



CROSS-DISCIPLINARY PHYSICS UNIT (UFI)



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1. Presentation and Research Lines

The Cross Disciplinary Physics Unit (UFI) is a joint research Unit of the [University of the Balearic Islands \(UIB\)](#) and the [Spanish National Research Council \(CSIC\)](#) created in 2006 building upon the former Cross-Disciplinary Physics Department of IMEDEA (DFI-IMEDEA, Mediterranean Institute for Advance Studies) dating from 1995. The creation of the UFI is the first step in the implementation of the 2006-2009 CSIC's Strategic Plan that in its Strategic Line RETICULA, and within the axis "Physics and Mathematics", foresees the creation of a new joint research institute with the UIB on Cross-Disciplinary Physics and Complex Systems (IFISC). The programmatic goal is the development of interdisciplinary and strategic research from the established practices of physicists, acknowledging that important avenues of scientific development occur at the borders of established fields.

By interdisciplinary research it is meant the general attitude of willing to transfer knowledge, concepts and methods across the borders between well established disciplines. By strategic research it is meant focusing in advanced studies in fields with strong future potential, avoiding incremental research as well as the "basic-applied" polarization. We therefore search for windows of opportunity in emerging areas beyond the traditional subjects that defined Physics in the twentieth century.

The backbone of the research that unifies, percolates and is the basis of the rest of activities is the study of generic phenomena in Nonlinear Physics and Complex Systems, with strong methodological components from Statistical Physics, Dynamical Systems, Computational Methods and Quantum Mechanics. From this source of concepts and ideas, the researchers face the challenge of cooperatively defining and updating specific [research lines](#) and projects within a flexible and changing framework

Research lines

In the evolving scheme associated with the programmatic orientation of the UFI there is a unifying transverse line of research of a fundamental nature, which is the identity sign of the UFI. In addition the typical senior researcher participates in other focused lines with a subject defined by the systems under study. This collaborative organization is an alternative to static schemes with disjoint groups of researchers devoted exclusively to a line of research. Participation in the lines of research during 2006 of the staff members and "Ramón y Cajal" postdoctoral associates is summarized in the following scheme:

Research Lines	Salvador Bal·le	Montserrat Casas	Pere Colet	Emilio Hernández-García	Cristóbal López	Víctor M. Eguíluz	Manuel Matías	Claudio Mirasso	Oreste Piro	Maxi San Miguel	LLorenç Serra	Alessandro Scire	Tomàs Sintes	Raúl Toral	Roberta Zambrini
1) Complex Systems: Statistical and Nonlinear Physics	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2) Non Linear Optics and Dynamics of Optoelectronic Devices.	X		X					X		X		X			
3) Quantum Information and Nanoscience		X									X				X
4) Fluid Dynamics, Biofluids and Geophysical Fluids.				X	X				X				X		
5) Biophysics and Nonlinear phenomena Ecology and Physiology				X	X	X	X	X	X				X	X	
6) Dynamics and CollectivPhenomena of Social Systems.						X				X				X	

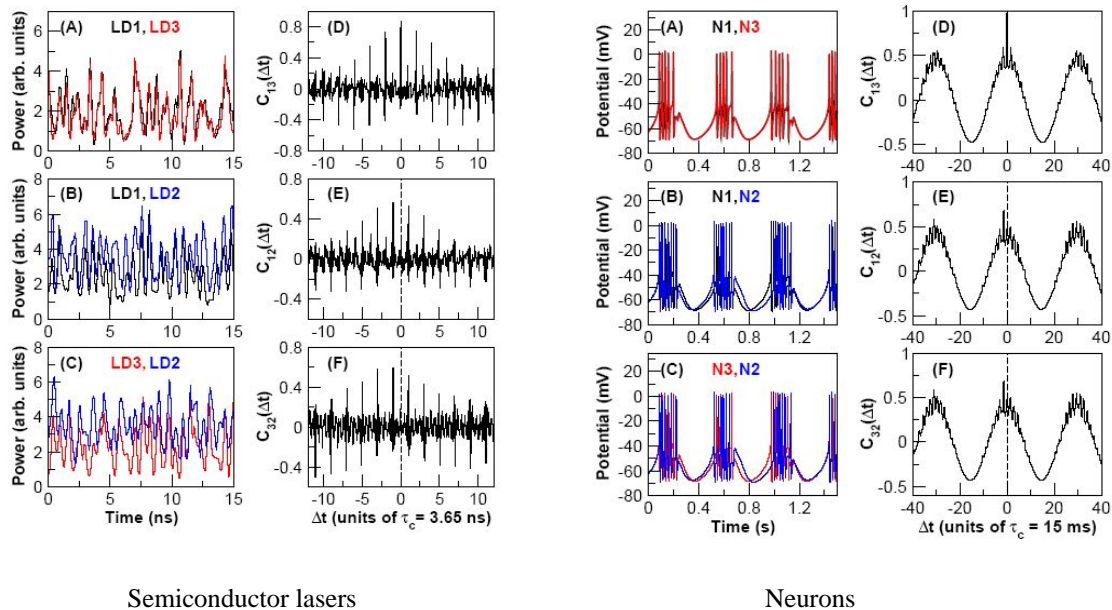
1.1. Some representative research results of 2006

1. Synchronization obtained delaying a delay

Zero-lag long-range synchronization via dynamical relaying.

Fischer, Ingo; Vicente, Raul; Buldu, Javier; Peil, Michael; Mirasso, Claudio R.;
Torrent, M.C.; Garcia-Ojalvo, Jordi
Physical Review Letters, **97**, 123902(1-4)

We show that isochronous synchronization between two delay-coupled oscillators can be achieved by relaying the dynamics via a third mediating element, which surprisingly lags behind the synchronized outer elements. The zero-lag synchronization thus obtained is robust over a considerable parameter range. We substantiate our claims with experimental and numerical evidence of such synchronization solutions in a chain of three coupled semiconductor lasers with long inter-element coupling delays. The generality of the mechanism is validated in a neuronal model with the same coupling architecture. Thus, our results show that zero-lag synchronized chaotic dynamical states can occur over long distances through relaying, without restriction by the amount of delay.



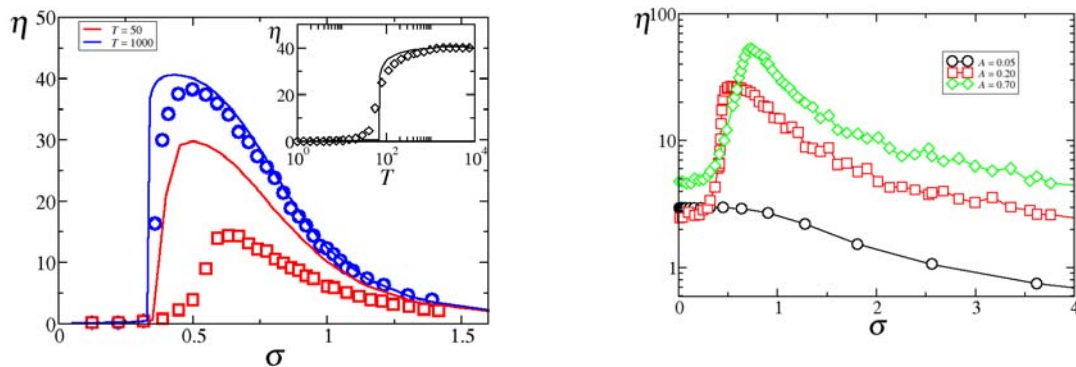
This work was discussed in a "Note of the week" in Science vol. 314, p. 37, October 6, 2006.

2 New resonance phenomena

Diversity-induced resonance.

Tessone, C.J.; Mirasso, C.R.; Toral, R.; Gunton, J.D.
Physical Review Letters, **97**, 194101 (1-4)

We present conclusive evidence showing that different sources of diversity, such as those represented by quenched disorder or noise, can induce a resonant collective behavior in an ensemble of coupled bistable or excitable systems. Our analytical and numerical results show that when such systems are subjected to an external subthreshold signal, their response is optimized for an intermediate value of the diversity. These findings show that intrinsic diversity might have a constructive role and suggest that natural systems might profit from their diversity in order to optimize the response to an external stimulus.



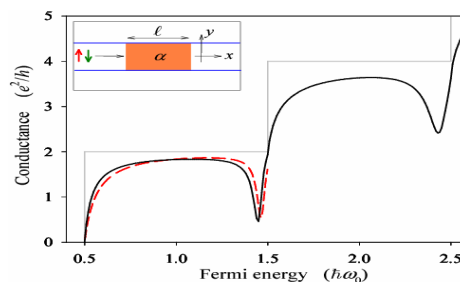
Response by a set of coupled bistable systems

3. Resonance in the conductance of nanometric semiconductors

Fano-Rashba effect in a quantum wire.

Sánchez, David; Serra, Llorenç
Physical Review B, **74**, 153313 (1-4)

We predict the occurrence of Fano line shapes in a semiconductor quantum wire with local spin-orbit Rashba coupling. We show that the Rashba interaction acts in a strictly one-dimensional channel as an attractive impurity, leading to the formation of purely bound states. In a quasi-one-dimensional system these bound states couple to the conduction ones through Rashba intersubband mixing, giving rise to pronounced dips in the linear conductance plateaus. We give exact numerical results and propose an approximate model capturing the main ingredients of the effect.

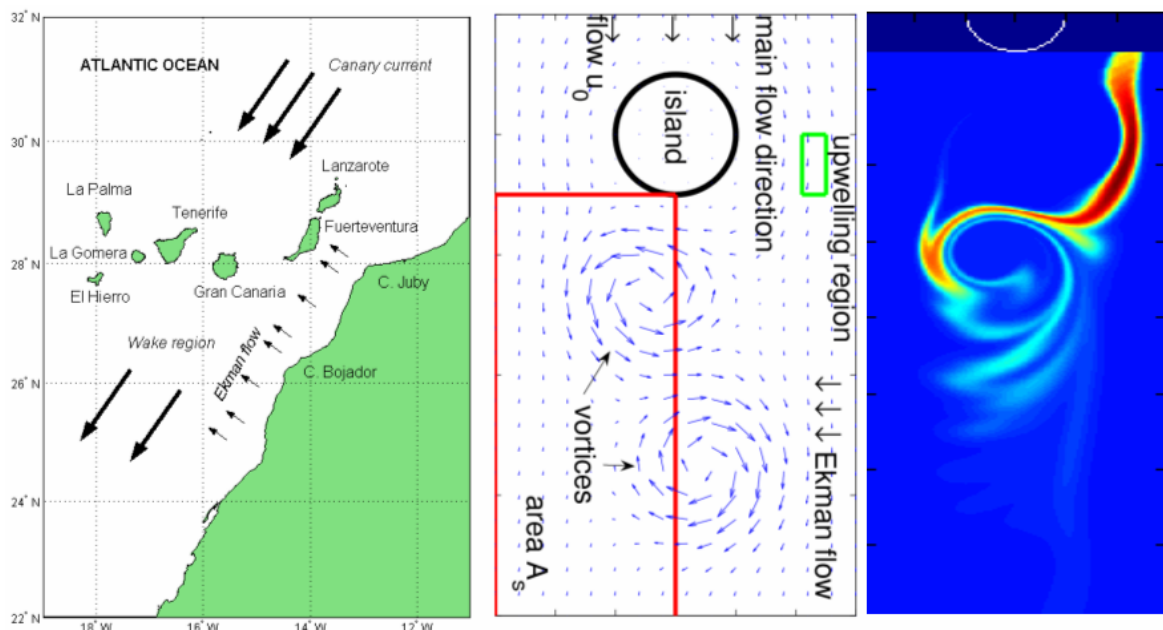


4. Transport in geophysical fluids

Kinematic studies of transport across an island wake, with application to the Canary islands.

Sandulescu, M; Hernández-García, E; López, C; Feudel, U
Tellus A, **58**, 605-615

Transport from nutrient-rich coastal upwellings is a key factor influencing biological activity in surrounding waters and even in the open ocean. The rich upwelling in the North-Western African coast is known to interact strongly with the wake of the Canary islands, giving rise to filaments and other mesoscale structures of increased productivity. Motivated by this scenario, we introduce a simplified two-dimensional kinematic flow describing the wake of an island in a stream, and study the conditions under which there is a net transport of substances across the wake. For small vorticity values in the wake, it acts as a barrier, but there is a transition when increasing vorticity so that for values appropriate to the Canary area, it entrains fluid and enhances cross-wake transport.



