBS cell is experimentally demonstrated.

TOM6_3513_04

Technologic constraints in GaAs/AlOx nonlinear waveguides

M. Savanier[1], F. Ghiglieno[1], X. Lafosse[2], I. Favero[1], S. Ducci[1], G. Leo[1]; [1]Laboratoire Matériaux et Phénomènes Quantiques, CNRS-UMR 7162, Université Paris Diderot (FR); [2]Laboratoire de Photonique et de Nanostructures, CNRS-UPR 20 (FR).

We report on the technologic issues in an oxidized GaAs/AlAs waveguide, aimed at performing as an optical parametric oscillator with signal degeneracy around 2 mm. After studying the oxidation impact on the roughness of waveguide interfaces and on optical losses, we have fabricated and characterized the cavity mirrors.

TOM6_3495_05 Student presentation

Design and characterization of nitride-based waveguides for optical switching operating at 1.5 µm

L. Monteagudo-Lerma[1], S. Valdueza-Felip[1], F.B. Naranjo[1], M. González-Herráez[1], A. Wirthmüller[2], E. Monroy[2], J. Viegas[3,4], P. Marques[3,4]; [1]Grupo de Ingeniería Fotónica, Departamento de Electrónica (EPS) Universidad de Alcalá (ES); [2]Equipe mixte CEA-CNRS-UJF, DRFMC/SP2M/ PSC, CEA-Grenoble (FR); [3]Physics & Astronomy Department, Faculty of Sciences, University of Porto (PT); [4]INESC Porto (PT).

We report on the design, fabrication and optical characterization of GaN/AlN quantum-well based waveguides for optical switching. Design is performed taking into account both optical and electrical confinement effects. For the optimized structures, an expected effective area is estimated as 4 µm2.

TOM6_3614_06 Student presentation

Temporal and spectral coherence of supercontinuum light

M. Surakka[1], G. Genty[2], J. Turunen[1], A.T. Friberg[1,3,4]; [1]University of Eastern Finland, Department of Physics and Mathematics (FI); [2]Tampere University of Technology, Optics Laboratory (FI); [3]Aalto University, Department of Applied Physics (FI); [4]Royal Institute of Technology, Dept. Microelectronics and Applied Physics (SE).

We study the coherence properties of supercontinuum (SC) light pulses using secondorder coherence theory. Significantly, we show that SC pulses can be decomposed into two parts due to the different nonlinear dynamics involved in the supercontinuum generation process: a quasicoherent and a quasistationary contribution.

TOM6_3568_07

Nonlinear optical biopsy of liver surfaces for monitoring fibrosis progression

*C.H. Kang[1], Y. He[1,2], S. Xu[1-3], Q. Peng[1,2], H. Yu[1,2]; [1]Institute of Bioengineering and Nanotechnology, A*STAR (SG); [2]Singapore-MIT Alliance, E4-04-10 (SG); [3]School of Computer Engineering, Nanyang Technological University (SG).*

Liver biopsy is the current gold standard for diagnosis of liver fibrosis. Nevertheless, monitoring of liver fibrosis, to assess treatment efficacies, through repeated and invasive biopsies is inadvisable due to the complications that may be involved during the process.

TOM6_3417_08 Student presentation

Raman amplification of optical pulses in silicon nanowaveguides

A. Baron[1], N. Dubreuil[1], P. Delay[1], G.P. Agrawal[2]; [1]Laboratoire Charles Fabry de l'Institut d'Optique, CNRS, Univ Paris-Sud, Campus Polytechnique RD128, 91127(FR); [2]Institute of Optics, University of Rochester (US).

We present a theoretical analysis, which predicts the decrease of the effective Raman gain coefficient owing to self-phase modulation induced by the Kerr and freecarrier effects, taking into account two-photon absorption of the pump energy in the case of silicon nanowaveguides. This model agrees with our experimental data.

TOM6_3671_09

Numerical modeling of the mechanical deformation of diode-pumped Nd:YVO_4 grazing-incidence laser crystal

S.A. Amarande; National Institute for Laser, Plasma and Radiation Physics, Laser Section Bucharest (RO).

