## Room 504 — TOM 5

18.00 - 18.15

**Ultrafast gain switching in conjugated polymer-doped Plastic Optical Fibers,** *J. Clark[1], L. Bazzana[2], W. C. Tsoi[3], R. Xia[4], A. L. Mendonça[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 (IT), [2]LUCEAT (IT), [3]Univ. of Sheffield (UK), [4]Imperial College (UK), [5]Inst. de Telecom., and Dep. de Engenharia Química, Inst. Superior Técnico (PT).* We demonstrate conjugated polymer-doped plastic optical fiber (POF) amplifiers which are capable of ultrafast all-optical gain switching in the visible spectral region. The switch is possible due to the unique properties of isolated conjugated polymers and shows high on/off ratios (50-100%) and rapid recovery times (sub-ps).

18.15 - 18.30

**Optical modulation of amplified emission in organic devices,** *M. Zavelani-Rossi[1], S. Perissinotto[1,2], M. Carvelli[1], M. Salerno[2], C. Bertarelli[3], G. Gigli[4], G. Lanzani[1]; [1]ULTRAS CNR-INFM, Dipartimento di Fisica, Politecnico di Milano (IT), [2]Istituto Italiano di Tecnologia (IT), [3]Dipartimento di Chimica; Politecnico di Milano (IT), [4]NNL of CNR-INFM, Università degli Studi di Lecce (IT).* We show optical modulation of stimulated and spontaneous amplified light (laser and ASE) in conjugated polymer devices. Emission control and wavelength conversion are obtained in various schemes by a control pulse exploiting different material properties: 2-photon pumping, photoinduced absorption and photochromism.

## Room 405 — TOM 6

18.00 - 18.15

**Pattern formation and dynamics in extended-cavity microresonators,** *M.Brambilla[1], T. Maggipinto[2]; [1]CNISM, CNR-INFM, e Dipartimento di Fisica (IT), [2]CNISM,CNR-INFM e Dipartimento di Fisica, Università di Bari, Via Amendola 173 (IT).* A microresonator is studied, based on nonlinear semiconductor layers and encompassing a passive, an active and a free-propagation stage. An appropriate model is proposed to describe the spatiotemporal field dynamics Pattern forming instabilities are studied and simulations are reported to evidence pattern dynamics.

18.15 - 18.30

**Selective amplification of scar modes in a chaotic optical fiber,** *C. Michel, V. Doya, O. Legrand, F. Mortessagne; Laboratoire de Physique de la Matiere Condensee (FR).* A multimode optical fiber made chaotic thanks to its D-shaped transverse cross section exhibits surprising modes that localize their intensities along given directions, the scar modes. We introduce a doped area in the core of the fiber, in order to enhance scar modes along the propagation. We propose a numerical study of the amplification of these modes.

## Room 513 — WS Education

Panel Discussion

## NOTES

19.00 - 21.00 Get-together / Reception

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## Room: 504 — TOM 5

16.15 - 16.30

**Stark spectrocopy of excited state transitionsin a poly(fluorene)-fluorenone copolymer,** *C. Gadermaier[1], F. Grasse[2], S. Perissinotto[3], M. Graf[4], F. Galbrecht[5], U. Scherf[5], E.J.W. List[4], G. Lanzani[3]; [1]Jozef Stefan Institute (SI), [2]Fraunhofer Institute for Microelectronic Circuits and Systems (DE), [3]National Laboratory of Ultrafast Science (IT), [4]Graz University of Technology and Institute of Nanostructured Materials and Photonics, Joanneum Research (AT), [5]Dep. of Chemistry and Institute of Polymer Chemistry (DE).* Transient excited states in a conjugated polymer with appropriate traps to build up a sufficient excited state population are probed with field-modulated femtosecond spectroscopy. The obtained Stark spectrum hints indicates a strong difference in the dipole moment between different excited states.

16.30 - 16.45

**Photochromic 1,2-diarylethenes: influence of chemical substituents on the polarizability and the refractive index,** *A. Bianco[1,2], C. Bertarelli[2], G. Callierotti[2], C. Castiglioni[2], G. Zerbi[2]; [1]INAF – IASF Istituto di Astrofisica Spaziale e Fisica Cosmica (IT), [2]Politecnico di Milano (IT).* Reversibility of the photoinduced processes in the photochromic systems has made such materials promising candidates for applications in optics and photonics. The devices based on diarylethene switch, usually exploit the change in the absorption spectrum (color) of the material. We paid, instead, attention to the NIR spectral range where the material does not absorb, but a change in the real part of the refractive index ($\Delta n$) takes place upon photoisomerization; this property paves the way for applications in telecoms or optical instrumentation. Understanding how the chemical design affects the refractive index becomes then important.