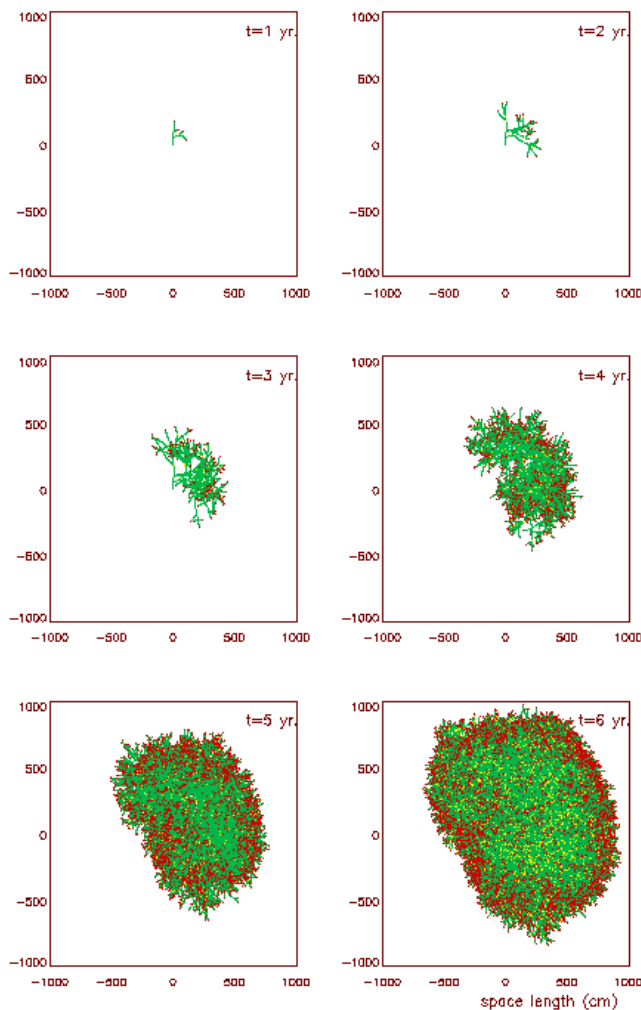
5. Models of growth and pattern formation in marine flora

Modeling non-linear seagrass clonal growth: Assessing the efficiency of space occupation across the seagrass flora.

Sintes, T.; Marbà, N.; Duarte, C.M.
Estuaries and Coasts, **29**, 72-80

The clonal growth of 9 seagrass species was modeled using a simulation model based on observed clonal growth rules (i.e., spacer length, rhizome elongation rates, branching rates, branching angle) and shoot mortality rates for seagrass species. The results of the

model confirmed the occurrence of complex, nonlinear growth of seagrass clones derived from internal dynamics of space occupation.



The modeled clones progressed from a diffuse-limited aggregation (DLA), dendritic growth, identified with a guerrilla strategy of space occupation, to a compact (Eden) growth, comparable to the phalanx strategy of space occupation, once internal recolonization of gaps, left by dead shoots within the clone, begins. The time at which seagrass clones shifted from diffuse limited to compact growth was predictable from the branching angle and frequency of the species and varied from 1 yr to several decades among species. As a consequence the growth behavior and the apparent growth strategy of the species changes with the development of the clones. The results of the model demonstrate that the emergent complexity of seagrass clonal growth is contained within the simple set of growth rules that can be used to represent clonal growth.

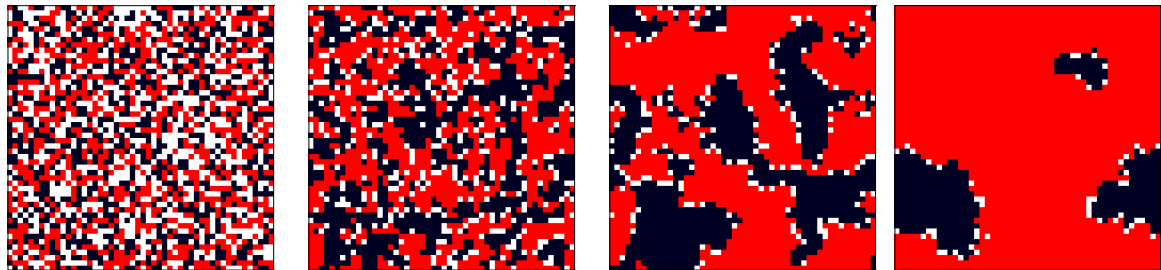
[6. Order-Disorder transitions in social dynamics](#)

[Ordering dynamics with two non-excluding options: bilingualism in language competition.](#)

Castelló, Xavier; Eguíluz, Victor M.; San Miguel, Maxi
 New Journal of Physics, **8**, 308

We consider an extension of the voter model in which a set of interacting elements (agents) can be in either of two equivalent states (A or B) or in a third additional mixed (AB) state. The model is motivated by studies of language competition dynamics, where the AB state is associated with bilingualism. We study the ordering process and associated interface and coarsening dynamics in regular lattices and small world networks. Agents in the AB state define the interfaces, changing the interfacial noise driven coarsening of the voter model to curvature driven coarsening. We argue that this change in the coarsening mechanism is generic for perturbations of the voter model dynamics. When interaction is through a small world network the AB agents restore

coarsening, eliminating the metastable states of the voter model. The time to reach the absorbing state scales with system size as $\ln N$ to be compared with the scaling as N for the voter model in a small world network.



Dynamics of growth of linguistic domains: A (*red*), B(*black*), AB (*white*)

2. People

2.1. Staff

- Salvador Bal·le, University Professor UIB (CU)
- Montserrat Casas, University Full Professor UIB (CU)
- Pere Colet, CSIC Research Professor (PI)
- Víctor M. Eguiluz, CSIC Tenured Scientist (CT)
- Emilio Hernández-García, CSIC Research Professor (PI)
- Cristóbal López, University Associate Professor UIB (CD)
- Manuel Matías, CSIC Senior Researcher (IC)
- Claudio Mirasso, University Professor UIB (TU)
- Oreste Piro, University Professor UIB (TU)
- Maxi San Miguel, University Full Professor UIB (CU)
- Llorenç Serra, University Professor UIB (TU)
- Tomàs Sintes, University Associate Professor UIB (TEU)
- Raül Toral, University Full Professor UIB (CU)

2.2. Postdoctoral Research Associates

- Juan José Cerdá, University Assistant UIB
- Damià Gomila, University Assistant UIB
- Julien Javaloyes, Juan de la Cierva Contract
- Josep Mulet, Postdoctoral Contract I3P CSIC
- Simone Pigolotti, Postdoctoral Contract I3P CSIC
- Alejandro F. Rozenfeld, Postdoctoral Contract MEC
- Alessandro Sciré, Ramón y Cajal Postdoctoral Contract
- Federico Vazquez, Postdoctoral Contract Project CONOCE2
- Roberta Zambrini, Ramón y Cajal Postdoctoral Contract

2.3. Graduate Students

- Pau Amengual, Fellowship Govern Balear
- Xavier Castelló, Fellowship Govern Balear
- Yanne Chembo, Fellowship Govern Balear
- Marzena Ciszak, Fellowship Govern Balear
- Iacyel G. da Silva, Fellowship Govern Balear
- Juan Carlos González-Avella, Fellowship MEC-FPI, Project CONOCE2
- Alejandro Herrada, Fellowship Govern Balear
- Adrián Jacobo, Fellowship MEC-FPU
- Niko Komin, Fellowship CE, Project BIOSIM
- Antonio Pérez López, Fellowship Govern Balear
- Antonio Pérez Serrano, Fellowship CE, Project IOLOS
- Sarah K. Reilly, Program Sócrates, Trinity Collage, Dublin
- Pedro A. Sanchez, Fellowship project PIF-CSIC HIELOCRIS
- Flora Souza Bacelar, Fellowship CE, Project THRESHOLDS

- Claudio J. Tessone, Fellowship MEC-FPI Project SINFIBIO
- Raúl Vicente, Fellowship MEC-FPI, Project SINFIBIO
- Francesco Visconti, Fellowship MEC-FPI, Project CONOCE2

2.4. Technical and administrative support

- Alexandra Casanovas, projects management
- Rubén Tolosa, computing lab technician

2.5. Visitors

a) Sabbatical and visiting professors

- Mario Cosenza, Centro de Física Fundamental, Andes University, Mérida, Venezuela. June 2006
- Jan Danckaert, Department of Applied Physics and Photonics (TONA) of the Vrije Universiteit Brussel, Bélgica. July and December 2006
- Wojcek Korneta, Physic's Faculty, Technical University of Radom, Polonia. July to August and December 2006
- José Roberto Iglesias, Physic's Institute, Porto Alegre, Brasil. June 2006
- Gordon Pipa, Frankfurt Institute for Advanced Studies. October-December 2006
- Dietrich Stauffer, University of Cologne, Germany. February 2006

b) Short visits

- Mahn-Soo Choi, Korea University and University of Basel. February 2006
- Damian H. Zanette, Centro Atómico Bariloche, Division de Física Estadística e Instituto Balseiro. February 2006
- Hans-Juergen Wuensche, Department of Physics, Humboldt-University of Berlin, Germany. March 2006
- Jari Saramäki, Helsinki University of Technology. March 2006
- Emili Bagan, Department of Physics- IFAE- Univ. Autónoma de Barcelona. March 2006
- Marta González, Institute for Computational Physics, Univ. Stuttgart. March 2006
- Stefano Berti, Dipartimento di Fisica Generale, Università di Torino. March 2006
- Javier Villarroel, Departamento de Estadística, Universidad de Salamanca. April 2006
- Katja Lindenberg, Department of Chemistry and Biochemistry, University of California, San Diego (US). April 2006
- Mindaugas Radziunas, Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany. May 2006

- Osvaldo A. Rosso, Universidad de Buenos Aires. May 2006
- Adan Cabello, Departamento de Física Aplicada II. Universidad de Sevilla. May 2006
- Rafael Vilela de Oliveira, Max Planck Institute for the Physics of Complex Systems, Dresden. May 2006
- Enrico Lipparini, Universitat de Barcelona, Universita di Trento and INFN. May 2006
- Teresa María Vaz Martins, Beca Universidad de Oporto. May – June 2006
- Fernando Sols, Universidad Complutense de Madrid. June 2006
- José Luis Mateos, Instituto de Física, Universidad Nacional Autónoma de Mexico (UNAM). June 2006
- Pablo Puleston, Universidad Nacional de La Plata, Argentina. June 2006
- Francesco d'Ovidio, Laboratoire de Météorologie Dynamique (LMD), Ecole Normale Supérieure, Paris, Fr. June 2006
- Agustí Emperador, Institut de Recerca Biomèdica, Parc Científic de Barcelona. June 2006
- Pablo Gleiser, Centro Atómico Bariloche, Argentina. June 2006
- Ana Majtey, Universidad Nacional de Córdoba, Argentina. July 2006
- Albert Compte, Instituto de Neurociencias de Alicante, Spain. October 2006
- Alex Arenas, Universidad Rovira i Virgili, Tarragona, Spain. November 2006
- Manuel de Llano, Instituto de Investigaciones en Materiales, UNAM, Mexico. November 2006
- Javier Buceta, Parc Científic de Barcelona/CeRQT. November 2006
- Joaquín Marro, Institute "Carlos I" for Theoretical and Computational Physics, Granada. November 2006
- Susanna C. Manrubia, Centro de Astrobiología (INTA-CSIC), Madrid, Spain. December 2006
- Paul Wofo, Laboratory of Nonlinear Modelling, University of Yaoundé I, Cameroon. December 2006
- Alessandro Torcini, ISC - CNR , Firenze, Italy. December 2006

3. Research Projects

3.1. Projects funded by the European Commission

“BIOSIM: Biosimulation, a new tool in drug development” (LSHB-CT-2004-005137) Network of Excellence del 6th EC Framework Programme in “Genomics and Biotechnology of Health”. Coordinator Erik Mosekilde (Technical University Denmark). Principal Investigator: R. Toral. (2005-2008). Budget: 217.000 €

“THRESHOLDS: Thresholds of environmental sustainability” Integrated Projecto of 6th EC Framework Programme in “Global Change and Ecosystems”. European Coordinator: C. Duarte (Recursos Naturales -IMEDEA). Responsable Scientific of work-package S2WP1 'regime modelling': E. Hernández-García. (2005-2008). Budget UFI: 126.225 €

"IOLOS: Integrated Optical Logic and Memory using Ultra-fast Micro-ring Bistable Semiconductor Lasers STREP within the Programm Information Society Technologies of European Committee. IST-2005-34743. Principal Investigator A.Scirè (2006-2009). Budget: 91.000 €

“PICASSO: Photonic Integrated Components Applied to Secure Chaos Encoded Optical communication systems” STREP within the programm Information Society Technologies of European Committee. IST-2005-34551 Principal Investigator: Claudio R. Mirasso (2006-2009). Budget: 250.000 euros.