Mechanical deformation due to thermal effects in a diode-pumped Nd:YVO_4 bounce laser amplifier was investigated numerically with finite element method. Although its contribution to thermal lens focal power is approximately the same as that of the index part, it has the main contribution to aberrations of thermal lens in the bounce plane.

TOM6_3336_10 Student presentation

High order optical harmonic generation in two-color laser field

A.V. Andreev, S.Yu. Stremoukhov; Faculty of Physics, M.V.Lomonosov Moscow State University (RU).

The results of the theoretical researches on the high-order-harmonic generation by single atom interacting with two-color laser field are discussed. The methods of control of conversion efficiency are proposed.

TOM6_3490_11 Student presentation

Role of domain disorder in second harmonic generation in strontium barium niobate

M. Ayoub, F. Sibbers, J. Imbrock, C. Denz; Institut für Angewandte Physik and Center for Nonlinear Science (CeNoS),Westfälische Wilhelms-Universität Münster (DE).

Noncollinear second harmonic generation is examined in strontium barium niobate crystals with different degrees of order of the ferroelectric domains. The spatial distributions of planar and conical second harmonic signals are studied during light-assisted poling and repoling of the crystal.

TOM6_3430_12

The nonlinear optical susceptibility of macroscopically ordered nanocrystals

V.I. Belotitskii, Yu.A .Kumzerov; A.F. Ioffe Physico-Technical Institute RAN (RU).

It is determined the second-order nonlinear optical susceptibility tensor for a macroscopically ordered nanocrystals, the crystallographic axes of which in the plane perpendicular to the direction of ordering are oriented in an arbitrary manner. The
results can be used for the development of new nanocrystalline materials.

TOM6_3468_13

On the Orbital Angular Momentum of Light in a quadratic nonlinear interaction of off-axis vortex beams

F.A. Bovino[1], M. Braccini[2], C. Sibilia[2]; [1]Elsag Datamat (IT); [2]Sapienza Università di Roma, Dipartimento di Energetica (IT).

A study on the evolution of optical on–axis and off–axis vortices generated by spiral phase plates is presented, emphasizing the properties of orbital angular momentum in the linear and nonlinear cases.

TOM 6 POSTER SESSION I: Wednesday, 27 October, 13:45-15:15 exhibition hall

TOM6_3542_14
Anisotropic dynamics of photoinduced waveguides in biased photorefractive media
V. Coda[1], M. Gorram[1], G. Montemezzani[1], F. Devaux[2], M. Chauvet[2]; [1]Laboratoire Matériaux Optiques, Photonique et Systèmes (LMOPS); Université Paul Verlaine – Metz et Supelec (FR); [2]Département d'Optique, Institut FEMTO-ST, UMR CNRS 6174, Université de Franche-Comté (FR).
The highly anisotropic buildup of photoinduced channel waveguides in biased photorefractive media is studied for different geometries and analyzed using a time-dependent 3D numerical model. The observed dynamic reveals that transient index profiles differ from steady-state ones, specially for the case of one-dimensional illumination.

TOM6_3524_15 Student presentation
Slow- and fast light in a photorefractive SBN crystal
W. Horn, J. Bassewitz, C. Denz; Westfälische Wilhelms-Universität, Institut für Angewandte Physik and Center for Nonlinear Science (DE).
We demonstrate slow and fast light by dispersive phase coupling in a photorefractive Strontium Barium Niobate crystal. The gain spectrum is modulated by using multiple frequency-shifted pump beams. The complete dispersion curve is measured by the phase modulation technique.

TOM6_3530_16
High average power solid-state Raman laser in near IR region
V. Lisinetskii[1,2], R. Chulkov[2], O. Lux[3], H. Rhee[3], S. Schrader[1], H.J. Eichler[3], V. Orlovich[2]; [1]University of Applied Sciences Wildau, Engineering Physics (DE); [2]B.I. Stepanov Institute of Physics, NAS of Belarus (BY); [3]TU Berlin - Institut für Optik und Atomare Physik (DE).
High average power barium nitrate Raman laser pumped with Nd:YAG laser radiation is presented. The output average powers of 17 W, 9.5 W, and 5.5 W were obtained for the wavelengths of the first, second, and third Stokes correspondingly. The thermal lens arisen during the Raman generation was investigated.

