

# RENCONTRES 2013

# PROJETS

Centre National de la Recherche  
Scientifique

Université de Corse

Université de Nice  
Sophia Antipolis

[www.iesc.univ-corse.fr](http://www.iesc.univ-corse.fr)

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## February

Feb 25 > Mar 9 **EUROPEAN SCHOOL ON MAGNETISM**  
*Nora Dempsey (Inst. Neel – Grenoble)*

## March

Mar 11 > Mar 16 **LES SCIENCES A L'ECOLE**  
*Marie-Cécile De Cian, Giovanna Chimini, (Univ. de Corse, IESC)*

Mar 18 > Mar 23 **2<sup>ÈME</sup> ECOLE DU GERM**  
*Patrick Berthault (CEA Saclay – Gif/Yvette)*

Mar 25 > Mar 30 **THZ DAYS AND GDR NETWORK MEETING**  
*Juliette Mangeney (Lab. Pierre Aigrain – Paris)*

## April

Apr 1 > Apr 6 **NANOTECHNOLOGY FOR NEXT GENERATION HIGH EFFICIENCY PV WORKSHOP AND SPRING SCHOOL**  
*Ludovic Escoubas (Univ. Aix-Marseille)*

Apr 8 > Apr 13 **ECOLE TECHNIQUE DE BASE DES DETECTEURS 2013**  
*Patrick Nayman (LPNHE IN2P3 – Paris)*

Apr 15 > Apr 20 **PROGRESS IN ULTRAFAST LASER MODIFICATIONS OF MATERIALS**  
*Lionel Canioni, Yves Bellouard (Univ. Bordeaux)*

Apr 22 > Apr 27 **PASSIVE IMAGING IN WAVE PHYSICS : FROM SEISMOLOGY TO EMISSIONS**  
*Michel Campillo (LGIT Maisons des Géosciences - Grenoble)*

## May

Apr 29 > May 8 **COSMIC ACCELERATORS**  
*Diego Götz (CEA Astrophysique – Gif/Yvette)*

May 6 > May 11 **SW7 : NEW TOPICS IN COSMOLOGY**  
*Roland Triay (CPT Luminy – Marseille)*

May 13 > May 18 **INTEGRATED OCEAN DRILLING PROGRAM – EXPEDITION 335 – 2<sup>ND</sup> POST-CRUISE MEETING**  
*Eric Ferre (Univ. Illinois – US)*

May 15 > May 18 **NUMERICAL SIMULATION OF FOREST FIRES, FROM COMBUSTION TO EMISSIONS**  
*Jean-Baptiste Filippi (Univ. Corse)*

May 20 > May 25 **ESNIE 2013**  
*Eric Brousseau (Univ. Paris X)*

May 27 > June 1 **CONTROLLING WAVE PROPAGATION IN COMPLEX MEDIA : FROM SHAPING WAVEFIELDS TO DESIGNING SMART MATERIALS**  
*Mathias Fink (ESPCI - Paris)*

## June

June 3 > June 8 **SEARCH AND EXPLORATION**  
*Gleb Oshanin (Univ. Pierre et Marie Curie – Paris)*

June 10 > June 19 **DYNAMIC ORGANISATION AND FUNCTION OF BIOMEMBRANES**  
*Gerrit Van Meer (Utrecht University - PB)*

June 25 > July 6 **TOPOLOGICAL PHASES IN CONDENSED MATTER AND COLD ATOM SYSTEMS**  
*Didier Poilblanc (IRSAMC - Toulouse)*

## July

July 8 > July 20 **QUANTITATIVE POPULATION GENETICS**  
*Michael Desai (Harvard University – Cambridge)*

July 22 > July 27 **MATHEMATICAL ASPECTS OF GEOPHYSICAL AND ASTROPHYSICAL FLUIDS DYNAMICS**  
*Emmanuel Dormy (IPGP – Paris)*

July 29 > Aug 3 **SUMMER SCHOOL ON PLASMONICS AND METAMATERIALS**  
*Nicolas Bonod (Inst. Fresnel – Marseille)*

## August

Aug 6 > Aug 17 **MECHANISMS, CRITICALITY AND TOPOLOGICAL PROTECTION (SUPERMCT- 2013)**  
*André Chubukov (Univ. of Wisconsin – Madison US)*

Aug 20 > Aug 29 **PHOTONICS AS AN ENABLING TECHNOLOGY FOR TELECOM, LIFE SCIENCES, ENVIRONMENT, ENERGY**  
*Abderrahim Ramdane (LPN – Marcoussis)*

## September

Sept 3 > Sept 14 **INTERNATIONAL SCHOOL ON OXIDE ELECTRONICS (ISOE2013)**  
*Manuel Bibes (Thalès - Palaiseau)*

Sept 16 > Sept 24 **MODÉLISATIONS PHYSIQUES ET NUMÉRIQUES POUR LES FLUIDES, LES PARTICULES**  
*Bernard Rebouret (CEA DAM - Arpajon)*

Sept 25 > Sept 27 **LES RENCONTRES DE CARGÈSE : ECONOMIE, GESTION ET SOCIOLOGIE DE L'INNOVATION**  
*Michel Poix (IMRI - Paris)*

Sept 30 > Oct 5 **3RD CARGÈSE WORKSHOP ON COMBINATORIAL OPTIMIZATION**  
*Gautier Stauffer (Inst. Mathématiques – Bordeaux)*

## October

Oct 7 > Oct 12 **ECOLE « CALCUL IN2P3 »**  
*Julien Giraud (LPSC – Grenoble)*

Oct 14 > Oct 19 **SMALL-SCALE PLASTICITY**  
*Muriel Hantcherli, Florence Pettinari Sturmle; Marc Legros (CEMES - Toulouse), Dirras Guy (univ. Paris13)*

Oct 21 > Oct 26 **ORGANISATIONAL PRINCIPLES OF MEMBRANE SIGNALING**  
*Thomas Lecuit (IBDML – Marseille)*

Oct 28 > Nov 1 **RENCONTRE GEORGES CHARPAK**  
*Frédéric Perez (Fondation LAMAP – Montrouge)*

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# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## European School on Magnetism February 26 – March 8, 2013

**Nora Dempsey**

Institut Néel

25 Rue des Martyrs, 38042 Grenoble, France,

nora.dempsey@grenoble.cnrs.fr

Tel : 04 76 88 74 35

The School aims at providing a thorough understanding of magnetism based on a broad series of fundamental lectures, while offering insight into up-to-date aspects of magnetism with lectures focusing on a special topic. It is addressed to young scientists, mainly PhD students and post-docs. It will gather 100 participants coming mainly from Europe with a few positions open to other countries.