“PATRES: Pattern Resilience” FP6-2005-NEST-Path-043268 Programm "NEST: New Emerging Science and Technology. Call on Tackling *Complexity*". Principal Investigator: M. San Miguel (2007-2009). Budget: 232.670 €

“EDEN: Ecological Diversity and Evolutionary Networks” FP6-2005-NEST-Path-043251 Programm "NEST: New Emerging Science and Technology. Call on Tackling *Complexity*". European Coordinator and Principal Investigator: E. Hernández-García (2007-2009). Budget UFI: 305.276 €

“GABA: Global Approach to Brain Activity: From Cognition to Disease” FP6-2005-NEST-Path-043309 Programm "NEST: New Emerging Science and Technology. Call on Tackling *Complexity*". European Coordinator: J. García-Ojalvo. (2007-2009). Principal Investigator Subcontract of Universidad Politecnica de Cataluña: C. Mirasso. Budget: 50.000 €

“PHYSBIO: Interactive training and research in nonlinear science from physics to biology”, MSCF-CT-2004-013119. European Coordinator: A. Buka (Budapest, Hungria) (2005-07). Principal Investigator: R. Toral. Budget: 137.917 €

"Physics of Risk". European COST ACTION P102. (2003-2007). Spanish Representant in Steering Committee: M. San Miguel. Coordinator: P. Richmond (Trinity, Dublin, Ireland).

“ONCE-CS. Open Network of Centres of Excellence in Complex Systems” Network de la Prioridad 2 “Information Society Technologies”. Future and Emerging Technologies. (2005-2008). (FP6-IST-3-015539). Principal Investigator: M. San Miguel.

3.2. Projects funded by the Spanish National Plan for Science

“CONOCE2: Cooperación y fenómenos no lineales en sistemas complejos extendidos” (FIS2004-00953) (2004-2008). Project of Ministerio de Educación y Ciencia. Principal Investigator: M. San Miguel. Budget: 302.500 €

“Leyes de Escala y Topología de redes funcionales cerebrales”. Acción Especial BFM-2002-12792-E (2004-2006). Principal Investigator: Víctor M. Eguíluz. Budget: 6.000€

“FCESCFB: Fenómenos emergentes en redes biológicas con interacciones complejas” (FIS2004-05073-C04-04) (2004-2006). Project of Ministerio de Educación y Ciencia. Principal Investigator: R. Toral. Budget: 24.400 €

“Dinámica y sincronización de láseres de semiconductor y aplicaciones” (TEC2005-07799-C02-01/MIC) (2005-2006). Principal Investigator: C. Mirasso. Budget: 15.000 €

“PhoDeCC: Dispositivos Fotónicos para Comunicaciones Basadas en Caos”. TEC2006-10009/MIC within the Plan Nacional de Tecnologías Electrónica y de las Comunicaciones del Ministerio de Educación y Ciencia Principal Investigator: Pere Colet. (2006-2009). Budget: 59.000 €

“SICOFIB: Sistemas complejos entre la Física y la Biología” (FIS2006-09966) Principal Investigator: Manuel Matías (2006-2007). Budget: 18.150 €

“Leyes de Escala y Topología de redes funcionales cerebrales”. Acción Especial BFM-2002-12792-E (2004-2006). Principal Investigator: Víctor M. Eguíluz. Budget: 6.000€

"Dynamical systems approach to ocean transport". Acción Integrada Hispano-Alemana del MEC, HA2003-0146. (2004-2006). Principal Investigator (Germany): J. Kurths (University of Potsdam). Principal Investigator of spanish group: E. Hernández-García. Budget (Spanish part): 10.608 €

"Dynamics of nonlinear units that interact through complex networks". Acción Integrada Hispano-Alemana del MEC, HA2003-0077. (2004-2006). Principal Investigator (Germany): S. Bornhold (University of Leipzig). Principal Investigator of Spanish Group: V. M. Eguíluz. Budget (Spanish part): 10.608 €

"Chaos synchronization and on/off phase shift keying encryption" Acción Integrada Hispano-Alemana del MEC, HA2005-0051. (2006-2007). Principal Investigator (Germany): H. J. Wuensche. Principal Investigator of Spanish Group: C. Mirasso. Budget: 10.000 €

"Chemical or biologically interacting substances transported by chaotic flows". Acción Integrada Hispano-Italiana del MEC, HI2004-0144. (2005-2006). Principal Investigator (Italy): A. Vulpiani (University of Rome-La Sapienza). Principal Investigator of Spanish Group: C. López. Budget (spanish part): 10.820 €

3.3. Projects funded by other entities

"Grupo de investigación competitivo de Física Interdisciplinar". PCTIB-2005GC4-05. Balear Government (2006-2008) Principal Investigator: Maxi San Miguel. Budget: 48.000 €

"Luz cuántica en microdispositivos" (2007-2008) Proyecto financiado por la Comunidad Autónoma de les Illes Balears. Principal Investigator: R. Zambrini. Budget: 33.000 €

"Crecimiento cristalino y química de películas de hielo en condiciones extremas (HIELOCRIS). Subproyecto UFI: Modelado y caracterización del crecimiento y la morfología de películas de hielo" (200530F0052) (2005-2007) Project PIF of CSIC. Principal Investigator: Oreste Piro. Budget UFI: 43.500€

"OCEANTECH: Herramientas avanzadas para el estudio de la dinámica oceánica y la gestión medio-ambiental" (2007-2008) Project PIF of CSIC. Principal Investigator of UFI: C. López. Budget UFI: 50.000€

"Estados entrelazados y puertas cuánticas" Project bilateral 2005AR0004 CSIC-CONICET (Argentina) (2006-2007). Principal Investigator: M. Casas

"Dinàmiques No Lineals d'Autoorganització Espai-temporal." Xarxa Temàtica 2004XT 00013 de la Generalitat de Catalunya (2005-2006). Coordinator: Jordi Garcia Ojalvo. Principal Investigator UFI: R. Toral

"STOCHDYN: Stochastic Dynamics. Fundamentals and Applications". Participation. Programm of the European Science Foundation. (2002-2007)

"Dynamics on Complex Networks and Applications" (DYONET06), Seminar and Workshop: Dresden, 6 February – 3 March, 2006. Scientific Coordinators: J. Kurths, M. A. Matías, and A. E. Motter. Budget: 60.000€(Max-Planck Institute for the Physics of Complex Systems, Germany)

3.4. Other Projects with participation of UFI's members

"EUR-OCEANS: European Network of Excellence for Ocean Ecosystems Analysis". Contract number 511106-2, 6th FP CE, priority "Global Change and Ecosystems" (Principal Investigator: C.M. Duarte, RRNN-IMEDEA). Participating scientists: E. Hernández-García, C. López and F. Visconti. (2005-2008).

“MARBEF: Marine Biodiversity and Ecosystem Function”. European Network (6FP) (2004-2009) (IP: C. M. Duarte, RRNN-IMEDEA). Participating scientists: T. Sintes and A. Rozenfeld.

"Información cuántica y dinámica electrónica en nanoestructuras" FIS2005-02796 (MEC) (2005-2008). Participating scientists: M. Casas (IP), Ll.Serra. Budget: 104.762€

"Aplicaciones de la física estadística y no-lineal a la economía y ciencias sociales" Thematic Network MEC FIS2004-22008-E, FIS2005-25318-E (2005-07). Principal Investigator: A. Díaz-Guilera (Barcelona). Participating scientists: M. San Miguel, R. Toral, V. M. Eguiluz.

“Física del Riesgo”. Special Action FIS2004-22783-E MEC related with COST P10 (2005-06). Principal Investigator: A. Sánchez (U. CarlosIII). Budget: 9.000 € Participating scientists: M. San Miguel, R. Toral, V. M. Eguiluz.

"Red Temática de Optica Cuántica y No Lineal". Complementary Action of MEC: FIS2005-24371-E. Participating scientists:: Maxi San Miguel, Pere Colet, Claudio R. Mirasso, Salvador Balle, Alessandro Scire, Roberta Zambrini, Damiá Gomila. Budget first year (may 2006-april 2007): 24.000 euros.

Grupo de Investigación coherente y muy competitivo de Física Atómica, Molecular y Nuclear, PCTIB-2005GC3-02. Balear Government (2006-2008). Participating scientists: M. Casas (IP), Ll.Serra. Budget: 36.000 €

4. Internal Activities: UFI Seminars

-08/02/2006: Pau Amengual, UFI (CSIC-UIB). Truels and N-uels

-09/02/2006: Mahn-Soo Choi, Korea University and University of Basel. Quantum information out of semiclassical states in superconducting circuits.

-15/02/2006: Roberta Zambrini (SUPA, Department of Physics, University of Strathclyde, Glasgow G4 0NG, UK). Quasi-intrinsic angular momentum.

-21/02/2006: Dietrich Stauffer, Cologne University, Germany. Computer simulation of language competition.

-23/02/2006: Dr. Damián H. Zanette. Centro Atómico Bariloche, División de Física Estadística e Instituto Balseiro. Coevolución de agentes y redes: Opinión y comunidades.

-09/03/2006: Hans-Juergen Wuensche, Department of Physics, Humboldt-University of Berlin, Germany. Semiconductor Lasers with Integrated Optical Delay: A Nonlinear Dynamics Lab.

-14/03/2006: Pedro Montoya, Departamento de Psicología UIB. Psicofisiología del dolor.

-15/03/2006: Jari Saramäki, Helsinki University of Technology. The role of weak ties in social networks.

-16/03/2006: Dr. Emili Bagan-Departamento de Física- IFAE- UAB. Estimación óptima de estados cuánticos: Aplicaciones a la comunicación.

-20/03/2006: Simone Pigolotti, Niels Bohr Institute, University of Copenhagen. The neutral theory of biodiversity and time predictions.

-21/03/2006: Marta González, Institute for Computational Physics, Univ. Stuttgart. School friendship networks: Community structure and race segregation.

-23/03/2006: Stefano Berti, Dipartimento di Fisica Generale, Università di Torino. Small scale statistics in viscoelastic turbulent flows.

-04/04/2006: Iris Hendriks, IMEDEA. What is the importance of direct particle trapping in seagrass meadows?.

-06/04/2006: Alejandro Herrada Mederer, UFI. Scaling properties of intraspecific and interspecific phylogenies in the Tree of Life.

-24/04/2006: Javier Villarroel, Departamento de Estadística, Universidad de Salamanca. Valuation of stochastic interest rate securities with time dependent variance.

-27/04/2006: Katja Lindenberg, Department of Chemistry and Biochemistry, University of California, San Diego (US). Subdiffusive Trapping Reactions.

-04/05/2006: Niko Komin, UFI. Stochastic Effects in Drug Absorption.

-09/05/2006: Mindaugas Radziunas, Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany. Agreement between cavity modes in traveling wave and Lang-Kobayashi models of laser with delayed feedback.

-16/05/2006: Xavier Castelló, UFI. Dynamics of language competition: bilingualism and social structure effects.

-17/05/2006: Claudio J. Tessone, UFI. Introducción a los applets en Java.

-19/05/2006: Osvaldo A. Rosso, Universidad de Buenos Aires. EEG analysis using wavelet-based information tools.

-22/05/2006: Dr. Adan Cabello, Departamento de Física Aplicada II. Universidad de Sevilla. Desigualdades de Bell basadas en igualdades.