TOM 6 POSTER SESSION II: Thursday, 28 October, 13:30-15:00 exhibition hall

TOM6_3420_17
Investigation of Raman threshold conditions in bulk silicon
V. Lisinetskii[1], H. Rhee[2], S. Schrader[1], H.J. Eichler[2]; [1]University of Applied Sciences Wildau, Engineering Physics (DE); [2]TU Berlin - Institut für Optik und Atomare Physik (DE).
Raman threshold calculations for bulk silicon in conditions of long free-carriers life-time were performed. Single-pass generation and Raman laser were considered. Ways for decreasing of Raman threshold in bulk silicon are discussed.

TOM6_3603_19 Student presentation
Ultra-High Conversion Efficiency and Low Lasing Threshold Chalcogenide Waveguide Raman Laser for Optical Interconnect
Y. Huang[1], M. Tang[2], F. Luan[1], P. Shum[1], Ch. Lin[1]; [1]Network Technology Research Centre, School of Electrical and Electronic Engineering, Nanyang Technological University (SG); [2]Tera-Photonics Lab, Extreme Photonics Department, Advanced Science Institute (JP).
Chalcogenide waveguide Raman laser are comprehensively investigated as a promising solution for optical interconnect laser source. Compared to silicon Raman laser, an order of magnitude conversion efficiency enhancement and 33% threshold reduction are simultaneously achieved within waveguide miniaturization to 35mm.

TOM6_3458_22
Femtosecond second harmonic generation with wavelength tunability by using diffractive lenses
G. Mínguez-Vega[1], J.R. Vázquez de Aldana[2], O. Mendoza-Yero[1], C. Méndez[3], C. Romero[2], R. Borrego-Varillas[2], P. Andrés[4], J. Lancis[1], V. Climent[1], L. Roso[3]; [1]Department de Física, Universitat Jaume I (ES); [2]Dept. de Física Aplicada, Universidad de Salamanca (ES); [3]Centro de Láseres Pulsados Ultracortos Ultraintensos (ES); [4]Departament d'Òptica, Universitat de València (ES).
We demonstrate that kinoform diffractive lenses (DL) can be used as a simple method to tune the central wavelength of femtosecond pulses generated in a second harmonic (SH) experiment with birefringent crystals. It is done thanks to the on-axis displacement of the nonlinear crystal in the vicinity of the focal position of the DL.

TOM6_3507_18
Temporal ghost imaging with incoherent classical light
T. Setälä[1], T. Shirai[2], A.T. Friberg[1,3,4]; [1]Aalto University, Dept. Applied Physic (FI); [2]National Institute of Advanced Industrial Science and Technology, Photonics Research Institute (JP); [3]University of Eastern Finland, Dept. Physics and Mathematics (FI); [4]Royal Institute of Technology, Dept. Microelectronics and Applied Physics (SE).
We show that in time-domain classical ghost imaging with incoherent stationary light, correlation of the output intensity fluctuations gives the fractional Fourier transform of the temporal object. For pulsed beams, a new imaging condition is obtained. Effects of pulse length and other system parameters on image quality are considered.

TOM6_3180_20 Student presentation
Nonlinear and saturable absorption characteristics of amorphous InSe thin films
M. Yüksek[1], U. Kürüm[1], H. Gul Yaglioglu[1], A. Elmali[1], A. Ateş[2]; [1]Department of Engineering Physics, Faculty of Engineering, Ankara University (TR); [2]Department of Physics, Science Faculty, Atatürk University (TR).
We prepared very thin amorphous InSe films and investigated the thickness dependence of the nonlinear absorption by pump-probe and open aperture Z-scan techniques. While thinner films (20 and 52 nm) exhibit saturable absorption, thicker films (70 and 104 nm) exhibit nonlinear absorption for 4 ns, 65 ps, and 44 fs pulse durations. This behavior is attributed to increasing localized defect states in the energy band gap as the film thickness increases.

TOM6_3447_23
Noncollinear second harmonic generation of fiber lasers radiation
K. Regelskis, R. Trusovas, J. Zeludevicius, N. Gavrilin, G. Raciukaitis; Center for Physical Science & Technology (LT).
In this work noncollinear generation of second harmonic using output of two fiber amplifiers in nonlinear KTP ($KTiOPO_4$) crystal was investigated. 60 % conversion efficiency and 66 μJ pulse energy was achieved.