### Main topics will include

- Fundamentals of magnetism
- Materials for energy conversion and harvesting
- Spintronics for lower-consumption microelectronics

### Eminent scientists in the field will animate the school.

#### These include:

Nora Dempsey (Grenoble, France), Wulf Wulfhekel (Karlsruhe, Germany), Claudine Lacroix (Grenoble, France), Michael Kuzmin (Dresden, Germany), Karl Sandeman (London, United Kingdom), Fausto Fiorillo (Torino, Italy), Rudolf Schäfer (Dresden, Germany), Olivier Gutfleisch (Darmstadt, Germany), Victorino Franco (Sevilla, Spain), Sebastian Fähler (Dresden, Germany), Geraint W. Jewell (Sheffield, UK), Orphée Cugat (Grenoble, France), Michel Viret (Paris, France), Sergio O. Valenzuela (Barcelona, Spain), Silvia Picozzi (L'aquila, Italy), Ken McKay, Crocus Technology (Grenoble, France)

### Organizing Committee

Nora Dempsey, Chair, Grenoble, France  
Oliver Gutfleisch, Co-Chair, Darmstadt, Germany  
Olivier Fruchart, Grenoble, France  
Olivier Isnard, Grenoble, France  
Claudine Lacroix, Grenoble, France

### Scientific Board

Leon Abelmann (Twente, Netherlands), Stephen Blundell (Oxford, UK), Franca Albertini (Parma, Italy), Ekkes Brück (Delft, The Netherlands), Emil Burzo (Cluj, Romania), Michael Coey (Dublin, Ireland), Nora Dempsey (Grenoble, France), Tomas Dietl (Warsaw, Poland), Olivier Fruchart (Grenoble, France), Pietro Gambardella (Barcelona, Spain), Oliver Gutfleisch (Darmstadt, Germany), Laura Heydermann (Villigen, Switzerland), Olivier Isnard (Grenoble, France), Jürgen Kirschner (Halle, Germany), Claudine Lacroix (Grenoble, France), Manuel Richter (Dresden, Germany), Karl Sandeman (London, UK), Dirk Sander (Halle, Germany), Ludwig Schultz (Dresden, Germany), Nicola Spaldin (Zürich, Switzerland), Josef Spátek (Krakow, Poland), Wulf Wulfhekel (Karlsruhe, Germany)

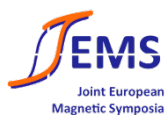
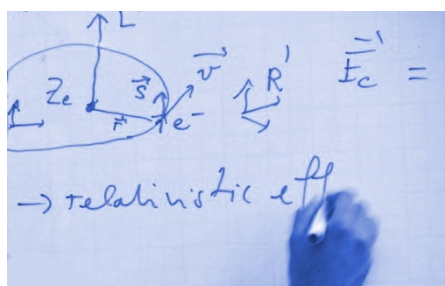
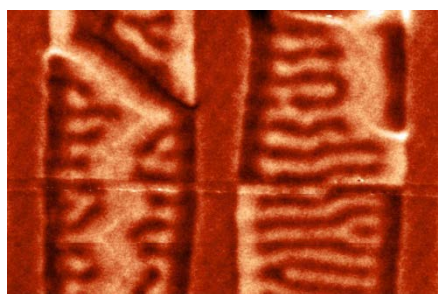
### Application and registration

<http://magnetism.eu/esm/2013/>

Deadline for application: October 15, 2012

Registration fee: 400€ (PhD students, Post-docs) and 600€ (Permanent staff)

Contact: [esm@magnetism.eu](mailto:esm@magnetism.eu)



UNIVERSITÉ DE  
GRENOBLE



Rhône-Alpes Région

# EUROPEAN SCHOOL ON MAGNETISM

26/02/2013 - 08/03/2013

**Olivier Fruchart** [Olivier.Fruchart@grenoble.cnrs.fr](mailto:Olivier.Fruchart@grenoble.cnrs.fr)

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The scientific investigation of Magnetism and magnetic materials is a topic more than a century old. Up to a few decades ago it had been a rather phenomenological topic, mainly devoted to permanent magnets, culminating in the high-performance (NdFeB) ones widely used nowadays. Despite its long history Magnetism has been a flourishing topic over the past twenty-five years, with many new branches opened. Two prominent branches are nanomagnetism (the modification of magnetic properties when implemented in systems with low dimensions such as nanoparticles and ultrathin films), and spintronics (the interplay of magnetism with electrical currents, lying at the base of electronics). Nanomagnetism and spintronics are intimately linked and have fueled each other since then. The symbolic birth of spintronics may be set to 1988 where two European groups independently demonstrated a very large effect coupling the direction of magnetization and electrical current in nanosized magnetic heterostructures. This was named giant magnetoresistance (GMR) and led to the Nobel prize awarded in 2007 to P. Grünberg and A. Fert. Researchers in these fields have been driven by the desire of advancement of fundamental science, as well as by a technological background. Progress in these fields lead to orders of magnitude of improvement in the capacity of hard disk drives, or the emergence of extremely sensitive sensors for magnetic fields with applications in contact-less sensing (eg position and speed measurements) or biological diagnosis.

For these reasons the scientific community of Magnetism has steadily grown in size over the years. This lead to the need to organize this community at the European scale, displaying the largest size worldwide. Several large European conferences devoted to Magnetism exist. In parallel, based on the early existence of a French-Romanian doctoral School jointly organized by Grenoble and Cluj-Napoca, we have been establishing over the past decade a European School on Magnetism (ESM: <http://esm.neel.cnrs.fr>). This School, which is held every other two years, is the largest such event worldwide and is now well recognized. It welcomes more than one hundred students, mostly PhDs, with now the necessity of selecting students and having waiting lists. Starting 2011 ESM will be associated with the largest European conference on Magnetism, JEMS, and receive financial support from it. Due to this association and synchronization with JEMS, ESM needs to be organized in 2011 and 2014. It has been proposed to organized a School in Winter or Spring 2013, so that a 3-year break is avoided. Whereas it is organized in Summer in Romania (for keeping costs moderate), another place needs to be used due to the unavailability of student accommodation at Universities in this period. Besides, the time between 2011, 2013 and 2014 ESM will be only 18 months, allowing us to reduce th number of students to less than one hundred. The IESC appears to be the ideal place

### 2ème Ecole du GERM

March 18 - 23, 2013

#### Patrick Berthault

Lab. Structure Dynamique Nucléaire  
CEA Saclay, 91191 Gif/Yvette, France,  
patrick.berthault@cea.fr  
Tel : 01 69 08 42 25

Magnetic resonance techniques are amongst the most powerful and versatile spectroscopic tools, occupying a central position in all branches of chemistry, being a reference in structural biology, and an imaging technique in medicine. The proposed summer school will teach the basic principles of NMR and the underlying concepts for the application of this spectroscopy in materials science, in biology and in imaging..