-23/05/2006: Rafael Vilela de Oliveira, Max Planck Institute for the Physics of Complex Systems, Dresden. Fractal signatures of chaotic advection in precipitation.

-24/05/2006: Enrico Lipparini, Universitat de Barcelona, Universita di Trento and INFN. Spin Hall effect in semiconductor quantum wells

-30/05/2006: Flora Souza Bacelar, UFI. Investigations on the HIV dynamics with a system of time delayed functional equations.

-02/06/2006: Fernando Sols, Universidad Complutense de Madrid. Emission of entangled electron pairs from superconductors.

-06/06/2006: Adrián Jacobo, UFI. Dynamics of Localized Structures in Kerr media.

-13/06/2006: Marzena Cizak, UFI. Anticipated Synchronization: Numerical and Theoretical Study.

-15/06/2006: Mario Cosenza, Universidad de los Andes, Merida, Venezuela. Characterization of complexity in EEG signals.

-16/06/2006: José Luis Mateos, Instituto de Física, Universidad Nacional Autónoma de Mexico (UNAM). Buscando alimento usando vuelos de Lévy: el caso de los monos araña en Yucatán.

-19/06/2006: Dr. Pablo Puleston, Universidad Nacional de La Plata, Argentina. Introducción al control automático, control por modo deslizante y su aplicación a los Sistemas de conversión de Energía Eólica.

-20/06/2006: Francesco d'Ovidio, Laboratoire de Météorologie Dynamique (LMD), Ecole Normale Supérieure, Paris, Fr. Transport and mixing of geophysical systems from finite-size Lyapunov exponent calculations.

-20/06/2006: José Roberto Iglesias, UFI + Instituto de Física UFRGS, Porto Alegre, Brasil. MODELOS PARA DISTRIBUCIÓN DE LA RIQUEZA Y DESIGUALDADES.

-21/06/2006: Agustí Emperador, Institut de Recerca Biomèdica, Parc Científic de Barcelona. Brueckner-Hartree-Fock study of quantum dots.

-27/06/2006: Pablo Gleiser, Centro Atómico Bariloche, Argentina. Sincronización en redes dinámicas.

-11/07/2006: Iacyel G. da Silva, UFI. Aspectos de sincronización en el circuito Chua.

-12/07/2006: Juan José Enseñat, UFI. Descripción de la nueva configuración de galiota (correo, webmail, etc.).

-18/07/2006: Pau Amengual, UFI. Paradoxical games: a physics point of view.

-21/07/2006: Raúl Vicente, UFI. Nonlinear dynamics and synchronization of bidirectionally coupled semiconductor lasers.

-26/07/2006: Ana Majtey, Universidad Nacional de Córdoba, Argentina. Una medida de Complejidad para secuencias simbólicas.

-03/10/2006: Gordon Pipa, Frankfurt Institute for Advanced Studies and Max-Planck Institute for Brain Research,. Task and behaviour related formation of synchronized neuronal cell assemblies.

-11/10/2006: Federico Vazquez, UFI. The Dynamics and Ultimate Fate of Competitive Societies.

-27/10/2006: Albert Compte, Instituto de Neurociencias de Alicante, Spain. Neural mechanisms of selective attention: a computational model.

-31/10/2006: David Sánchez, Dept. de Física, UIB. Spin-orbit interaction in quantum wires.

-03/11/2006: Alessandro Scire, UFI. Integrated semiconductor ring lasers.

-10/11/2006: Alex Arenas, Universidad Rovira i Virgili, Tarragona, Spain. Towards a mesoscopic theory of complex networks

-14/11/2006: Manuel de Llano, Instituto de Investigaciones en Materiales, UNAM, Mexico. Condensación de Bose-Einstein generalizada

-15/11/2006: Javier Buceta, Parc Científic de Barcelona/CeRQT. Dorsoventral Boundary Formation in the Drosophila Wing: a Systems Biology Approach.

-21/11/2006: Yanne Chembo, UFI. Generating ultra-pure radar frequencies with semiconductor lasers.

-30/11/2006: Joaquín Marro, Institute "Carlos I" for Theoretical and Computational Physics, Granada, Spain. INESTABILIDADES DINÁMICAS EN REDES COMPLEJAS.

-12/12/2006: Susanna C. Manrubia, Centro de Astrobiología (INTA-CSIC), Madrid, Spain. Evolution of fast mutating replicators: RNA viruses and the RNA world.

-13/12/2006: Susanna C. Manrubia, Centro de Astrobiología (INTA-CSIC), Madrid, Spain. Neutral networks of RNA secondary structure.

-14/12/2006: Prof. Paul Wofo, Laboratory of Nonlinear Modelling, University of Yaoundé I, Cameroon. Nonlinear electromechanical devices and main research interests in biological physics.

-15/12/2006: Sarah Reilly, UFI. The Influence of Wealth on Cultural Dynamics

-15/12/2006: Yanne Chembo, UFI. Nonlinear Dynamics of Semiconductor Laser Systems with Feedback: Optical Chaos Cryptography, Radar Frequency Generation and Transverse Mode Control.

-18/12/2006: Iacyel Gomes da Silva, UFI. Aspectos de sincronización en un sistema caótico.

-20/12/2006: Alessandro Torcini, ISC - CNR , Firenze, Italy. Synchronization of extended chaotic systems.

-21/12/2006: Claudio Tessone, UFI. Synchronisation and Collective Effects in Extended Stochastic Systems.

5. Publications

Publications are available from UFI's web page: <http://ifisc.uib.es/>

5.1. International Journals

- [Quasi-Intrinsic Angular Momentum and the Measurement of Its Spectrum.](#)
Zambrini, Roberta; Barnett, Stephen M.
Physical Review Letters, **96**, 113901 (1-4)
- [Zero-lag long-range synchronization via dynamical relaying.](#)
Fischer, Ingo; Vicente, Raul; Buldu, Javier; Peil, Michael; Mirasso, Claudio R.; Torrent, M.C.; Garcia-Ojalvo, Jordi
Physical Review Letters, **97**, 123902(1-4)
- [Passive Mode Locking of Lasers by Crossed-Polarization Gain Modulation.](#)
Javaloyes, Julien; Mulet, Josep; Balle, Salvador
Physical Review Letters, **97**, 163902 (1-4)
- [Diversity-induced resonance.](#)
Tessone, C.J.; Mirasso, C.R.; Toral, R.; Gunton, J.D.
Physical Review Letters, **97**, 194101 (1-4)
- [Synchronization of extended chaotic systems with long-range interactions: an analogy to Lévy-flight spreading of epidemics.](#)
Tessone, Claudio Juan; Cencini, Massimo; Torcini, Alessandro
Physical Review Letters, **97**, 224101 (1-4)
- [Ordering dynamics with two non-excluding options: bilingualism in language competition.](#)
Castelló, Xavier; Eguíluz, Victor M.; San Miguel, Maxi
New Journal of Physics, **8**, 308
- [Clone size distributions in networks of genetic similarity.](#)
Hernandez-Garcia, E.; Rozenfeld, A.F.; Eguiluz, V.M.; Arnaud-Haond, S.; Duarte, C.M.
Physica D, **214**, 166-173
- [Analysis of attachment models for directory and file trees.](#)
Klemm, Konstantin; Eguiluz, Victor M; San Miguel, Maxi
Physica D, **214**, 149-155
- [Optical response of two-dimensional few-electron concentric double quantum rings: A local-spin-density-functional theory study.](#)
Malet, F.; Pi, M.; Barranco, M.; Lipparini, E.; Serra, Ll.
Physical Review B, **74**, 193309 (1-4)
- [Time delay in the Kuramoto model with bimodal frequency distribution.](#)
Montbrío, Ernest; Pazó, Diego; Schmidt, Jürgen
Physical Review E, **74**, 056201 (1-5)

- [Dynamics on Complex Networks and Applications.](#)
Motter, Adilson E.; Matías, Manuel A.; Kurths, Jürgen; Ott, Edward
Physica D, **214**, vii-viii
- [Noise-induced inhibitory suppression of frequency-selective stochastic resonance.](#)
Tessone, C.J.; Ullner, E.; Zaikin, A.A.; Kurths, J.; Toral, R.
Physical Review E, **74**, 046220 (1-9)
- [Synchronization by dynamical relaying in electronic circuit arrays.](#)
Gomes Da Silva, Iacyel; Buldú, Javier M.; Mirasso, Claudio R.; García-Ojalvo, Jordi
Chaos, **16**, 043113 (1-7)
- [Fano-Rashba effect in a quantum wire.](#)
Sánchez, David; Serra, Llorenç
Physical Review B, **74**, 153313 (1-4)
- [Synchronization Properties of Two Coupled Multisection Semiconductor Lasers Emitting Chaotic Light.](#)
Pérez, Toni; Radziunas, Mindaugas; Wunsche, Hans-Jurgen; Mirasso, Claudio R.; Henneberger, Fritz
IEEE Photonics Technology Letters, **18**, 2135-2137
- [Bunching-induced asymmetry in degenerate four-wave mixing with cold atoms.](#)
Gattobigio, G.L.; Michaud, F.; Javaloyes, J.; Tabosa, J.W.R.; Kaiser, R.
Physical Review A, **74**, 043407 (1-7)
- [Optimized multicanonical simulations: A proposal based on classical fluctuation theory.](#)
Viana Lopes, J.; Costa, Miguel D.; Lopes dos Santos, J.M.B.; Toral, R.
Physical Review E, **74**, 046702 (1-9)
- [Kinematic studies of transport across an island wake, with application to the Canary islands.](#)
Sandulescu, M; Hernández-García, E; López, C; Feudel, U
Tellus A, **58**, 605-615
- [Experimental Study of the Transitions between Synchronous Chaos and a Periodic Rotating Wave.](#)
Sánchez, Esteban; Pazó, Diego; Matías, Manuel A.
Chaos, **16**, 033122 (1-10)
- [The effects of Stress, Temperature and Spin Flips on Polarization Switching in VCSELS.](#)
Van der Sande, Guy; Peeters, Michael; Veretennicoff, Irina; Danckaert, Jan; Verschaffelt, Guy; Balle, Salvador
IEEE Journal of Quantum Electronics, **42**, 896-904
- [Spin-orbit effects in GaAs quantum wells: Interplay between Rashba, Dresselhaus, and Zeeman interactions.](#)
Lipparini, E.; Barranco, M.; Malet, F.; Pi, M.; Serra, Ll.
Physical Review B, **74**, 115303 (1-12)

- [Truels, or survival of the weakest.](#)
Amengual, P.; Toral, R.
Computing in Science and Engineering, **8**, 88-95
- [Entanglement and the lower bounds on the speed of quantum.](#)
Borras, A.; Casas, M.; Plastino, A.; Plastino, A.R.
Physical Review A, **74**, 022326
- [Macroscopic description of particle systems with non-local density-dependent diffusivity..](#)
López, Cristóbal
Physical Review E, **74**, 012102 (1-4)
- [On the connection between entanglement and the speed of quantum evolution.](#)
Batle, J.; Casas, M.; Plastino, A.; Plastino, A.R.
Physical Review A, **73**, 049904(1)
- [Experimental study of stochastic resonance in a Chua's circuit operating in a chaotic regime.](#)
Korneta, Wojciech; Gomes, Iacyel; Mirasso, Claudio R.; Toral, Raúl
Physica D, **219**, 93-100
- [Brueckner-Hartree-Fock study of circular quantum dots.](#)
Emperador, Agustí; Lipparini, Enrico; Serra, Llorenç
Physical Review B, **73**, 235341 (1-6)
- [Angular minimum uncertainty states with large uncertainties.](#)
Gotte, J.B.; Radmore, P.M.; Zambrini, R.; Barnett S.M.
Journal of Physics B, **39**, 2791-2801
- [Universal behavior in populations composed of excitable and self-oscillatory elements.](#)
Pazó, Diego; Montbrió, Ernest
Physical Review E, **73**, 055202(R) (1-4)
- [Reversals of chance in paradoxical games.](#)
Amengual, P.; Meurs, P.; Cleuren B.; Toral, R.
Physica A, **371**, 641-648
- [Multiplicative noise in the longitudinal mode dynamics of a bulk semiconductor laser.](#)
Pedaci, Francesco; Lepri, Stefano; Balle, Salvador; Giacomelli, Giovanni; Giudici, Massimo; Tredicce, Jorge R.
Physical Review E, **73**, 041101 (1-11)
- [Local versus global interactions in nonequilibrium transitions: A model of social dynamics.](#)
González-Avella, J.C.; Eguíluz, V.M.; Cosenza, M.G.; Klemm, K.; Herrera, J.L.; San Miguel, M
Physical Review E, **73**, 046119 (1-7)