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TOM6_3466_21
Spatiotemporal characterization of the waveforms generated by the quasi-direct space-to-time pulse shaper
V. Loriot[1,2], O. Mendoza-Yero[3], G. Mínguez-Vega[3], E. Tajahuerce[3], L. Bañares[2], R. de Nalda[1]; [1]Instituto de Química Física Rocasolano, CSIC (ES); [2]Departamento de Química Física I, Facultad de Ciencias Químicas, Universidad Complutense de Madrid (ES); [3]Departament de Física, GROC-UJI, Universitat Jaume I (ES).
Using a space-resolved 2nd order cross-correlation technique combined, we obtain experimentally the three-dimensional (3D) intensity map of the output collimated pulse from the quasi -direct space to time (QDST) pulse shaper.

TOM 6 **POSTER SESSION II:** Thursday, 28 October, 13:30-15:00 **Exhibition hall**

TOM6_3240_24
Nonlinear Absorption of Ultrapower Laser Radiation by Relativistic Underdense Plasma
H.K. Avetissian, A.G. Markossian, G.F. Mkrtchian; Centre of Strong Fields Physics, Yerevan State University, (AM).
Nonlinear absorption of supershort laser pulses of ultrarelativistic intensities in underdense plasma due to inverse bremsstrahlung of electrons on the ions/nuclei is investigated. Coefficient of nonlinear absorption is studied for relativistic Maxwellian plasma at asymptotically large values of laser fields and high temperatures of electrons.

TOM6_3472_27
Theoretical modeling of open aperture reflection Z-scan on media with high-order optical nonlinearities
A. Petris[1,2], V.I. Vlad[1]; [1]National Institute for Laser, Plasma and Radiation Physics, Dept. of Lasers (RO); [2]The Abdus Salam International Centre for Theoretical Physics (IT).
We present the first analytic description of open aperture reflection Z-scan in media with high-order nonlinearities. An expression for the normalized reflectance is derived and its consequences are discussed. A simulation using our formula and data from literature for high-order nonlinear refractive indices of As_2S_3 is performed.

TOM6_4031_30
Tm^{3+}-doped fiber laser based on a highly GeO_2-doped fiber
V.V. Dvoyrin[1,2], I.T. Sorokina[1], V.M. Mashinsky[2], L.D. Ischakova[2], V.L. Kalashnikov[3], V.F. Khopin[4], A.N. Guryanov[4], E.M. Dianov[2]; [1]Department of Physics, Norwegian University of Science and Technology (NO); [2]Fiber Optics Research Center, Russian Academy of Sciences (RU); [3]Institut für Photonik, TU Wien (AU); [4]Institute of Chemistry of High-Purity Substances, Russian Academy of Sciences (RU).
All-fiber CW Tm-doped laser with $55GeO_2$-$45SiO_2$ core, operated at 1862 nm with 37% slope efficiency was demonstrated. Four-wave mixing owing to a high nonlinearity and shifted to 1.87 μm zero-dispersion-wavelength has been observed.

TOM6_3441_25
Frequency doubling with laser beams transformed by conical refraction in biaxial crystals
V. Peet; Institute of Physics, University of Tartu (EE).
Single-step and cascaded conical refraction in biaxial crystals was used for transformation of a lowest-order Gaussian beam into a variety of light configuration like Bessel-Gauss, modified Bessel-Gauss, Hermite-Gauss, Laguerre-Gauss, bow-tie beams, and others. Frequency-doubling process and generation of second harmonic with some of these light configurations was studied.

TOM6_3436_28 Student presentation
Micro-Raman and micro-luminescence spectroscopy of different types of lithium niobate waveguides
J. Villarroel[1], S. Mignoni[2], M. D. Fontana[2], M. Carrascosa[1], A. García-Cabañes[1], J. Olivares[3], F. Agulló-López[3]; [1]Universidad Autónoma de Madrid, Dept. Física de Materiales (ES); [2]Université Paul Verlaine Metz, LMOPS (FR); [3] Universidad Autónoma de Madrid, CMAM (ES).
Micro-Raman and micro-luminescence spectroscopy have been investigated on different types of LiNbO3 waveguides. Specifically, proton-exchange (PE), reversed proton-exchange (RPE), and swift-heavy-ion (SHI) irradiation waveguides have been analyzed in reference to the behaviour of a congruent LiNbO3 substrate.