#### Main topics will include

- Basic principles of NMR
- Multi-dimensional NMR spectroscopy
- Relaxation and dynamics
- Imaging
- Instrumentation
- Hyperpolarisation
- Applications in materials science
- Applications to biological systems (solids and liquids)

#### Eminent scientists in the field will animate the school.

##### These include:

*Philip Grandinetti (Univ. Ohio US), Carine van Heijenoort (ICSN Gif/Yvette FR), Bruno Kieffer (IGBMC Illkirch FR), Nicolas Giraud (Univ. Paris Sud Orsay FR), Jean-Marie Bonny (INRA Clermont-Ferrand FR), Gaël de Paëpe (CEA Grenoble FR), Guido Pintacuda (ENS Lyon FR), Thibaut Charpentier (CEA Saclay FR), Jean-Marc Nuzillard (Univ. Reims FR), Joël Mispelter (Institut Curie, Paris FR), Pierre Florian (CEMHTI, Orléans FR)*

The School is addressed to PhD and post-doctoral students, as well as young independent researchers, belonging to different scientific communities (e.g. chemistry, biology, physics, medicine and their different subareas). The School will be divided in lectures and practical training sessions.

#### Organization Committee

Patrick Berthault (CEA Saclay Gif/yvette FR), Anne Lesage (CRMN ENS Lyon FR), Christel Gervais (LCMCP Paris FR), Bruno Alonso (ICGM Montpellier FR), Pierre Florian (CRMHT Orléans FR), Jean-Christophe Ginefri (Univ. Paris Sud FR), Sabine Bonnet (ICPM Nancy FR), Marc Fleury (IFP Rueil-Malmaison FR), Françoise Ochsenbein (CEA Saclay FR), Sylvain Miraux (Univ. Bordeaux FR)

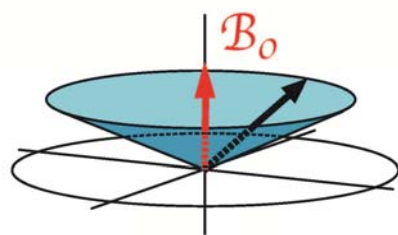
#### Application and registration

<http://www.germ.asso.fr>

<http://www.iesc.univ-corse.fr>

Registration fees: 350 euros for graduate students, 450 euros for others (to be confirmed).

Deadline for applications to mid-January 2013



# 2ÈME ECOLE DU GERM

18/03/2013 - 23/03/2013

**Patrick Berthault** [patrick.berthault@cea.fr](mailto:patrick.berthault@cea.fr)

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La Résonance Magnétique Nucléaire (RMN) est une technique spectroscopique qui s'applique à des domaines très variés des sciences, aussi bien en physique qu'en chimie ou en biologie. Il s'agit par essence, d'une technique pluridisciplinaire où des concepts développés dans un domaine sont continuellement adaptés dans une branche voisine de la recherche scientifique. Depuis la découverte du phénomène physique en 1945 par Purcell et Bloch (récompensée par le Prix Nobel de Physique en 1952), de nombreuses avancées ont été faites tant sur le plan méthodologique qu'instrumental qui ont permis de révéler des domaines d'application toujours plus nombreux, souvent inattendus. Les développements méthodologiques associées à la détermination de la structure et de la dynamique des biomolécules par RMN ont été couronnés par l'attribution du prix Nobel de Chimie à Richard Ernst en 1991, puis à Kurt Wüthrich en 2002. En 2003, Paul Lauterbur et Peter Mansfield ont à leur tour reçu cette distinction (Prix Nobel de Médecine) pour les développements méthodologiques apportés à cette technique à partir des années 80 dans le domaine de l'Imagerie par Résonance Magnétique (IRM).

Aujourd'hui la RMN est une technique en perpétuelle évolution, incontournable pour la caractérisation structurale et dynamique à l'échelle de l'atome de systèmes tels que des catalyseurs de surface, des nanomatériaux, des systèmes amorphes de type verres ou des polymères, des cristaux liquides, des protéines membranaires, des complexes biologiques ou encore des fibres amyloïdes. La RMN s'impose également comme une technique d'analyse majeure pour l'analyse de fluides biologiques et la découverte de nouveaux marqueurs métaboliques pour le diagnostic médical. L'Imagerie par Résonance Magnétique révolutionne aujourd'hui l'approche des sciences cognitives. Dans le domaine de la physique, notons enfin que la RMN est aujourd'hui au cœur du développement de nouveaux ordinateurs quantiques.

Tous ces domaines ont une base commune, à savoir les concepts sous-jacents de la RMN. La RMN en solution, en phase solide, ou l'imagerie, reposent sur une manipulation des spins nucléaires. Dans ce contexte, il nous semble important de mettre de nouveau en place une école thématique de RMN ayant pour objectif de former nos jeunes personnels de recherche aux bases fondamentales de cette spectroscopie. Celles-ci leur permettront d'appréhender par la suite toute application de la RMN. Cette école a donc pour vocation de rassembler des utilisateurs d'horizons variés (physique, chimie, biologie) afin de leur présenter les bases fondamentales de la RMN, ce qui leur permettra une meilleure compréhension des techniques émergentes.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## THz days and GDR newtwork meeting March 25 –27, 2013

**Juliette Mangeney**

Lab. Pierre Aigrain

25 rue Lhomond, 75005 Paris, France,

juliette.mangeney@lpa.ens.fr

Tel : 01 44 32 35 07

The next Terahertz Days and GDR-I workshop will take place in Cargèse (Corsica, France) from 25<sup>th</sup> to 27<sup>th</sup> of March 2013. The objective of the workshop is to present the latest developments in the field of Terahertz related Science and Technology, and to promote collaborative projects between the French Terahertz network and the international community.

### Main topics will include

- Terahertz sources and detectors: electronics and photonics
- Quantum Cascade Lasers
- THz propagation and waveguiding
- Terahertz spectroscopy systems and applications
- Imaging and nondestructive investigation
- Intense THz-field spectroscopy
- THz Near-field microscopy
- Metamaterials and plasmonics
- THz properties and applications of new materials (graphene, carbon nanotubes...)
- Applications to biology, chemistry, environment, physics, security and telecommunications.

### Eminent scientists in the field will animate the school.

#### These include:

*L. Chusseau (IES, Montpellier), D. Dolfi (Thales, Palaiseau), F. Garet (IMEP-LAHC, Chambéry), F. Destic (ISAE, Toulouse), V. Gavrilenko (Nizhnii Novgorod, Russia), J-F. Lampin (IEMN, Villeneuve d'Ascq), J. Lusakowski (Warsaw, Poland), P. Mounaix (CPMOH, Bordeaux), G. Mouret (LPCA, Dunkerque), T. Otsuji (Sendai, Japan), C. Palermo (IES, Montpellier), E. Peytavit (IEMN, Villeneuve d'Ascq), G. Piau (EADS, Suresnes), C. Sirtori (MPQ, Université Paris 7), G. Valusis (Vilnius, Lithuania)*

International and eminent scientists in the field will present 40 min invited talks. PhD students and postdoctoral researchers are encouraged to participate.