- [Synchronization properties of two self-oscillating semiconductor lasers subject to delayed optoelectronic mutual coupling.](#)
Vicente, Raúl; Tang, Shuo; Mulet, Josep; Mirasso, Claudio; Liu, Jia-ming
Physical Review E, **73**, 047201 (1-4)
- [Comment on "Periodic Phase Synchronization in Coupled Chaotic Oscillators".](#)
Pazó, Diego; Matías, Manuel A.
Physical Review E, **73**, 038201 (1-2)
- [Resolution in rotation measurements.](#)
Barnett, S.M., Zambrini, R.
Journal of Modern Optics, **53**, 613-625
- [Coherent regimes of mutually coupled Chua's circuits.](#)
Gomes Da Silva, I.; De Monte, S.; d'Ovidio F.; Toral, R.; Mirasso, C.R.
Physical Review E, **73**, 036203 (1-7)
- [Ghost stochastic resonance in an electronic circuit.](#)
Calvo, Oscar; Chialvo, Dante R.;
International Journal of Bifurcation and Chaos, **16**, 731-735
- [Ensemble equivalence for non-Boltzmannian distributions.](#)
Toral, R.
Physica A, **365**, 85-90
- [Modeling non-linear seagrass clonal growth: Assessing the efficiency of space occupation across the seagrass flora.](#)
Sintes, T.; Marbà, N.; Duarte, C.M.
Estuaries and Coasts, **29**, 72-80
- [Pulse properties of external-cavity mode-locked semiconductor lasers.](#)
Mulet, J.; Kroh, M.; Mork, J.
Optics Express, **14**, 1119-1124
- [Angular momentum of optical vortex arrays.](#)
Courtial, J., Zambrini, R., Dennis, M., Vasnetsov, M.
Optics Express, **14**, 938-949
- [Convective instability induced by two-points nonlocality.](#)
Zambrini, R., Papoff, F.
Physical Review E, **73**, 016611
- [Analysis of timing jitter in external-cavity mode-locked semiconductor lasers.](#)
Mulet, Josep; Mork, Jesper
IEEE Journal of Quantum Electronics, **42**, 249-256
- [Bistable polarization switching in mutually coupled vertical-cavity surface-emitting lasers.](#)
Vicente, Raúl; Mulet, Josep; Mirasso, Claudio R.; Sciamanna, Marc
Optics Letters, **31**, 996-998

- [Metrics, entanglement, and mixedness in the space of two qubits.](#)

Battle, J.; Casas, M.; Plastino, A.; Plastino, A.R.
Physics Letters A, **353**, 161-165

5.2. Book Chapters

- [Logistic population growth and beyond: the influence of advection and nonlocal effects.](#)

Hernandez-Garcia, Emilio; Lopez, Cristobal.

The Logistic Map and the Route to Chaos, edited by M. Ausloos and M. Dirickx, Springer-Verlag , 117-129

5.3. Other Publications in 2006

- [Polarization switching dynamics and bistability in mutually coupled vertical cavity surface emitting lasers.](#)

Vicente, Raul; Mulet, Josep; Mirasso, Claudio R.; Sciamanna, Marc

Proceedings of SPIE, Semiconductor Lasers and Laser Dynamics II, **6184**, 648113

- [Technological challenges for CW operation of small-radius semiconductor ring lasers.](#)

Furst,A; Sorel,M; Scirè,A; Giuliani,G; Yu,S

Proc. SPIE Vol. **6184**, p. 237-244, Semiconductor Lasers and Laser Dynamics II; Daan Lenstra, Markus Pessa, Ian H. White; Eds.

- [Linewidth of monolithic semiconductor ring lasers.](#)

Giuliani,G; Scirè, A; Sorel,M; Donati,S

Proc. SPIE Vol. **6184**, p. 640-647, Semiconductor Lasers and Laser Dynamics II; Daan Lenstra, Markus Pessa, Ian H. White; Eds.

- [Two-mode dynamics in different semiconductor laser structures.](#)

Scirè, A; Sorel,M; Colet,P; Tessone,C.J.; Mirasso, C.R; San Miguel,M;

Proc. SPIE Vol. **6184**, p. 38-52, Semiconductor Lasers and Laser Dynamics II; Daan Lenstra, Markus Pessa, Ian H. White; Eds.

- [All-optical two-mode switching in semiconductor ring lasers.](#)

Scirè, A; Sorel, M; Giuliani, G; Colet, P; Pérez, Toni; Mirasso, C.R.

Proc. SPIE Vol. **6184**, p. 70-75, Semiconductor Lasers and Laser Dynamics II; Daan Lenstra, Markus Pessa, Ian H. White; Eds.

- [Modeling and optimization of vertical-external-cavity surface-emitting diode lasers for passive mode-locking.](#)

Mulet, J.; Balle, S.

Procs. of SPIE, **6184**, p.47, Semiconductor Lasers and Laser Dynamics II; Daan Lenstra, Markus Pessa, Ian H. White; Eds.

- [Localized structures in nonlinear optical cavities.](#)
Gomila, Damià; Colet, Pere; Matías, Manuel A.; San Miguel, Maxi; Oppo, Gian-Luca
Proceedings of SPIE, Topical Problems of Nonlinear Wave Physics, (A.M. Sergeev, ed.), **5975**, 59750U
- [Positive operator valued measures and the quantum Monthly Hall problem.](#)
Zander, C; Casas, M; Plastino, A; Plastino, A.R.
Annals of the Brazilian Academy of Sciences, **78**, 417-422
- [Fast scale hyperchaos on top of slow scale periodicity in delayed dynamical systems](#)
Y.Chembo Kouomou, P.Colet, L.Larger, N. Gastaud
First IFAC conference on analysis and control of chaotic systems **1**, 375
- [Zero- lag Synchronization in Bidirectionally Coupled Lasers.](#)
R. Vicente, J. Buldú, M. Peil, C. Mirasso, C. Torrent, J. García-Ojalvo and I. Fischer
SPIE Conference “Photonics Europe”
- [Synchronization properties of network elements based on mutually delay-coupled semiconductor lasers.](#)
I.Kanter, E. Klein, R. Vicente, C. R. Mirasso, and I. Fischer.
European Conference on Optical Communications, CLEO Focus Meeting, Cannes
- [Bidirectional Message Transmisión in a Chain of Three Delay-Coupled Semiconductor Lasers](#)
I.Fischer, R. Vicente and C. Mirasso
European Conference on Optical Communications, CLEO Focus Meeting, Cannes
- [Chaos Synchronization of Unidirectionally Coupled Multisection Lasers](#)
T. Pérez, J.H. Wünsche, M. Radizunas, C. Mirasso and F. Henneberge
European Conference on Optical Communications, CLEO Focus Meeting, Cannes

5.4. Publications submitted in 2006

- [Microscopic Abrams-Strogatz model of language competition.](#)
Stauffer, Dietrich; Castelló, Xavier; Eguíluz, Víctor M.; San Miguel, Maxi
Physica A, **374**, 835-842. (2007)
- [Cascade Dynamics of Complex Propagation.](#)
Centola, Damon; Eguíluz, Víctor M.; Macy, Michael W.
Physica A, **374**, 449-456. (2007)
- [Maximum entropy principle and continuity evolution equation with source terms.](#)
Schonfeldt, J.H.; Jimenez, N; Plastino, A. R.; Plastino, A; Casas, M.
Physica A, **374**, 573-584. (2007)
- [Message Encryption by Phase Modulation of a Chaotic Optical Carrier.](#)
Valerio Annovazzi-Lodi, Mauro Benedetti, Sabina Merlo, Toni Perez, Pere Colet and Claudio R. Mirasso
IEEE Photonics Technology Letters, **19**, 76-78. (2007)

- [Theory of collective firing induced by noise or diversity in excitable media.](#)
Tessone, Claudio Juan; Scirè, Alessandro; Toral, Raul; Colet, Pere
Physical Review E, **75**, 016203 (1-5). (2007)
- [Stochastic resonance in an extended FitzHugh-Nagumo system: The role of selected coupling.](#)
Claudio J. Tessone, Horacio S. Wio
Physica A, **374**, 46-54. (2007)
- [Embryonic nodal flow and the dynamics of nodal vesicular parcels.](#)
Cartwright, J.H.E.; Piro, N.; Piro, O.; Tuval, I.
Journal of the Royal Society Interface, **4**, 49-55. (2007)
- [Absorbing phase transition from a structured active particle phase.](#)
Lopez, Cristobal; Ramos, Francisco; Hernandez-Garcia, Emilio
Journal of Physics: Condensed Matter, **19**, 065133 (1-8). (2007)
- [Bifurcation Structure of Dissipative Solitons.](#)
Gomila, Damia; Scroggie, Andrew J.; Firth, William J.
Physica D, doi:10.1016/j.physd. 2006.12.008.
- [Homophily, Cultural Drift and the Co-Evolution of Cultural Groups.](#)
Centola, Damon; González-Avella, Juan Carlos; Eguíluz, Víctor M.; San Miguel, Maxi
arXiv:physics/0609213.
- [Multiple time-scale approach for a system of Brownian particles in a non-uniform temperature field.](#)
Lopez, Cristobal; Marini Bettolo Marconi, Umberto.
Physical Review E.
- [Development of an MSFIA-MPFS pre-treatment method for radium determination in water samples.](#)
Fajardo, Y.; Gómez, E.; Garcías, F.; Cerdá, V.; Casas, M.
Talanta.
- [Divergences in the 2-qubits space: Werner and thermal states.](#)
Borrás, A; Plastino, A.R; Casas, M; Plastino, A.
Applied Mathematical Physics.
- [Effects of auditory noise on the psychophysical detection of visual signals: Cross-modal stochastic resonance.](#)
Martinez, L; Mirasso, C. R., Flores, A., Manjarrez, E.
Neuroscience Letters.
- [Clonal growth dynamics of the invasive *Carpobrotus affine acinaciformis* in Mediterranean coastal systems: a non-linear model..](#)
Tomás Sintés, E. Moragues, A. Traveset and J. Rita
Ecological Modelling.

- [Ghost resonance in a pool of heterogeneous neurons.](#)
Balenzuela P., Garcia-Ojalvo J., Manjarrez E., Martínez L., Mirasso C.
BioSystems.
- [Phantom reflexes: Muscle contractions at a frequency not physically present in the input stimuli.](#)
Manjarrez, E.; Balenzuela, P.; García-Ojalvo, J.; Vázquez, E.; Martínez, L.; Flores, A.; Mirasso, C.
BioSystems.
- [Finite size effects in the dynamics of opinion formation.](#)
Toral, Raúl; Tessone, Claudio Juan
Communications in Computational Physics.
- [Experimental and modelling assessment of the effects of seagrass \(*P. oceanica*\) on flow and particle trapping.](#)
Hendriks, I.; Sintès, T.; Bouma, T.; Duarte, C.
Marine Ecology Progress Series.
- [Phase-space structure of 2D excitable localized structures.](#)
Gomila, Damia; Jacobo, Adrian; Matías, Manuel A.; Colet, Pere
Physical Review E.
- [Chaotically spiking canards in an excitable system with 2D inertial fast manifolds.](#)
Marino, Francesco; Marin, Francesco; Balle, Salvador; Piro, Oreste
Physical Review Letters
- [Spatial patterns in non-locally interacting particle systems.](#)
Lopez, Cristobal; Hernandez-Garcia, Emilio
European Physical Journal-Special Topics
- [Information feedback and mass media effects in cultural dynamics.](#)
J.C. González-Avella, M.G. Cosenza, K. Klemm, V.M. Eguíluz and M. San Miguel.
- [Boltzmann entropy and chaos in a large assembly of weakly interacting systems.](#)
Falcioni, Massimo; Palatella, Luigi; Pigolotti, Simone; Rondoni, Lamberto; Vulpiani, Angelo.
- [Synchronization Properties of Coupled FitzHugh-Nagumo Systems.](#)
Tessone, C.J.; Toral, R.; Mirasso, C.R.; Gunton, J.D.
- [Comparison between the Okubo-Weiss parameter and Finite-Size-Lyapunov-Exponents.](#)
Isern-Fontanet, J; d'Ovidio, F; López, C; Hernández-García, E; García-Ladona, E.
- [Lagrangian transport through an ocean front in the North-Western Mediterranean Sea.](#)
Mancho, A.M.; Hernandez-Garcia, E.; Small, D.; Wiggins, S.; Fernandez, V.
- [Spectrum of genetic diversity and networks of clonal plant populations.](#)
Rozenfeld, A.F.; Arnaud-Haond, S.; Hernandez-Garcia, E.; Eguiluz, V.M.; Matias, M.A.; Serrao, E. ; Duarte, C.M.