TOM6_4029_31
Tunable VCSEL with intracavity liquid crystal layer
Olivier Castany[1], Laurent Dupont[1], A. Shuaib[2], J.P. Gauthier[2], C. Levallois[2], C. Paranthoen[2], N. Chevalier[2], O. Durand[2], A. Le Corre[2] ; [1]Optics Department, Telecom Bretagne, UMR CNRS 6082 (FR); [2]FOTON-INSA, UMR CNRS 6082 (FR).
A tunable VCSEL is demonstrated, where tunability is achieved with an intracavity nematic liquid crystal layer. Laser effect is obtained under optical pumping. By choosing an adequate cavity length, it is possible to obtain a single mode emission on the extraordinary mode. A tuning range of more than 30 nm is demonstrated, with an applied voltage of less than 3 V.

TOM6_3474_26
Supercontinuum generation with femtosecond pulses focused by diffractive lenses
C. Romero[1], R. Borrego-Varillas[1], A. Camino[1], G. Mínguez-Vega[2], O. Mendoza-Yero[2], J.R. Vázquez de Aldana[1], J. Lancis[2]; [1]Dept. de Física Aplicada, Universidad de Salamanca (ES); [2]Dept. de Física, Universitat Jaume I (ES).
We investigate the supercontinuum generation with femtosecond pulses focused by a kinoform diffractive lens on a sapphire crystal. Differences are found with the supercontinuum generated with refractive lenses. Dependence of the generated spectrum with the lens-crystal distance is shown to have a more complex behavior.

TOM6_3907_29 Student presentation
Coupling between filament-forming beams in liquid methanol
B.D. Strycker, M. Springer, C. Trendafilova, M. Zhi, A.V. Sokolov, G.W. Kattawar; Texas A&M University, Institute for Quantum Studies and Department of Physics (US).
We demonstrate pulse energy exchange between two filament-forming beams in liquid methanol. Our results are consistent with those of previous works, and, in addition, we have identified a previously unreported energy-exchange phenomenon occurring at increments in relative delay between the pulses of half an optical period (1.3 fs).

TOM6_4008_32
Generation of broadly tunable sub-30-fs infrared pulses by four-wave optical parametric amplification
J. Darginavičius[1], E. Rubino[2] , D. Faccio[2], P. Di Trapani[2], A. Piskarskas[1] and A. Dubietis[1]; [1]Department of Quantum Electronics, Vilnius University (LT); [2]CNISM and Department of Physics and Mathematics, Università dell'Insubria (IT).
We report on the generation of sub-30-fs near-infrared light pulses by means of broadband four-wave parametric amplification in fused silica. The amplifier is seeded by broadband visible pulses and produces up to 20 μJ infrared idler pulses tunable from 1 to 1.5 μm. The shortest pulse duration is 17.6 fs, measured at 1.2 μm.

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TOM 7 **POSTER SESSION II:** Thursday, 28 October, 13:30-15:00 **exhibition hall**

TOM7_3246_01
A theoretical study of *q*-plates and possible applications in nematic liquid crystals and hybrid photomaterial optical devices
P. Vaveliuk[1,2], F. Moraes[3], S. Fumeron[4], O. Martinez Matos[1], M.L. Calvo[1]; [1]Departamento de Óptica, Facultad de Ciencias Físicas, Universidad Complutense de Madrid (ES); [2]Faculdade de Tecnologia, Servicio Nacional de Aprendizagem Industrial SENAICimatec (BR); [3]Departamento de Física, CCEN, Universidade Federal da Paraiba (BR); [4]Laboratoire d'Energétique et de Mécanique Théorique et Appliquée, CNRS UMR 7563, Nancy Université (FR).
A *q*-plate is a stratified optical medium composed of a uniaxial nematic liquid crystal with an inhomogeneous orientation of the optical axis possessing a topological charge *q*. We report here results from a previous theoretical approach to analyze the associate dielectric tensor, by giving a detailed study of non trivial tensor coordinate transformations. The relationship between the diagonal dielectric tensor and the topological charge of the plate is established. From that, the dielectric tensor for a given *q*-plate can be explicitly calculated in a convenient frame, and hence the field propagation equations can be derived. Some possible *q*-plate structures holding unconventional structural properties are proposed. The possible applications for implementing such particular structures in liquid crystals and hybrid photomaterials are discussed.