### Organization Committee

Juliette Mangeney (ENS, Paris), Nicolas Breuil (Thales, Elancourt), Pascale Roy (Soleil, Gif-sur-Yvette), Guilhem Gallot (Polytechnique, Palaiseau), Wojciech Knap (L2C, Montpellier) Jean Louis Coutaz (IMEP-LAHC, Chambéry), Jean Pierre Gex (ARMIR, Paris)

### Application and registration

<http://www.lob.polytechnique.fr/thzdays>

Deadline : early birds 31st of January 2013

Registration fee : from 350 € to 600 €



# THz DAYS AND GDR NETWORK MEETING

25/03/2013 - 27/03/2013

**Juliette Mangeney** [juliette.mangeney@lpa.ens.fr](mailto:juliette.mangeney@lpa.ens.fr)

Laboratoire Pierre Aigrain 25 rue Lhomond 75005 Paris

## Scientific Board

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Jean-Louis Coutaz	LAHC - Univ. Savoie	<a href="mailto:Jean-Louis.Coutaz@univ-savoie.fr">Jean-Louis.Coutaz@univ-savoie.fr</a>	FR

Jusqu'ici peu exploré en raison de l'absence de sources et de détecteurs, le rayonnement électromagnétique terahertz, peu énergétique et non-ionisant, est aujourd'hui en plein essor. Capable de voir à travers la peau, les vêtements, le brouillard, ou les murs, le « rayon T » ouvre de nombreuses pistes d'applications, en particulier dans les domaines de la médecine et de la sécurité.

Le journées Térhertz que nous planifions seront un lieu d'échanges entre les spécialistes, les non-spécialistes et les utilisateurs autour de thèmes particuliers comme la spectroscopie, l'état de l'art des sources et de détecteurs. Les journées térahertz sont organisées depuis 10 ans tous les 2 ans. Elles se sont tenues à Paris, Dunkerque, Aussois et dernièrement Bombannes, elles rassemblent aujourd'hui environ 100 participants. En 2013, la conférence sera jumelée avec le GDR National et International pour réunir un grand nombre de chercheurs Français et Internationaux. La mission première de ce regroupement est de favoriser les échanges et les discussions scientifiques et de faire émerger des projets de collaborations sur la Science et la Technologie terahertz. Durant la conférence, les dernières avancées dans le domaine du terahertz seront présentés.

Cargèse International School 2013

## Nanotechnology for NEXt Generation High Efficiency PV Workshop and Spring International School

April 1 - 6, 2013

Ludovic Escoubas

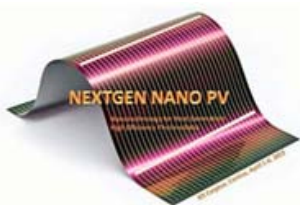
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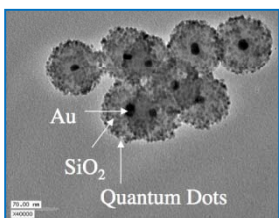


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The main idea of this event is to share the experience of researchers and engineers focused on new concepts at the nanoscale, where one can change the architecture of the solar cell, and open new opportunities for low-cost processes to capture light, convert it, and then move charges through the solar cell structure. The timing of these events (workshop and spring school in parallel) is excellent as these technologies could have a dramatic impact on efficiency, help produce low-cost devices and reduce the quantity of materials used, and thus lead the way to a true technological breakthrough leading to the mass deployment of photovoltaic technologies.

### Main topics will include

- Nanomaterials and Photovoltaics
- Photonic nanostructures for PV efficiency enhancement
- Dye Sensitized Solar Cells
- Organic solar cells / Hybrid solar cells
- Intermediate band solar cells
- Low cost technologies for 3rd generation photovoltaics
- Technological approach for low cost-high efficiency. Addressing market needs
- Young scientists... Building the future of Photovoltaics

### Eminent scientists in the field will animate the school.

#### These include:

Frédéric Chandezon (CEA, FR), Antonio Facchetti (Polyera Corporation, USA), Lawrence Kazmerski (NREL, USA), Thomas Kirchartz (Imperial College, UK), Daniel Lincot (IRDEP, FR), Antonio Marti (IES, ES), Juan Morante (IREC, ES), Jenny Nelson (Imperial College, UK), Jaroslav Romanyuk (EMPA, CH), Jeroen Van Duren (Intermolecular, USA), Jao Van De Lagemaat (NREL, USA), Hans-Werner Shock (Helmholtz Zentrum, DE), Oleg Sulima (General Electric, USA), Theodor Todorov (IBM, USA)

### Organization Committee

Veronica Bermudez (NEXCIS, France), Partha S. Dutta (Rensselaer, USA), Ludovic Escoubas (IM2NP, France), Judikaël Le Rouzo (IM2NP, France), Cathy Paitel (IM2NP, France), Jean-Jacques Simon (IM2NP, France)

### Application and registration

<http://www.im2np.fr/NextGenNanoPv/>

Registration fees : free for PhD students and CNRS members, 450 euros for academic and industrials

Deadline for application : November 15, 2012

# NANOTECHNOLOGY FOR NEXT GENERATION HIGH EFFICIENCY PV WORKSHOP AND SPRING SCHOOL

01/04/2013 - 06/04/2013

**Ludovic Escoubas** [ludovic.escoubas@im2np.fr](mailto:ludovic.escoubas@im2np.fr)

IM2NP - UMR CNRS 7334 Universite Aix-Marseille 13397 Marseille cedex 20

## Scientific Board

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Sunlight is an abundant source of renewable and clean energy on earth. However the cost of the photovoltaic (PV) systems still remains a barrier for large scale deployment of this technology. The United States Department of Energy (DOE) estimates that a US dollar (\$) 1 per watt installed PV system cost (including installer margin) that is equivalent to 5-6 cents (c)/kilowatt hour (kWh) would make solar energy competitive with the wholesale rate of electricity without any subsidies, nearly everywhere in the United States. This target represents a significantly more challenging goal than current DOE projections of reaching \$2.20 per watt for utility scale systems by 2016 and requires fundamental shift in PV system design paradigm in addition to creating high efficiency solar cells. In the mean time, fierce competition from global PV manufacturers is rapidly bringing down the cost of PV modules. Thin film silicon manufacturing systems are reaching a point where the expected cost of module production is around \$0.70/Watt at an average module efficiency of 10%. For further cost reduction, shift in module design to a roll-to-roll process is inevitable in addition to reducing the operational cost of the PV systems.