- [Oscillation patterns in negative feedback loops.](#)
Pigolotti, Simone; Krishna, Sandeep; Jensen, Mogens H.
- [Collective effects induced by diversity in extended systems.](#)
Raúl Toral, Claudio J. Tessone, João Viana Lopes
- [Synchronization of coupled chaotic oscillators as a phase transition.](#)
Arecchi, F.T.; Cizak, M.
- [Delayed frequency-selective optoelectronic oscillators in strongly nonlinear regimes.](#)
Chembo Kouomou, Yanne; Larger, Laurent; Tavernier, Hervé; Benduola, Ryad; Colet, Pere; Rubiola, Enrico
- [Biological activity in the wake of an island close to a coastal upwelling.](#)
Sandulescu, M; López, C; Hernández-García, E; Feudel, U
- [Ghost resonance in a pool of heterogeneous neurons.](#)
Balenzuela, P.; García-Ojalvo, J., Manjarrez, E.; Martínez, L; Mirasso, C.
- [From quasiperiodicity to high-dimensional chaos without intermediate low-dimensional chaos.](#)
Pazó, Diego; Matías, Manuel A.
- [Optical Switching in Semiconductor Ring Lasers.](#)
Scirè, Alessandro; Perez, Toni; Colet, Pere and Mirasso, Claudio R.
- [Frequency-selective feedback control of the multi-transverse mode dynamics in VCSELs](#)
Y. Chembo Kouomou, S.K. Mandre, I.Fischer, W.ElsäBer, P.Colet
- [Perfomances of single-mode current-modulated VCSELs stabilized by frequency-selective feedback](#)
Y.Chembo Kouomou, Pere Colet

6. Conferences and Workshops

6.1. Invited Talks

-Balle, Salvador. Modeling and optimization of vertical-external-cavity surface-emitting semiconductor lasers for passive mode-locking. SPIE - Photonics Europe 2006, Estrasburg, France. April 3 to 7

-Casas, M. Fisher information and quantum states. II International Workshop on Fisher Information, Tucson, Arizona, USA. April 22 to 29

-Casas, M. Information measures and entanglement states. International Workshop on quantum information, La Plata, Argentina. February 9 to 10

-Colet, Pere. Excitability mediated by localized structures in nonlinear optical cavities. WIAS workshop on "Complex Dynamics and Delay Effects in Coupled Systems". Berlin, Germany. September 11 to 13

-Eguíluz, V.M. An introduction to network structure. Scale-free brain functional networks. International Seminar and Workshop on Dynamics on Complex Networks and Applications, Max-Planck-Institut für Physik Komplexer Systeme, Dresden, Germany. February 6th to March 3rd

-Eguíluz, V.M. Co-evolution in social networks. Complex systems: from Physics to Biology and the social sciences, Lisboa, Portugal. November 22 to 25

-Gomila, Damià. Bifurcation Structure and Asymmetric Sequences of Cavity Solitons. SIAM Conference on Nonlinear Waves and Coherent Structures (NW06), Seattle, USA. September 9 to 12

-Hernandez-Garcia, Emilio. Genetic Similarity and Evolutionary Networks. MEDYFINOL'06: XV, Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics. Mar del Plata, Argentina. December 4 to 8

-Matías, Manuel. Excitability mediated by localized structures. 6th Crimean School and Workshop on Nonlinear Dynamics, Chaos, and Applications. Mellis (Yalta), Ukraine. May 15 to 19

-Mirasso, Claudio. Chaos Encryption in real life: Field demonstration of telecommunication with a chaotic carrier, Nonlinear Dynamics of Spatiotemporal Self-Organization, Barcelona. February

-Mirasso, Claudio. Chaos Encryption in real life: Field demonstration of telecommunication with a chaotic carrier, FISES 2006, Física Estadística y No Lineal, Granada. September

-Mirasso, Claudio. Collective behavior yields zero-lag synchronization between distant elements: from lasers to neurons, MEDYFINOL'06 XV, Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics. Mar del Plata, Argentina. December

- San Miguel, Maxi. Models of social consensus. Workshop on Complex Systems: New Trends and Expectations, Santander. June 5 to 9
- San Miguel, Maxi. Dynamics of language competition: bilingualism and social structure. MARF2 conference, Prey-predator like systems workshop, Rome. August 31 to September 2nd
- San Miguel, Maxi. Dynamics of language competition: effects of bilingualism and social structure. Workshop of Language simulations, Warsaw, Poland. September 10 to 14
- San Miguel, Maxi. Co-evolution in social networks. Workshop on Social and Ecological Networks, ECCS 06, Oxford, United Kingdom. September 28 to 29
- Serra, Llorenç. Quantum-transmitting-boundary algorithm with local spin-orbit coupling. European Conference on Mathematics for Industry, Leganés. July 10 to 14
- Scirè, A. Monolithic semiconductor ring lasers: design, experiments and applications. 8th International Conference on Transparent Optical Networks Nottingham, United Kingdom. June 18 to 22
- Scirè, A. Two-mode dynamics in different semiconductor laser structures. SPIE, Semiconductor Lasers and Laser Dynamics II; Strasbourg. April 4 to 7
- Pigolotti, Simone. Static and dynamic patterns of biodiversity. Workshop on Social and Ecological Networks, European Conference on Complex Systems (ECCS06), Oxford, United Kingdom. September 28 to 29
- Tessone, Claudio Juan. Coherent firing of excitable systems induced by repulsive links. MEDYFINOL'06: XV Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics, Mar del Plata, Argentina. December 4 to 9
- Toral, Raúl. Diversity induced effects in the dynamics of coupled oscillators. Workshop on Complex Systems: New Trends and Expectations, Santander. June 5 to 9
- Toral, Raúl. Diversity induced resonance. Biosim workshop, Potsdam, Germany. April 24 to 25
- Toral, Raúl. Collective behavior induced by diversity. Granada Seminar on Computational and Mathematical Modeling of Cooperative Behavior in Neural Systems. September 11 to 15
- Toral, Raúl. Uso y abuso de distribuciones no Boltzmannianas. Fises-2006, Granada. September 14 to 16
- Toral, Raúl. Collective effects induced by diversity. Conference on Complex Systems: from physics to biology and the social sciences, Lisboa, Portugal. November 22 to 25

-Toral, Raúl. Diversity induced resonance MEDYFINOL'06: XV, Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics. Mar del Plata, Argentina. December 4 to 9

-Zambrini, R. Convective instability induced by nonlocality. FisEs2006, Granada, Spain. September 14 to 16

6.2. Seminal talks in other research centers

-Casas, Montserrat. Maximum entangled mixed states and the speed of quantum evolution, IFAE, Universitat Autònoma de Barcelona. July 3

-Chembo, Y. A mode for single-mode optoelectronic oscillators, Centre National d'Études Spatiales (CNES), Toulouse, France. June 27

-Colet, P. Excitabilidad mediada por estructuras localizadas en cavidades ópticas no lineales, Universitat Politècnica de Catalunya, Terrassa, Barcelona. June 27

-Eguíluz, V.M. Introduction to the Voter model, and other opinion spreading models. Basic properties on regular lattices and on complex networks. Scale-free brain functional networks. Introduction to some basic models of epidemic spread; SIS and SIR. Properties on regular graphs and complex networks. NET-ACE School, Department of Mathematical Sciences, Brunel University, United Kingdom. April 17 to 21

-López, Cristóbal. Transporte y mezcla en el Mediterráneo con métodos de la Física del Caos. Departamento de Física aplicada de la Univ. de Málaga. November 23

-López, Cristobal. Individual-based modelling approach to plankton population dynamics. Geophysics and spatial oceanography lab., Toulouse, France. June 29

-López, Cristóbal. Transport and mixing in the Mediterranean Sea: comparison between Okubo-Weiss and finite size Lyapunov exponents. Institute for Physics and Chemistry of the marine environment, Oldenburg, Germany. January 26

-San Miguel, Maxi. Modelos de dinámica social y formación de consenso. Conferencia Univ. de Zaragoza dentro del Ciclo cofinanciado por Gobierno de Aragón. February 13

-Serra, Llorenç. Effects of Rashba interaction in quantum wires. Departamento de Estructura y Constituyentes de la Materia, Universidad de Barcelona. February 1st

-Tessone, Claudio Juan. Diversity-induced resonance. Istituto dei Sistemi Complessi e Università della Sapienza, Rome. January 16

-Toral, Raúl. Collective effects in the dynamics of complex systems. Mathematics Department, Warrwick University, United Kingdom. April 14

- Vicente, Raul. Delay effects in coupled oscillators. Max Planck Institute for Brain Research, Frankfurt, Germany. April 24

6.3. Talks in conferences and workshops

-Castelló, X.; Eguíluz, V. M.; San Miguel, M. Ordering dynamics with two non-excluding options: Bilingualism in language competition. Complex systems: from physics to biology and the social sciences, Lisboa, Portugal. November 22 to 25

-Castelló, X.; Eguíluz, V. M.; San Miguel, M. Dynamics of Language Competition: Effects of Bilingualism and Social Structure. WEHIA 2006: 1st International Conference on Economic Sciences with Heterogeneous Interacting Agents; Bologna, Italy. 15 to 17 June

-Castelló, X., Eguíluz, V. M., San Miguel, M. Language competition with bilinguals in social networks. 12th International Conference on Computing in Economics and Finance, Limassol, Chipre. June 1st

-Castelló, X., Eguíluz, V.M., San Miguel, M. Dynamics of language competition: bilingualism and social structure effects. First World Congress on Social Simulation WCSS06, Kyoto, Japan. August

-Centola, D.; Macy, M.W.; Eguíluz, V.M. Cascade Dynamics of Complex Propagation. First World Congress on Social Simulation WCSS06, Kyoto, Japan. August

-Cizak, Marzena. Anticipated synchronization in the dynamics of neural systems. Biosim Meeting, Warwick, United Kingdom. April 3rd

-Colet, Pere; Larger, Laurent; Gastaud, N.; Chembo, Y. Fast-scale chaos on top of slow scale periodicity in semiconductor lasers with electro-optical feedback. 1st IFAC Conference on Analysis and Control of Chaotic Systems, Reims, France. June 28 to 30

-Colet, Pere. Nonlinear optics, quantum optics and dynamics of optoelectronic devices research at IMEDEA (CSIC-UIB), en el Primer Encuentro de la Red Temática de Optica Cuántica y No Lineal, Barcelona. September 14 to 15

-D'Ovidio, F. ; Legras, B. ; Hernandez-Garcia, E. ; Lopez, C. ; Garcia-Ladona, E. ; Isern-fontanet, J. ; Levi, M. ; Lehahn, Y. Transport and mixing properties of observational datasets from finite-size Lyapunov exponent calculations. 3rd General Assembly of the European Geosciences Union. Viena, Austria. April 2nd to 7.