16.45 - 17.00

**Simultaneous Optimization of Semiconducting Polymer Films for Optical Gain and Charge Carrier Mobility,** *R. Xia, B. Yap, M. Campoy-Quiles, P. N. Stavrinou, D. D. C. Bradley; Experimental Solid State Physics Group, The Blackett Laboratory, Imperial College London (UK).* We report a strategy towards polymer semiconductors that combine efficient light emission and high charge carrier mobility. This approach results in polymer films that exhibit hole mobilities as high as 6 x $10^{-2}$ $cm^2/Vs$ and state of the art optical gain characteristics. Optically pumped distributed feedback lasers comprising 1-D etched silica grating structures coated with these polymers have excitation thresholds as low as 30 $W/cm^2$ and slope efficiencies up to 11%.

## Room: 405 — TOM 6

16.15 - 16.30

**Transverse Localized Structures with Delay,** *M. Tlidi, G. Kozyreff, P. Mandel, D. Pieroux; Optique Nonlinéaire Théorique, Université libre de Bruxelles (U.L.B.) (BE).* We study 2D spatial localized structures in coherently driven optical cavities subjected to a delayed feedback. The delay is found to induce motion of localized structures that are otherwise stationary and stable. We study this phenomenon in two models: the Swift-Hohenberg and the Lugiato-Lefever models.

16.30 - 16.45

**Transient growth and sensitivity to noise in nonlinear optics,** *G. D'Alessandro[1], F. Papoff[2], G.-L. Oppo[2]; [1] School of Mathematics, University of Southampton (UK), [2]SUPA and Department of Physics, University of Strathclyde (UK).* Perturbations of a stable state asymptotically decay to zero. However, in systems that show transient growth a perturbation can grow to macroscopic scale and dominate the dynamics. We show that semiconductor lasers and optical parametric oscillators are such systems and analyse their response to noise.

16.45 - 17.00

**Transverse spatial structure of a high-Fresnel number Vertical External Cavity Surface Emitting Laser,** *T. Elsass[1], S. Barbay[1], X. Hachair[2], I. Sagnes[1], R. Kuszelewicz[1]; [1]Laboratoire de Photonique et de Nanostructures (FR), [2]present address: INRIA, 2004 Rte des Lucioles (FR).* Spatial mode selection of an optically pumped vertical external cavity surface emitting laser (VECSEL) with an intracavity lens is investigated experimentally by changing the position of the lens or the size and the power of the pump beam. We demonstrate the possibility of controlling the Fresnel number and show high-Fresnel number patterns, a necessary condition for cavity solitons to appear.

## Room: 513 — TOM 7

16.15 - 16.30

**Adaptive optics for microscopy,** *X. Levecq; Imagine Optic (FR).* Optical microscopy is an inescapable technique in the life sciences, in particular for studying the intracellular organisation of biochemical events. However, there is an increasing need in a variety of fields (neurophysiology, developmental biology, biopsy, …) to image cells in their native environment, i.e. intact tissue. The task is difficult because tissues are heterogeneous media that strongly affect light propagation, causing large amounts of scattering and wavefront aberration at large depths. These effects reduce the signal and contrast in usual optical techniques (such as confocal microscopy), and prevent them to provide images deep within intact tissue.

16.30 - 16.45

**Toward 3D high resolution imaging using adaptive optics and full-field optical coherence tomography,** *M. Blavier[1], L. Blanco[2], F. Pouplard[1], M. Glanc[2], S. Tick[1], I. Maksimovic[1], G. Rousset[2,3], L. Mugnier[4], G. Chénegros[4], M. Pâques[1], J.-F. Le Gargasson[1], J.A. Sahel[1]; [1]Centre d'Investigations Cliniques du CHNO des XV-XX, Université Paris VI (FR), [2]PHASE/LESIA Observatoire de Paris (FR), [3]PHASE/LESIA Université Paris VII (FR), [4]PHASE/DOTA ONERA (FR).* We describe here 2 eye fundus imaging prototypes. First one is an Adaptive Optics flood imager with a posteriori image reconstruction. Second one is a full-field Optical Coherence Tomograph, which performs "4 phases" image reconstruction of biological samples. Aim is to couple both to achieve 3D high resolution mapping of live retinas.