Europe is also a well established as the leading worldwide market for photovoltaics (PV) and is also strongly involved in both nanotechnology innovation and industrial application. The IAE has identified solar energy as the main contributor to electricity production by 2060 ('Solar may produce most of the world's power by 2060, IEA Says, Bloomberg 29 august 2011). Solar PV electricity production is the most obvious energy technology where innovative nanostructured materials and nanotechnology are contributing to technology development and to new sustainable, competitive industrial processes.

Nanotechnology offers the unprecedented opportunity to design, develop and manufacture Full Spectrum Photovoltaic Materials and Devices. Lack of economical device fabrication and integration processes has limited the development of high efficiency tandem cell or stacked photovoltaic (PV) devices for terrestrial applications. Research and development geared towards device grade semiconductor material synthesis and integration of different bandgap devices leveraging nano-scale precursors and transferable substrates will help in accomplishing the goal of energy conversion efficiency exceeding 50% using PV. Focus should also be on the exploration of earth abundant and recyclable PV materials.

Nanotechnology and nanosciences, knowledge based multifunctional Materials and new Production processes and devices (NMP) projects support PV, in particular through various nanotechnology breakthrough applications. As a matter of fact, nanotechnologies and nanomaterials are used in several ways in a variety of PV projects funded by European Commission Programmes.

European companies producing solar photovoltaic cells and modules utilizing nanotechnology now or in the near future is about 60. 75% of these companies are small or medium sized, and almost 90% of the companies focused only on solar photovoltaic.

The main idea of this event is to share the experience of researchers and engineers looking at new concepts at the nanoscale, where one can change the architecture of the solar cell, and open new opportunities for low-cost processes to capture light, convert it, and then move the charge through the solar cell structure.

These events (workshop and spring school in parallel) will be held at the right time as those technologies could have a dramatic impact on efficiency, help produce low-cost devices and save on materials utilization, and thus give place to the true technological breakthrough leading to the mass deployment of photovoltaic technologies. All those could change the whole game in the energetic domain at the world level.

### Ecole Technique de Base des détecteurs 2013

April 8 – April 13, 2013

#### Patrick Nayman

LPNHE Univ. Pierre et Marie Curie  
Tour 12-22 1<sup>er</sup> étage, 75005 Paris, France  
nayman@in2p3.fr  
Tel 01 44 27 45 79



L'école donne un aperçu des techniques utilisées en physique nucléaire, en physique des particules et également aborde l'astrophysique et la cosmologie.

Pour cela, les enjeux de la physique de ces disciplines sont largement présentés. Un cours de physique nucléaire et deux cours sur la physique des particules sont proposés.

D'autre part, l'instrumentation des détecteurs est globalement envisagée pour donner une vue d'ensemble de ce type d'équipements. Puis au niveau purement technique, les différentes solutions mises en œuvre pour obtenir le vide, créer des aimants à fort champ ou encore la cryogénie sont expliquées.

Pour la thématique autour de l'électronique, un cours de compatibilité électromagnétique explique les principales règles nécessaires pour réaliser des connexions correctes et efficaces.

Pour compléter l'ensemble un cours d'électronique et de traitement du signal montre les différentes techniques couramment utilisées dans nos domaines d'intérêts.

#### Main topics will include

- Introduction à la physique des particules et à la physique nucléaire
- Description et finalité des détecteurs
- Techniques de base des détecteurs (vide, cryogénie, électronique, CEM, mécanique)
- Expériences futures et présentes

#### Eminent scientists in the field will animate the school.

##### These include:

*Philippe Bredy (CEA / IRFU, FR), Steve Muanza (CPPM FR), Laurent Letierrier (LPC Caen FR), Patrick Nayman (LPNHE Paris FR), Joël Pouthas (IPNO-GANIL Orsay FR), Jean-Paul Tavernet (LPNHE FR)*

Public concerné : Techniciens, AI et IE nouveaux entrants

Donner aux techniciens de l'Institut une connaissance générale des techniques utilisées dans l'étude, la construction et la mise en service des détecteurs de physique nucléaire, de physique des particules et d'astrophysique.

Permettre ainsi aux stagiaires une meilleure compréhension de leurs activités et des contraintes des expériences.

#### Organization Committee

Patrick Nayman (LPNHE Paris, FR), Bertrand Di Cesare (IN2P3 Paris, FR)

#### Application and registration

Contact : bdicesare@admin.in2p3.fr



# ECOLE TECHNIQUE DE BASE DES DÉTECTEURS 2013

08/04/2013 - 13/04/2013

**Patrick Nayman** [nayman@in2p3.fr](mailto:nayman@in2p3.fr)

LPNHE Université Pierre & Marie Curie, Tour 1 75005 PARIS

## Scientific Board

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Joël Pouthas	IPNO - Orsay	<a href="mailto:pouthas@ipno.in2p3.fr">pouthas@ipno.in2p3.fr</a>	FR
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L'école donne un aperçu des techniques utilisées en physique nucléaire, en physique des particules et également aborde l'astrophysique et la cosmologie.

Pour cela, les enjeux de la physique de ces disciplines sont largement présentés. Un cours de physique nucléaire et deux cours sur la physique des particules sont proposées.

D'autre part, l'instrumentation des détecteurs est globalement envisagée pour donner une vue d'ensemble de ce type d'équipements. Puis au niveau purement technique, les différentes solutions mises en œuvre pour obtenir le vide, créer des aimants à fort champ ou encore la cryogénie sont expliquées.

Pour la thématique autour de l'électronique, un cours de compatibilité électromagnétique explique les principales règles nécessaires pour réaliser des connexions correctes et efficaces.

Pour compléter l'ensemble un cours d'électronique et de traitement du signal montre les différentes techniques couramment utilisées dans nos domaines d'intérêts.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## Progress in Ultrafast Laser Modifications of Materials April 15 - 20, 2013

### Lionel Canioni

LOMA  
351 Cours de la Libération,  
33405 Talence-France  
lionel.canioni@u-bordeaux1.fr  
Tél : 0540008325

### Yves Bellouard

Eindhoven University of Technology,  
PO Box 513, 5600 MB Eindhoven  
The Netherlands  
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Tél : +31-40-247 3715

Using recent progress in laser technology and in particular in the field of ultra-fast lasers, we are getting close to accomplish the alchemist dream of transforming materials. Compact lasers can generate pulses with ultra-high peak powers in the Tera-Watt or even Peta-Watt ranges. These high-power pulses lead to a radically different laser-matter interaction than the one obtained with conventional lasers. Non-linear processes are observed leading to new and exciting opportunities to tailor the matter in its intimate structure with sub-wavelength spatial resolutions and in the three dimensions. This workshop will cover the science and technology of ultrafast laser modification of materials, from the fundamentals – the interaction of ultrafast non-ablative pulses with dielectrics and other transparent materials, to the applications in various technological fields.