-Gomila, D.; Oppo, G.. Spatial solitons with intra-cavity photonic crystals. Photon06, Manchester, United Kingdom. September 4th to 7th

-Hernandez-Garcia, E. Networks of Genetic Similarity in Populations of Clonal Plants. Workshop on Social and Ecological Networks, European Conference on Complex Systems (ECCS06), Oxford, United Kingdom. September 28

-Hernandez-Garcia, E.; Lopez, C. Excitability threshold for plankton in open flows. 1st Assembly of the Thresholds integrated project, Madrid. February 14

-Hernandez-Garcia, Emilio. Networks of genetic relationship between clonal plants. Dynamics on Complex Networks and Applications, DYONET06 2nd week Seminar, Dresden, Germany. February 28

-Herrada, E. Alejandro. Topological diversity in phylogenies: microevolution vs macroevolution. XVI Seminario de genética de poblaciones y evolución, Sant Feliu de Guíxols, Girona. November 15 to 18

-Herrada, E. Alejandro; Tessone, Claudio J. ; Eguíluz, Víctor M. ; Hernández-garcía, Emilio; Duarte, Carlos M. ;. Scaling properties in the Tree of Life. Workshop on Social and Ecological Networks, European Conference on Complex Systems (ECCS06). Oxford, United Kingdom. September 28

-Gelens, L., Van Der Sande, G, Tassin, G.P., Kockaert, P., Tlidi, M., Gomila, D., Veretennicoff, I. y Danckaert, J.. Sub-Diffraction Limited Cavity Solitons. EOS Annual Meeting 2006, Paris. October 16 to 19

-González-Avella, J.C., Eguíluz, V.M., San Miguel, Maxi. Group formation and Mass Media effects in cultural dynamics: The power of being subtle. 12th International Conference on Computing in Economics and Finance, Limassol, Chipre. June 1st

-Pérez, Toni; Mirasso, Claudio; Colet, Pere; Scire, Alessandro. All-optical Two-modes switching in Semiconductor Ring Lasers. SPIE Photonics Europe 2006. Strasbourg. France. April 3rd to 7

-Sandulescu, M.; Lopez, C. ; Hernandez-Garcia, E. ; Feudel, U. Simple modelling of the biological activity at the Canary Islands. 3rd General Assembly of the European Geosciences Union. Viena, Austria. April 2nd to 7

-Scirè, A.. Technological challenges for CW operation of small-radius semiconductor ring lasers. SPIE, Semiconductor Lasers and Laser Dynamics II. Strasbourg. April 4th to 7

-Scirè, A; Mirasso, C. R; Colet, P; Perez, T. All-optical two-mode switching in semiconductor ring lasers. SPIE, Semiconductor Lasers and Laser Dynamics II. April 4 to 7

-Serra, Llorenç. The Fano-Rashba effect. International Conference on Nanoscience and Technology ICN+7 2006, Basel, Suiza. July 30 to August 4

-Tessone, Claudio Juan. A general mechanism for collective firing in excitable systems. BioSim workshop, Potsdam, Germany. April 24

-Vázquez, Federico. Non-monotonicity in Axelrod model dynamics. Conference on Complex Systems: from physics to biology and the social sciences, Lisboa, Portugal. November 22

-Zambrini, R.; Papoff, F. Convective instability induced by two-point nonlocality. EOS annual meeting 2006. October 16 to 19

-Zambrini, R; Barnett, S. M. Resolution in rotation measurements. EOS annual meeting. October 16 to 19

6.4. Poster Presentations

-Castelló, X. ; Eguíluz, V. M. ; San Miguel, M. Dynamics of Language Competition. DPG annual meeting (Physics of socio-economic Systems), Dresden, Germany. March 27

-Castelló, X; Eguíluz, V M; San Miguel, M. Dynamics of Language Competition: Effects of Bilingualism and Social Structure. 4a reunió Xarxa Temàtica Dinàmiques No Lineals d'Auto-organització Espai-temporal. February 1st to 3rd.

-Castelló, X., Eguíluz, V.M., San Miguel, Maxi. Dynamics of language competition: effects of bilingualism and social structure. Conference on Language Simulations, Warsaw, Poland. September

-Castelló, X., Eguíluz, V. M., San Miguel, Maxi. Ordering dynamics with two non-excluding options: Bilingualism in language competition. Complex systems: from physics to biology and the social sciences, Lisboa, Portugal. November 22 to 25

-Cerdà, Juan J.; Sintes, Tomas. Polymer depletion driven colloids: shear effect in the induction times of kinetic phase separation. Julich Soft Matter Days 2006. Bonn. November 14 to 17

-Colet, Pere; Jacobo, Adrian; Matías, Manuel y Gomila, Damià. Excitability mediated by localized structures. Nonlinear Dynamics of Spatio-Temporal Selforganization, Barcelona. February 1st to 3rd.

-Colet, Pere; Sciré, Alessandro; Tessone, Claudio J.; Toral, Raúl. Global firing induced by noise or diversity in excitable media. Nonlinear Dynamics of Spatio-Temporal Selforganization, Barcelona. February 1st to 3rd

-Chembo Kouomou, Y., Tavernier, H., Bendoula, R., Larger, P., Colet, P.. A stochastic model for optoelectronic radar frequency generators. Física Estadística 2006, Granada. September 14 to 16

-Chembo Kouomou, Y.; Colet, Pere; Larger, Laurent; Gastaud, N. . Fast-scale chaos on top of slow-scale periodicity in semiconductor lasers with electro-optical feedback, CLEO Focus Meeting on the 32nd European Conference on Optical Communications ECOC 2006, Cannes, France. September 24 to 28

-González, Juan Carlos; Toral, Raúl; San Miguel, Maxi. Homophily, co-evolution, cultural drift and globalization. Workshop on Complex Systems: New Trends and expectation. June 5th

-González, Juan Carlos; Toral, Raúl; San Miguel, Maxi. Mass media effect in cultural dynamics: the power of being subtle. The first World Congress on Social Simulation. August 21 to 25

-Jacobo, Adrian; Colet, Pere; Hernández-García, Emilio. Jump detection in ecological data series using nonlinear dynamics of extended systems. FISES 2006, XIV Reunión de Física Estadística, Granada. September 14 to 16

-Jacobo, A., Gomila, D., Matias, M.A. y Colet, P.. Excitability of localized structures in nonlinear optical cavities. EOS Annual Meeting 2006, Paris. October 16 to 19

-Jacobo, Adrian; Gomila, Damià; Colet, Pere; Matías, Manuel A.. Excitability of localized structures in nonlinear optical cavities. Física Estadística 2006, Granada. September 14 to 16

-Jacobo, Adrian; Gomila, Damià; Colet, Pere; Matías, Manuel A.. Excitability of localized structures in Kerr media, CLEO Focus Meeting on the 32nd European Conference on Optical Communications ECOC 2006, Cannes, France. September 24 to 28

-Komin, Niko. An Intestinal Drug Transport Model. DPG Frühjahrstagung. Congreso de primavera de la DPG, Dresden, Germany. March 27 to 31

-Komin, Niko. Absorption of Pharmaceuticals Through Cell Monolayers, EUFEPS Conference on Optimising Drug Development, Basilea, Suiza. November 29 to December 1st

-Gomila, Damià y Oppo, Gian-luca. Coupled-mode theory for photonic band-gap inhibition of spatial instabilities. XIV Congreso de Física Estadística (FisEs 06), Granada. September 14 to 16

-González-Avella J. C. , Cosenza M. G, Klemm K. , Herrera J. L. , Eguíluz V. M. , San Miguel M. A model for social dynamics with controlled mass media. 21 General Conference of EPS Condensed Matter Division, Dresden, Germany. March 27 to 31

-González-Avella J. C. , Cosenza M. G. , Klemm K. , Herra J. L. , Eguíluz V. M. , San Miguel M. Mass media effects in cultural dynamics. 4ta Reunió de la Xarxa Temàtica Dinàmiques No Lineals d'Auto-organizació Espaitemporal, Barcelona. February 1st to 3rd.

-González-Avella, J.C.; Eguíluz, V.M.; Cosenza, M.G.; Klemm, K.; San Miguel, M.. Mass media effects in cultural dynamics: the power of being subtle, First World Congress on social simulation WCSS06, Kyoto, Japan. August 21 to 25

-Herrada, E. A. ; Tessone, C. R. ; Eguíluz, V. M. ; Hernández-García, E. ; Duarte, C. M. Scaling properties of intraspecific and interspecific phylogenies in the tree of life. MEDYFINOL'06: XV Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics. Mar del Plata, Argentina. December 4 to 8

-Herrada, E. Alejandro. 10th Evolutionary Biology Meeting, Marseille, France. September 20 to 22

-Herrada, E. A. ; Eguíluz, V. M. ; Hernández-García, E. ; Duarte, C. M. Scaling properties of intraspecific and interspecific phylogenies in the tree of life. FisEs2006, XIV Reunión de Física Estadística, Granada. September 14 to 16

-Herrada, E.A.; Eguíluz, V.M.; Hernández-García, E.; Duarte, C.M.. Topological diversity in phylogenies: microevolution vs macroevolution. XVI Seminario de genética de poblaciones y evolución, Sant Feliu de Guxols. November

-Jacobo, Adrian; Gomila, Damià; Matias, Manuel A; Colet, Pere. Excitability mediated by localized structures. 4a reunió Xarxa Temàtica Dinàmiques No Lineals d'Auto-organització Espai-temporal, Barcelona. February 1st to 3rd

-Komin, Niko; Toral, Raúl;. An Intestinal Drug Transport Model. IV Jornades de la Xarxa Temàtica Nonlinear Dynamics of Spatio-Temporal Selforganization, Barcelona. February 1st to 3rd

-López, C. Oceanic turbulence-plankton dynamics interaction: Application to the Benguela upwelling system. Summer School: Climate changes impact on marine ecosystems. Ankara, Turquía. August 14

-López, C; Hernández-garcía, E. Simple modelling of the biological activity at the canary islands. EGU, Viena. April 3rd

-López, Cristóbal; Hernández-García, Emilio; D'ovidio, Francesco; Isern-fontanet, Jordi; Garcia-ladona, Emilio. Transport and mixing in the Mediterranean sea: comparison between Okubo-Weiss and finite size Lyapunov exponents calculation. IV Jornades de la Xarxa Temàtica Nonlinear Dynamics of Spatio-Temporal Selforganization, Barcelona. February 1st to 3rd

-López, Cristóbal; Hernández-García, Emilio; Sandulescu, Mathias; Feudel, Ulrike. Transport enhancement by the wake of an island. IV Jornades de la Xarxa Temàtica Nonlinear Dynamics of Spatio-Temporal SelfOrganization, Barcelona. February 1st to 3rd

-Rozenfeld, A. ; Eguíluz, V. E. ; Hernández-García, E. ; Matías, E. ; Duarte, C. M.; Arnaud-haond, S. Network Approach to the Genetic Structure of Clonal Plants. IV Jornades de la Xarxa Temàtica Nonlinear Dynamics of Spatio-Temporal Selforganization, Barcelona. February 1st to 3rd.

-Rozenfeld, A. F. ; Arnaud-Haond, S. ; Hernández-garcía, E. ; Eguíluz, V. M. ; Matías, M. A. ; Serrão E. ; Duarte, C. M. Genetic similarity networks in clonal plant populations. FisEs2006, XIV Reunión de Física Estadística, Granada. September 14 to 16

-Rozenfeld, A.F., Arnaud-Haond, S., Hernández-García, E., Eguíluz, V.M., Matías, M.A., Serrao, E., Duarte, C.M. Networks of genetic relationship between clonal plants. International Seminar and Workshop on Dynamics on Complex Networks and Applications, Max-Planck-Institut für Physik Komplexer Systeme, Dresden, Germany. February 6th to March 3rd.

-Sanchez, P. A. ; Sintés, T. ; Piro, O. Dynamical basis of the Structure Zone Model of thin solid films growth. FisEs2006, XIV Reunión de Física Estadística, Granada. September 14 to 16

-Sandulescu, M. ; López, C. ; Hernández-garcía, E. ; Feudel, E. Transport enhancement by the wake of an island. FisEs2006, XIV Reunión de Física Estadística, Granada. September 14 to 16

-Scirè, A.; Linewidth of monolithic semiconductor ring lasers. SPIE, Semiconductor Lasers and Laser Dynamics II. Strasbourg. April 4th to 7.