TOM7_3913_02
Tracing some industrial combustion products using differential optical absorption spectroscopy (DOAS) equipment
S.S. Sackey[1], P.K. Buah-Bassuah[1], M.J. Eghan[1], O.S. Akpade[2], G. Giovanelli[3], I. Kostadinov[3]; [1]Laser and Fibre Optics Centre, Department of Physics, University of Cape Coast Ghana. (GH); [2]Tema Oil Refinery (GH), 3Institute of Atmospheric Science and Climate (IT).
Combustion processes from the major industries in the Accra-Tema industrial area in Ghana can be of major concern and interest as the combustion product emissions can have serious consequences on the climate, energy and environment. The laser and Fibre Optics Centre, Tema Oil Refinery all in Ghana in collaboration with Institute of Atmospheric Science and Climate(ISAC) as well as International Centre for Theoretical Physics (ICTP) all in Italy are doing pilot studies of monitoring some trace gases from combustion processes to understand the impact of such industrial activities on climate and environment. The initial investigation has been done with Differential Optical Absorption Spectroscopy (DOAS) on some of the industrial emissions (O3, SO2, NO2) at the lower atmosphere.

TOM7_4026_03
Methods of the measuring accuracy estimation in the stereoscopic system for the control of objects displacements
K.G. Arakantsev, E.M. Bogatinskiy, A.A. Gorbachev, I.A. Konyakhin, V.V. Korotaev; Saint-Petersburg State University of Information Technologies, Mechanics and Optics, Department of the Optic-electronic Devises and Systems (RU).
Methods of data processing in stereoscopic system for the control of spatial objects displacements are considered. Possibility of using perturbation theory for estimation of systematic and accidental errors in stereoscopic measuring system is based.

TOM7_4019_04
Electrical activation of amorphous silicon on glass using microwave annealing for the application of thin film solar cells
H.Y. Chen[1], Y.J. Lee[2], C.P. Chang[1]; [1]Huafan University, Department of Electronic Engineering (TW), [2]National Nano Device Laboratories (TW).
A 5.8 GHz microwave annealing (MWA) is employed to electrically activate the doped amorphous silicon (a-Si) thin films on glass. MWA can electrically activate better the doped a-Si films at low annealing temperature and short processing time and effectively reduce their resistivity. The longer annealing time for MWA is better.

TOM7_4014_05
The Generation and Analysis of Spatial Energy Distribution in the Optical Equisignal Zone
E.M. Bogatinskiy, I.A. Konyakhin, V.V. Korotaev, A.N. Timofeev; St. Petersburg State University of Information Technologies, Mechanics and Optics (RU).
Optical-electronic system with optical equisignal zone for control automation of attitude position relatively to basic plane is offered. To ensure planar shape of this zone is achieved by light beam's spatial energy distribution forming.

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Topics:

- Microfluidic lasers
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- Fluid paper
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- Optical and photonic tweezers
- High sensitivity biomolecular sensor platforms
- and specific application areas

Abstract due date: 5 January 2011

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Munich, Germany | 23 – 25 May 2011
www.myeos.org/events/eosmoc2011 | munich@myeos.org

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- Theoretical and practical aspects of manufacturing and finishing technologies
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- A joint session will be organised with the SPIE Europe Conference "Optical Meterology" (Optical Measurement Systems for Industrial Inspection).

Abstract due date: 28 Febr. 2011

1st EOS TOPICAL MEETING ON PHOTONICS FOR SUSTAINABLE DEVELOPMENT - FOCUS ON THE MEDITERRANEAN (PSDM 2011)

Tunis, Tunisia | 11 - 13 July 2011
www.myeos.org/events/psdm2011 | psdm2011@myeos.org

Topics:

- Biophotonics
- Optics and energy
- Optics and environment
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- Organic photonics
- Optical sensing

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