#### Main topics will include

- Ultrafast lasers,
- Femtosecond lasers,
- Laser-matter interactions,
- Dielectrics,
- Microfabrication,
- Microstructuring,
- Integrated optics,
- Optofluidics,

#### Eminent scientists in the field will animate the school.

##### These include:

*B. Poumellec (Univ. Paris Sud), F. Chen (Shandong Univ.), K. Sugioka (Riken), M. Richardson (CREOL), M. Gu (Swinburne Univ.), S. Juodkakis (Swinburne Univ.), Y. Shimotsuma (Kyoto Univ.), Y. Hayasaki (Utsunomiya Univ.), K. Richardson (Clemson Univ.), D. Jaque (Univ. Autonomia Madrid), S. Pissadakis (FORTH), J. Qiu (South China Normal Univ.), R. Grundwald (Max Born Inst.), D. Krol (Univ. of California Davis), R. Thomson (Heriot Watt Univ.), R. Osselame (Politecnico di Milano)*

The primary objective is to gather experts, students and young researchers in a remote, stimulating and mind-lifting environment where participants will have a chance to present their latest results, to interact and to exchange ideas on the exciting topic of ultrafast laser modification of materials.

#### Organization Committee

Lionel Canioni, University of Bordeaux, France.  
Yves Bellouard, Eindhoven University of Technology, the Netherlands.  
Jeff Squier, Colorado School of Mines, USA.  
Michael Withford, University of Macquarie, Australia.  
Ya Cheng, Shanghai Institute for Optics and fine Mechanics (SIOM), China.  
Shigeki Matsuo, University of Tokushima, Japan

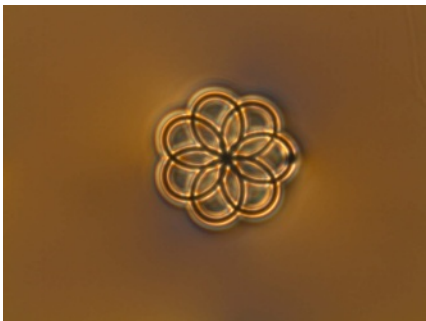
#### Application and registration

[http://femtomicromachining.org/index.php?option=com\\_content&view=article&id=48&Itemid=62](http://femtomicromachining.org/index.php?option=com_content&view=article&id=48&Itemid=62)

Contact : [cargese2013@femtomicromachining.org](mailto:cargese2013@femtomicromachining.org)

Registration fee : 300 euros for students, 400 to 500 euros for others

Deadline for application : February 28th, 2013



# PROGRESS IN ULTRAFAST LASER MODIFICATIONS OF MATERIALS

15/04/2013 - 20/04/2013

**Lionel Canioni** [lionel.canioni@u-bordeaux1.fr](mailto:lionel.canioni@u-bordeaux1.fr)

LOMA 351 Cours de la libération 33405 Talence

## Scientific Board

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Yves Bellouard	University of Technology	<a href="mailto:y.bellouard@tue.nl">y.bellouard@tue.nl</a>	NL

Using recent progress in laser technology and in particular in the field of ultra-fast lasers, we are getting close to accomplish the alchemist dream of transforming materials.

Compact lasers can generate pulses with ultra-high peak powers in the Tera-Watt or even Peta-Watt ranges. These high-power pulses lead to a radically different laser-matter interaction than the one obtained with conventional lasers. Non-linear processes are observed leading to new and exciting opportunities to tailor the matter in its intimate structure with sub-wavelength spatial resolutions and in the three dimensions.

This new way of processing material has numerous potential applications not only in integrated optics (waveguide writing, novel polarization devices, Bragg gratings, devices for future quantum communications, etc.) but also for optomechanics (sensors, actuators, etc.) and optofluidics (lab-on-a-chips).

This field of research is still at its infancy. Numerous aspects of the non-ablative laser-matter interaction (below the ablation regime) has yet to be understood and its full application potential has yet to be unraveled.

This workshop will cover the science and technology of ultrafast laser modification of materials, from the fundamentals - the interaction of ultrafast non-ablative pulses with dielectrics and other transparent materials, to the applications in various technological fields.

## Passive imaging in wave physics : from seismology to ultrasound

April 22 – 27, 2013

**Michel Campillo**

ISTerre Maison des Géosciences  
38041 Grenoble, France  
Michel.campillo@ujf-grenoble.fr  
Tel 0476635260

The Green's function (GF) of a medium between two points A and B represents the record we would get at A if an impulse source was applied at B. Passive imaging consists of the crosscorrelation of wavefields recorded at two points in order to converge to the GF of the medium, including all reflection, scattering and propagation modes. Various experimental, numerical and theoretical approaches have been developed to demonstrate passive imaging and to define more precisely under which assumption it is valid.

### Main topics will include

- Seismology
- Underwater Acoustics
- ultrasound Imaging
- Non Destructive Testing
- Wave Physics

### Eminent scientists in the field will animate the school.

#### These include:

Michel Campillo (Université de Grenoble, FR), Nicolas Shapiro (IPGP & CNRS, Paris, FR), Mathias Fink (Institut Langevin & ESPCI Paris FR), W.A. Kuperman (Scripps Inst. Of Oceanography San Diego, USA) R. L. Weaver (Univ. Illinois Urbana, USA), Josselin Garnier (Univ. Paris VII, France), Rob Van Der Hilst (EAPS Cambridge Massachussetts, USA), Arie Verdel (SIE Utrecht NL), Haruo Sato Tohoku (Tohoku Univ. Japan)

The goal of the school is to gather young scientists (graduate students, post-docs) and senior scientists working in the field of ambient noise imaging through a multidisciplinary approach including geophysics, underwater acoustics, ultrasonics and wave physics in general..

### Organization Committee

Michel Campillo (Maison des Géosciences, Grenoble FR), Eric Larose (Maison des Géosciences, Grenoble FR), Philippe Roux (Maison des Géosciences, Grenoble FR)

### Application and registration

<http://isterre.fr/recherche/equipes/ondes-et-structures/ambient-noise-imaging-and/>  
<http://www.iesc.univ-corse.fr>

The registration fees are 600 Euros.

Deadline for applications to february 1st, 2013



# PASSIVE IMAGING IN WAVE PHYSICS : FROM SEISMOLOGY TO ULTRASOUND

22/04/2013 - 27/04/2013

**Michel Campillo** [Michel.Campillo@ujf-grenoble.fr](mailto:Michel.Campillo@ujf-grenoble.fr)

ISTerre UMR CNRS 5275 Maison des Geoscience, BP53 38041 Grenoble

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Josselin Garnier	Université paris 6	<a href="mailto:garnier@math.jussieu.fr">garnier@math.jussieu.fr</a>	Fr

Cette école fait suite à celle organisée en 2011 à Cargèse sur le meme thème. L'ensemble des participants (~85) était unanime sur la nécessité d'organiser une nouvelle édition deux ans après la première (en 2013, donc) avec l'idée de suivre l'évolution des travaux scientifiques sur l'imagerie passive.