16.45 - 17.00

**Programmable micro light emitting diode arrays: a tool for confocal imaging and neural photo-stimulation,** V. *Poher,[1] G.T. Kennedy,[1] N. Grossman[2], H.X. Zhang,[3] E. Gu,[3] M.D. Dawson,[3], P. Degenaar[2], P.M.W. French[1], M.A.A. Neil[1]; [1]Imperial College London, Photonics Group, Blackett Laboratory (UK), [2]Imperial College London, Institute of Biomedical Engineering (UK), [3]University of Strathclyde, Institute of Photonics (UK).* Light emitting diodes can be readily patterned into arrays of individual elements of order 20 microns in size. We present the application of two such programmable arrays. The first, a 120 element array of line devices, is applied to obtain optically sectioned images a fluorescence microscope. The second, a 64x64 element matrix addressed array, is used to provide selective photo-stimulation of neuron cells with high spatial resolution.

## NOTES

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| TOM 5 | TOM 6 | TOM 7 | NOTES |
|---|---|---|---|

**TOM 7**

9.45 - 10.30 Plenary
**Dynamic Interferometry,** *James Millerd, Neal Brock, John Hayes, Brad Kimbrough, Michael North-Morris, James C. Wyant[1]; 4D Technology Corporation (US), [1]College of Optical Sciences, University of Arizona (US).*
—> see page 16
Room: 401

**JOINT**
10:30 – 13:00 Poster Session II and Lunch Break
- Exhibition Hall -
For the schedule of the Poster Presentations please see pages 73 to 88.

**TOM 6**

13.00 - 14.15
**Cavity Solitons in dissipative optical systems**
Session Chair: NN

13.00 - 13.30 Invited
**Optically controllable microlasers based on cavity solitons,** *T. Ackemann; SUPA and Department of Physics, University of Strathclyde (UK).* Bistable microlasers in a broad-area vertical-cavity semiconductor laser with frequencyselective feedback and their possible applications are analyzed experimentally and theoretically.

13.30 - 13.45
**Cavity solitons in a Vertical Cavity Semiconductor Optical Amplifier: from single to cluster states,** *S. Barbay[1], T. Elsass[1], X. Hachair[2], I. Sagnes[1], R. Kuszelewicz[1]; [1]Laboratoire de Photonique et de Nanostructures (FR), [2]present address: INRIA (FR).* We present experimental results on the formation of single localized states and clusters of localized states in a Vertical Cavity Semiconductor Optical Amplifier. A titled snaking instability is evidenced showing multistability among the different structures.

**TOM 7**

13.00 - 14.30
**Adaptive Optics**
Michael Totzeck;
Carl Zeiss AG (DE).

13.00 - 13.30 Invited
**Optimal Wavefront Sensing at Low Light Levels,** *C. Paterson; Imperial College London, The Blackett Laboratory (UK).* We have previously derived an information limit for measurement of wavefront at low light levels. The limit was derived for a canonical wavefront sensor but suggests the form for optimal wavefront sensors. Here we describe progress towards implementation.

13.30 - 13.45
**Development of an Adaptive Optics System for Imaging Applications in Educational Astronomy,** *D. Coburn[1], D. Thornton[1], S. Lynch[1,2], K. Kepa[2,3], J.C. Dainty[1]; [1]National University of Ireland, Dept. of Experimental Physics (IE), [2]National University of Ireland, Dept. of Electronic Eng. (IE), [3]Wroclaw University of Technology, Institute of Computer Engineering Control and Robotics (PL).* We report on a prototype adaptive optics system designed for use in astronomical imaging applications for 14 – 16" class telescopes. The instrument, which is targeted as an educational tool for university based observatories is currently undergoing lab testing with a view to field testing in late 2008.

## Room: 405 — TOM 6

13.45 - 14.00
**Cavity solitons in vertical-cavity surface-emitting lasers with feedback from a volume Bragg grating,** *N. Radwell[1], T. Ackemann[1], R. Jäger[2]; [1]Department of Physics, University of Strathclyde (UK), [2]Philips Technologie GmbH U-L-M Photonics, d-89081 (DE).* We demonstrate a compact scheme to produce laser cavity solitons by using a volume Bragg grating. The solitons display freedom of polarisation and frequency. The freedom of frequency allows mode competition which leads to fast oscillations at the cavity round trip time.

14.00 - 14.15
**Cavity Soliton Motion in VCSELs with Modulated Optical Injection,** *C. McIntyre[1], A. M. Yao[1], F. Prati[2], G. Tissoni[2], G.-L. Oppo[1]; [1]University of Strathclyde, SUPA and Department of Physics (UK), [2]Universita' dell'Insubria, Dipartimento di Fisica (IT).* We study the motion of cavity solitons in reduced models of VCSELs with spatially modulated optical injection. Cavity solitons move to the maxima of the spatial phase modulation and form controllable arrays. Soliton merging is observed when several cavity solitons move towards the same spatial position.