-Scirè, A., Tuval, I., Eguíluz, V.M.. Dynamic modelling of the electric power network. International Workshop on Complex Network and Infrastructure Protection CNIP 2006, Rome, Italy. March

-Scirè, A.; Tuval, I.; Eguíluz, V.M.. A Growth Model for the Electric Power Network. XIV Meeting of Statistical Physics FISES'06, Granada. September

-Scire, Alessandro; Colet, Pere; Perez, Toni; Mirasso, Claudio R.. All-optical two-mode switching in semiconductor ring lasers. CLEO Focus Meeting on the 32nd European Conference on Optical Communications ECOC 2006, Cannes, France. September 24 to 28

-Serra, Llorenç. The Fano-Rashba effect. XXII Trobades Científiques de la Mediterrània, Mahón. October 9 to 11

-Sintés, Tomas; Hendriks, Iris; Duarte C. M. Experimental and numerical modeling of the effect of seagrass (*P. oceanica*) on flow and particle trapping. FISES, Granada. September 14 to 16

-Tessone, Claudio J. ; Sciré, Alessandro; Toral, Raúl; Colet, Pere. Global firing induced by noise or diversity in excitable media. 4a reunió Xarxa Temàtica Dinàmiques No Lineals d'Auto-organització Espai-temporal, Barcelona. February 1st to 3rd

-Tessone, Claudio Juan. Coherent firing induced by network disorder in excitable systems. 2nd Conference of the BioSim Network of Excellence, Cala Viñas, Mallorca. October 20

-Zambrini, R.; Barnett, S. M. Quasi-intrinsic angular momentum. EOS annual meeting 2006. October 16 to 19

6.5 Attendance to Conferences and workshops

- Amengual, P.; Castelló, Xavier; Tessone, Claudio Juan; González-Avella, Juan Carlos; Eguíluz, V.M.; San Miguel, M.; Toral, R.. ENDIN 06, 2a reunió de la Xarxa Temàtica Aplicacions de la Física Estadística y No-lineal a la Economia y Ciències Socials, Palma de Mallorca. May 24 to 26

- Bacelar, Flora S. ; Colet, Pere; Hernandez-Garcia, Emilio; Herrada, E. Alejandro; Komin, Niko; Matias, Manuel; Pigolotti, Simone; Sintès, Tomas; Tessone, Claudio J. ; Toral, Emilio;. 2nd Conference of the BioSim Network of Excellence, Cala Viñas, Mallorca. October 18 to 21

- Bacelar, F. S.; Hernandez-Garcia, E.; Sintès, T.; Rozenfeld, A. 1st Assembly of the Thresholds Integrated Project, Madrid. February 14 to 15

- Castelló, X.; Eguíluz, V.M.; Hernández-García, E.; Matías, M. Dynamics on Complex Networks and Applications (DYONET06), Dresden, Germany. Attendance to the school (2 weeks) and Seminar (1st week). February 6 to 24

- Castelló, X. DPG annual meeting (Physics of socio-economic Systems), Dresden, Germany. March 27 to 31

- Castelló, X. WEHIA 2006: 1st International Conference on Economic Sciences with Heterogeneous Interacting Agents, Bologna, Italy. June 15 to 17

- Castelló, X.; San Miguel, M. Workshop on Language Simulations (GIACS); Warsaw, Poland. September 11 to 14

- Castelló, X. ; Eguíluz, V.M.; Toral, R.; Vázquez, F. Complex systems: from physics to biology and the social sciences, Lisboa, Portugal. November 22 to 25

- Chembo, Y. ; Colet, P. ; Gomila, D. ; Zambrini, R. ; Hernandez-Garcia, E. ; Jacobo, A. ; Komin, N. ; Matias, M. ; Piro, O. ; Sanchez, P. A. ; Toral, R. ;. FisEs2006: XIV Reunion de Fisica Estadística, Granada. September 14 to 16

- Chembo, Y. IXe Rencontres du Non-Linéaire, Poincaré Institute, Paris, France. March 8 to 10

- Cizak, Marzena; Komin, Niko; Tessone, Claudio Juan; Toral, Raúl;. Biosim Meeting, Warwick, United Kingdom. April 3rd

- Colet, Pere; Zambrini, Roberta; Primer Encuentro de la Red Temática de Optica Cuántica y No Lineal, Barcelona. September 14 to 15

- Hernández-García, Emilio. Eur-Oceans PIs meeting, Barcelona. March 15 to 16

- Hernandez-Garcia, Emilio; Herrada, E. Alejandro; San Miguel, Maxi; Pigolotti, Simona. Workshop on Social and Ecological Networks, European Conference on Complex Systems (ECCS06). Oxford, United Kingdom. September 28 to 29

- Hernandez-Garcia, Emilio; Komin, Niko; Tessone, Claudio; Toral, Raul;. BioSim workshop, Potsdam, Germany. April 24 to 25
- Hernandez-Garcia, Emilio; Mirasso, Claudio; Toral, Raul; Tessone, Claudio. MEDYFINOL'06: XV Meeting on Nonequilibrium Statistical Mechanics and Nonlinear Physics, Mar del Plata, Argentina. December 4 to 8
- Herrada, E. Alejandro. XVI Seminario de genética de poblaciones y evolución. Sant Feliu de Guíxols, Girona. November 15 to 18
- Herrada, E. Alejandro. 10th Evolutionary Biology Meeting, Marseilles, France. September 20 to 22
- Herrada, E. Alejandro. Introduction to Sequence and Genome Analysis, Bremen, Germany. January 23 to 27
- Bacelar, F.; Komin, Niko.; Perez, T. Stochastic processes, fluctuations and noise. Physbio Summerschool. Saint Etienne de Tinée, France. August 13 to October 8
- Lopez, C.. 3rd General Assembly of the European Geosciences Union. Viena, Austria. April 2nd to 7th
- Pérez, Toni; Mirasso, Claudio. Conference on Mathematical Neuroscience (NEUROMATH 06). Conference organized by CRM at Sant Julia de Loria, Andorra. September 1st to 4th
- Sanchez, P. A.; Pérez, Toni; Toral, Raul. 9th Granada Seminar on Computational and Statistical Physics. Granada. Computational and Mathematical Modeling of Cooperative Behavior in Neural Systems. September 11 to 15
- Toral, Raúl; Hernández-garcía, Emilio; Colet, Pere; Mirasso, Claudio R.; Matias, Manuel A; Lopez, Cristobal; Jacobo, Adrian; Pérez, Toni; Amengual, Pau; Castelló, Xavier. 4a reunió Xarxa Temàtica Dinàmiques No Lineals d'Auto-organització Espai-temporal. Barcelona. February 1st to 3rd

7. Other Activities

7.1. PhD Thesis

- [Aspectos de sincronización en un sistema caótico.](#)

G. da Silva, Iacyel. Thesis Supervisors: Claudio Mirasso y Raul Toral.

- [Nonlinear Dynamics of Semiconductor Laser Systems with Feedback: Applications to Optical Chaos Cryptography, Radar Frequency Generation, and Transverse Mode Control.](#)

Chembo Kouomou, Yanne. Thesis Supervisor: Pere Colet.

- [Nonlinear dynamics and synchronization of bidirectionally coupled semiconductor lasers.](#)

Vicente, Raul. Thesis Supervisor: Claudio Mirasso.

- [Anticipated Synchronization: Numerical and Theoretical Study.](#)

Ciszak, Marzena. Thesis Supervisors: Raul Toral y Claudio Mirasso.

- [Synchronisation and Collective Effects in Extended Stochastic Systems.](#)

Tessone, Claudio Juan. Thesis Supervisor: Raul Toral.

7.2. Research stays in other centers

- Bacelar, Flora S.; Hernandez-Garcia, Emilio. Institute for Environment and Sustainability, Joint Research Center of the European Commission, Ispra, Italy. Research visit within the project Thresholds. May 12 to November 20

- Casas, Montserrat. Reunión Campaña intercomparación red de Vigilancia Radiológica Ambiental, Consejo de Seguridad Nuclear, Madrid. May 24 to 25

- Casas, M. Instituto de Física, La Plata, Argentina. February 3 to 17

- Chembo, Y. FEMTO-ST Institute, University of Franche-Comté, Besançon, France. February 3rd to August 2nd

- Emilio Hernandez-Garcia. School of Mathematical Sciences, University College Dublin. Colaboration with Dr. Z. Neufeld. August 29 to September 2nd

- López, Cristóbal. Institute for Chemistry and Biology of the Marine Environment, Carl Von Ossietzky Universitat Oldenburg, Germany. January 22 to 28

- López, Cristóbal. Dipartimento di Fisica, Università di Roma "La Sapienza", Rome, Italy. February 24 to March 11

- López, Cristóbal. Geophysics and spatial oceanography laboratory, LEGOS, Toulouse, France. June 24 to July 1st

- Matías, Manuel. Institut für Physik, Universität Potsdam. June 10 to 18
- Mirasso, Claudio. Departamento de Física, Universidad Federal de Pernambuco, Brasil. June 23 to July 18
- Pérez, Toni. Photonik Group. Humboldt-Universität zu Berlin Institut fuer Physik. Colaboration sojourn in common Project by Integrated Actions. February 19 to March 6
- Tessone, Claudio Juan. Estancia de trabajo. Istituto Nazionale di Ottica Aplicata, Firenze, Italy. December 15 of 2005 to February 20

7.3. Organization and scientific committees of conferences and workshops

- Colet, Pere. Member of Scientific Committee. XIV Física Estadística, FisEs'06, Granada. September 14 to 16
- Colet, Pere. Member of Scientific Committee Red Temática de Optica Cuántica y No Lineal (FIS2005-24371-E)
- Hernandez-Garcia, Emilio; Toral, Raul. 2nd Conference of the BioSim Network of Excellence, Cala Viñas, Mallorca. October 18 to 21
- López, C. Session organizer: Transport, diffusion and mixing in geophysical flows, European Geosciences Union, Viena, Austria. April 3rd
- Matías, Manuel. Organization Committee. Dynamics on Complex Networks and Applications (DYONET06). Max-Planck Institute for the Physics of Complex Systems, Dresden, Germany. February 6 to March 3rd
- Mirasso, Claudio. Member of organization committee “CLEO Focus meeting, Nonlinear, Quantum and Chaotic Optics: New Directions in Photonics and Optical Communications”, Cannes. September
- San Miguel, Maxi. Member of “International Program Committee”, Physics of Risk and Complex Systems Science, Vilnius, Lituania. May 13 to 16
- San Miguel, Maxi. Member of Scientific Committee “Spring School on Solitons in Optical Cavities”, Cargese, France. May 8 to 12
- San Miguel, Maxi. Organizar of ENDIN06: Encuentro para el diálogo interdisciplinar sobre ciencias sociales, Mallorca. May 24 to 26
- San Miguel, Maxi. Member of “International Advisory Board” of the 2nd International conference on Management of Risk Factors in Economically Relevant Human Activities, Rome. August 31 to September 2nd

- San Miguel, Maxi. Member of Organizing Committee of the “Workshop on COMPLEX SYSTEMS: from physics to biology and the social sciences”, Lisbon. November 22 to 25

- Toral, Raúl: School Director. Physbio. Two months schools organized in St. Etienne de Tinée (France). August 13 to October 8

7.4. Members of Editorial Board of scientific journals

- San Miguel, Maxi. Member of Editorial Board of The European Physical Journal B. New section on Complex Systems.

- Matías, Manuel. Member of Editorial Board of "Mathematical Biosciences and Engineering" <http://math.asu.edu/~mbe>.

- Toral, Raúl. Member of Editorial Board of Fluctuations and Noise Letters.

7.5. Outreach activities

- San Miguel, M. and Eguíluz, V.M.: Participation in the program REDES(Spanish TV, TVE1) , Esclavos de las leyes físicas, *Slaves of Physics Laws*, March 7th
<http://www.rtve.es/tve/b/redes/semanal/prg389/index.html>

- Toral, Raúl. Interview in Radio France International to explain the project BIOSIM the development of drugs by computer. May 29

Talks in High Schools:

- Colet, Pere. Usos del Caos: Comunicaciones Secretas, Colegio Francés, Palma de Mallorca. November 10

- Colet, Pere. Usos del Caos: Comunicacions Secretes, Instituto Educación Secundaria Santa Maria d'Eivissa. November 13

- Colet, Pere. Usos del Caos: Comunicacions Secretes, Instituto Educación Secundaria Sant Agustí (Eivissa). November 13

- Mirasso, Claudio. Los Láseres: cómo funcionan y para qué sirven. IES Berenguer D'Anoia de Inca. November 8

- Mirasso, Claudio. Los Láseres: cómo funcionan y para qué sirven. IES Guillem Sagrera, Palma. November 6