Le but de l'école est donc de rassembler des chercheurs juniors (doctorant, post-doc) et des chercheurs confirmés autour du thème de la tomographie passive (sans source) dans le domaine très général de la propagation d'ondes en milieu complexe. Cette école s'appuie sur les thèmes des GDR MesolImage 3219 et Ondes 2451 dans un cadre très pluridisciplinaire puisque les conférenciers seront issus de la sismologie, de l'acoustique sous-marine, du domaine des ultrasons et de la propagation d'onde en milieu complexe.

Le thème de la tomographie passive nait d'expériences physiques récentes (2001) qui ont montré comment, dans le domaine de la physique ondulatoire, le bruit ambiant est porteur d'informations riches sur le milieu de propagation. Depuis 2001, tous les domaines touchant à la propagation des ondes (sismologie, acoustique, océanographie, ultrason, optique) se sont emparés de ce sujet pour en extraire des applications scientifiques et technologiques propres à leurs thématiques. Le foisonnement d'articles sur le sujet dans des journaux allant de la sismologie aux ultrasons montre l'engouement de la communauté scientifique sur ce thème. L'ambition de notre école est de rassembler les principaux acteurs dans les domaines suscités pour faire bénéficier des doctorants, des post-docs et de jeunes chercheurs de l'expertise de chacun des conférenciers.

Le thème de l'école est à l'interface de plusieurs instituts du CNRS (INSU, INP, INSIS et INSMI). Plusieurs ANR (jeune chercheur, RiskNat) ainsi qu'un projet européen (ERC senior) ont été financés sur ce thème ces dernières années. De nombreux doctorants en France et à l'étranger ont fait de la tomographie passive en physique des ondes l'axe principal de leur recherche.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## Cosmic Accelerators April 30 – May 8, 2013

Diego Götz

CEA Sce Astrophysique

Orme des Meurisières 91191 Gif/Yvette FR

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sur les lois fondamentales  
de l'Univers

The particle acceleration mechanisms and the associated radiative processes that are at play in numerous phenomena observed in different astrophysical objects (e.g. AGNs, micro-quasars, GRBs, SNRs, pulsars and PWNe) are often very similar, but they take place on different time scales, distances, as well as in very different environments. Historically the phenomenology associated to the different sources has been studied in a specific way. Nevertheless, many methods (e.g. simulations, data analysis, analytical solutions) and theoretical concepts could and should be shared among the different communities in order to facilitate the progress in the particle acceleration field. The school is aimed mainly at PHD students and young post-docs with the goal of providing them with a global view of the particle acceleration problem, and to help them to make the fundamental connections between communities, in order to have a more comprehensive approach to the proposed scientific theme

### Main topics will include

- Radiation from accelerated particles
- Acceleration processes
- Cosmic rays
- Supernova remnants
- Pulsar Wind Nebulae
- Isolated neutron stars
- High-energy binaries
- Active Galactic Nuclei
- Gamma-Ray Bursts

### Eminent scientists in the field will animate the school.

#### These include:

*Felix Aharonian (MPI-K, Heidelberg DE), Elena Amato (Observatory of Arcetri IT), Andrei Bykov (Ioffe Institute, St. Petersburg RU), Frederic Daigne (IAP Paris FR), Andrea De Luca (INAF, IASF-Milano IT), Guillaume Dubus (IPAG Grenoble / IAP Paris FR), Don Ellison (North Carolina State Univ. USA), Jelle Kaastra (SRON, Utrecht NL), Martin Lemoine (IAP Paris FR), Alexandre Marcowith (Univ. Montpellier II FR), Vladimir Ptuskin (IZMIRAN, Moscow RU), Lorenzo Sironi (Princeton Univ. USA), Henk C. Spruit (MPI-Garching DE), Jacco Vink (API, Univ. of Amsterdam NL)*

### Organization Committee

Diego Götz (CEA-Saclay FR), Fabio Mattana (APC Paris FR), Maurizio Falanga (ISSI Bern CH), Volker Beckmann (FACe - APC Paris FR), Régis Terrier (APC Paris FR), Matthieu Renaud (LUPM, Montpellier FR), Pascale Chavegrand (CEA-Saclay FR)

### Application and registration

<http://www.issibern.ch/cargese2013>

Contact: [cargese2013@cea.fr](mailto:cargese2013@cea.fr)

The registration fee : 600 euros

Deadline for applications : December 20, 2012

# COSMIC ACCELERATORS

30/04/2013 - 08/05/2013

**Diego Götz** [diego.gotz@cea.fr](mailto:diego.gotz@cea.fr)

CEA Saclay - DSM/Irfu/Service d'Astrophysique Orme des Merisiers, Bat 709 91191 Gif sur Yvette

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The particle acceleration mechanisms and radiative processes that are at play in different astrophysical objects (AGNs/microquasars jets, GRBs, SNRs & PWNe, pulsars) are often very similar but take place on different temporal or spatial scales and environments. The approaches historically developed by the different astrophysical communities are often applied only to a specific object class. Nevertheless several methods (simulations, numerical modelling, data reduction techniques) and theoretical concepts could be shared and the communities would greatly benefit from each other's experience.

Focussing on the high energy part of the electromagnetic spectrum (X-rays and above), several common mechanisms are invoked in order to explain the non-thermal origin of the observed radiation over 9 decades of energy (from keV to TeV). From the particle acceleration point of view (shocks and diffusive shock acceleration, stochastic acceleration, acceleration in current sheets, etc.), as well as from the radiative one (e.g. synchrotron, inverse Compton, Bremsstrahlung emission in leptonic models, neutral pion gamma-rays/secondary radiation in hadronic ones), many astrophysical objects show striking similarities, but also some differences, especially in terms of the maximal energy the particles reach (from the trans-relativistic to the ultra-relativistic regime), their injection rate, their environment, and the processes driving their evolution from the out-of-equilibrium initial conditions.

From the instrumental point of view, we are currently witnessing a "golden era" of high-energy astronomy - both space based and ground based (e.g., Pierre Auger, H.E.S.S., MAGIC, VERITAS, Fermi, Swift, INTEGRAL, XMM Newton) - and some projects for the future are already foreseen to take over in the same domain (SVOM, CTA, etc.), as well as in closely related fields, potentially providing further constraints to the acceleration and radiation processes (LOFAR, KM3, Advanced Virgo and Ligo, etc.). In order to maximise the scientific return of such wealth of data for the high energy astrophysical community, we propose a school addressed to Ph.D. students and young post-docs. By taking advantage of lecturers, experts in the different topics covered by the school, we would like to stimulate the students to broaden their scientific horizons and to develop the capability to tackle a problem from a different perspective with respect to what they usually are doing or recently did during their Ph.D.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

## Cargèse International Workshop 2013

### Spontaneous Workshop (SW7)

May 6 – 11, 2013

**Roland Triay**

Centre de Physique Théorique  
Luminy, 13288 Marseille, France  
triay@cpt-univ-mrs.fr  
Tel 0491269519

Spontaneous Workshop (SW) brings together specialists on recent insights in Particle Physics, Astrophysics and Cosmology. The aim is to stimulate debates on common topics in views of providing us with innovating ideas. The workshop's organization is based on an optimal number of concise presentations and enough space for discussions on emergent problems in order to favour interactions among participants..