14.15 - 15.00 **Coffee break**

## Room: 513 — TOM 7

13.45 - 14.00
**Limits of visual performance with adaptive optics correction of ocular aberrations,** *E. Dalimier, J. C. Dainty; National University of Ireland, Galway, Applied Optics Group (IE).* We describe the use of an adaptive optics system to study the limits of visual performance with high-order optical correction of ocular aberrations. The results can be applied for the development of high-order ophthalmic correction techniques.

14.00- 14.15
**Spatial light modulators for atmospheric applications,** *Olga Korotkova; Department of Physics, University of Miami (US).* Spatial light modulators can be used for synthesis of sources of stochastic electromagnetic beams with arbitrary spectral, coherence and polarization properties. Such beams can carry rich information content through linear random media, e.g. turbulent atmosphere, if used in laser communication and laser radar systems.

14.15- 14.30
**High Resolution Adaptive Optics Using a Spatial Light Modulator Coupled with a Quadri-Wave Lateral Shearing Interferometer,** *Ivan Doudet, Isabelle Jour, Benoit Wattellier; PHASICS XTEC (FR).* We demonstrate the use of a Quadri-Wave Lateral Shearing Interferometer to control a phase-only spatial light modulator (SLM) in an adaptive optics loop. Active optics recent developments aim to higher and higher actuator densities. For instance, arrays of micro-mirrors or liquid-crystal based spatial light modulators achieve actuator densities higher than 500x500 control points. To take advantage of these extreme resolutions, it is necessary to use wave front sensors which spatial resolution approaches the correction device performances.

End of TOM 7

## NOTES

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TOM 6

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15.00 - 16.15
**Patterns in dissipative systems**
Session Chair: NN

15.00 - 15.15
**Dissipative optical solitons and cavity soliton lasers,** *W. J. Firth[1], A. J Scroggie[1], P. Paulau[2], T. Ackemann[1]; [1]University of Strathclyde, SUPA and Department of Physics (UK), [2]Institute of Physics, NASB (BY).* A recent demonstration of a cavity soliton laser based on a VCSEL with frequency-selective feedback will be briefly described, and we will discuss its theory and present numerical results from different models of the device, in both one and two transverse dimensions.

15.15 - 15.30
**Cavity soliton laser based on two mutually coupled broad area micro -resonators,** *P. Genevet, S. Barland, M. Giudici, J.R. Tredicce; Université de Nice Sophia Antipolis (FR).* We describe the experimental observation of self localized laser sources, or a cavity soliton laser. We use a compound laser system consisting of two mutually coupled broad area VCSELS, one of which is used as a saturable absorber. We demonstrate that under suitable parameter conditions, independent and bistable localized structures can be generated by means of an external optical perturbation.

15.30 - 15.45
**Moving Solitons in a Cavity Soliton Laser,** *M. Brambilla[1], L.A. Lugiato[2], F. Prati[2], G. Tissoni[2], K. Mahmoud Aghdami[3]; [1]CNR-INFM, CNISM and Dipartimento di Fisica Interateneo, Università e Politecnico di Bari (IT), [2]CNR-INFM, CNISM and Dipartimento di Fisica e Matematica, Università dell'Insubria (IT), [3]Physics Department, Peyame Noor University (IR).* We show that in a cavity soliton laser there is an instability which sets in motion the cavity solitons. We study the parametric conditions for the moving solitons and measure their velocity as a function of the bifurcating parameter. In the case of a finite pump region, we show that the solitons bounce at the boundaries.

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TOM 6

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15.45 - 16.00
**Monolithic vertical cavity laser with a saturable absorber : towards an integrated cavity soliton laser,** *S. Barbay[1], T. Elsass[1], K. Meunier[1], G. Beaudoin[1], I. Sagnes[1], R. Kuszelewicz[1]; [1]Laboratoire de Photonique et de Nanostructures (FR).* Cavity solitons in semiconductor systems have been first demonstrated in optical amplifiers, and recently in a laser with external grating feedback. We propose an original design of a monolithic and integrated vertical cavity laser with saturable absorber and discuss experimental results showing the formation of bistable laser spots.

16.00 - 16.15
**Long term simulations of VCSELs and solid-state lasers,** *G.-L. Oppo[1], F. Prati[2], A. M. Yao[1], G. deValcarcel[3]; [1]University of Strathclyde (UK), [2]Universita' dell'Insubria (IT), [3]Universitat de Valencia (ES).* We remove irrelevant variables from models of broad-area Vertical Cavity Surface Emitting Lasers (VCSELs) and solid-state lasers with large separation of time scales of the dynamical variables. Our reduced models can be integrated 350 times faster, yet accurately reproduce the spatio-temporal dynamics of the full equations, even far above threshold.

End of EOSAM 2008