#### Main topics will include

- Cosmological parameters, Anomalies in CMB
- Baryon and Lepton number violation, CP violation
- LHC and Dark Matter, Astroparticle Physics
- Neutrino Cosmology
- Baryogenesis and Leptogenesis , Cosmic antimatter
- Inflation - Dark Energy, Modified Gravity
- Cosmological Large Scale Structures, Magnetic Fields
- Gravitational waves of Cosmological and Astrophysical origin

#### Eminent scientists in the field will animate the workshop.

##### These include:

The scientific program will gradually established, based on the proposals of accepted papers (the list of these is regularly updated on the website). It is not necessary that you submit a talk to participate in the workshop, your contribution will be appreciated in the debates. In the same spirit, students and young researchers are welcomed. Because, the number of participants is limited to 30 people, it is recommended to register early. The workshop is funded primarily on registration fees, unfortunately we do not have any scholarship.

#### Organization Committee

Denis Comelli, INFN (Ferrara IT), Roland Triay, Centre de Physique Théorique (Marseille FR), Alexander Dolgov (Univ. de Ferrara, IT), Berezhiani Zurab (Univ. de l'Aquila, IT)

#### Scientific Committee

Berezhiani Zurab (Univ. de l'Aquila, IT), Denis Comelli, INFN (Ferrara IT), Cédric Deffayet (APC Paris FR), Alexander Dolgov (Univ. de Ferrara, IT), Mario Novello, CBPF (Rio de Janeiro BR), Alexei Starobinsky, (LITP Moscou RU), Roland Triay, (Centre de Physique Théorique Marseille, FR)

#### Application and registration

[http://www.cpt.univ-mrs.fr/~cosmo/SW\\_2013/SW7.html](http://www.cpt.univ-mrs.fr/~cosmo/SW_2013/SW7.html)

<http://www.iesc.univ-corse.fr>

Registration fee : 200 Euros.

Deadline for applications to April 14<sup>th</sup> 2013



# SPONTANEOUS WORKSHOP (SW7)

06/05/2013 - 11/05/2013

**Roland Triay** [triay@cpt.univ-mrs.fr](mailto:triay@cpt.univ-mrs.fr)

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Mario Novello	Lab ICRA Rio de Janeiro	<a href="mailto:novello@cbpf.br">novello@cbpf.br</a>	BR
Zurab Berezhiani	Univ. de L'Aquila	<a href="mailto:berezhiani@fe.infn.it">berezhiani@fe.infn.it</a>	IT

L'atelier annuel Spontaneous Workshop (SW) a pour objectif de rassembler des spécialistes en physique des particules, astrophysique et cosmologie pour débattre sur des problèmes émergents en vue de perspectives innovantes. Il se singularise par le fait que le programme est précisé seulement une semaine avant sa tenue, sur la base des sujets proposés par les participants, avec un nombre optimal d'interventions, et ce afin de favoriser d'avantage les débats.

Pour ce qui est de sa qualité scientifique, la présence de participants de très haut niveau lors des ateliers précédents en atteste de manière incontestable, ainsi que par les origines diverses des participants internationales (Allemane, Belgique, Canada, Danemark, Etats Unis, Fédérations de Russies, France, Grande Bretagne, Italie, Japon, Koweït, Pologne, Suisse, Turquie, ...) alors que SW est principalement financé par les frais d'inscription. Les sujets pour le SW7 sont les suivants :

- ° Théories au-delà du modèle standard, dimensions supplémentaires
- ° Violation du nombre baryonique et leptonique, la violation CP
- ° Axions et neutrinos dans les laboratoires et en cosmologie
- ° Baryogénèse et leptogénèse
- ° Physique de l'Univers primordial. Modèles pour l'inflation et l'énergie sombre
- ° Matière noire et physique des astroparticules
- ° Structures cosmologiques à grande échelle, champs magnétiques
- ° Tests et théories de la gravitation modifiée
- ° Nouvelles données astronomiques et paramètres cosmologiques
- ° Ondes gravitationnelles

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

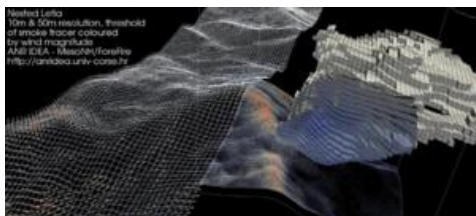
Cargèse International School 2013

## Numerical simulation of Forest Fires, from combustion to emissions

May 13 – 18, 2013

Jean-Baptiste Filippi

Univ. de Corse  
20250 Corte, France  
filippi@univ-corse.fr  
Tel 0495450158



The objective of the workshop is to present and exchange about the recent advances in wildfire combustion in a remote, stimulating and mind-lifting environment. Specific focus will be given to the different numerical approaches developed for the simulation of turbulent flame, fire front dynamics, fire emissions, atmospheric chemistry and model evaluation. The week is divided in two parts :

The first three days host a small restricted workshop that holds the conclusion and of the IDEA project («Incendies de forêts : simulation de la dynamique et des émissions atmosphériques par couplage de code», Forest Fires: propagation dynamics and atmospheric emissions simulation by code coupling) whose object was to create a reliable and integrated multi-scale approach for large-wildfire simulation.

The last two days are open for contributions related to the development, use and validation of numerical tools in the field of forest fire science.

The last session will be devoted to present these advances to fire managers, in order to exchange with decision makers, which expect pragmatic answers.

Selected and extended articles will be published in a special issue of “Natural Hazards and Earth System Sciences” an Open Access Journal of the European Geosciences Union.

### Main topics will include

- Combustion scale, solid to gaseous phase, combustion and associated atmospheric emissions
- Flame scale, turbulent flame to fire burns experiments and analysis
- Wildfire scale, large wildfire simulation, interaction with atmosphere dynamics
- Atmospheric scale, chemistry, impact of the fire at the regional scale and model evaluation

### Eminent scientists in the field will animate the school.

#### These include:

Arnaud Trounev (University of Maryland, USA), Catherine Lioussé (Laboratoire d'Aérodynamique, France), Albert Simeoni (WPI, Boston, USA), Mark Finney (Firelab, Missoula, USA), Ana Isabel Miranda (University of Aveiro, Portugal), Jan Mandel (University of Colorado, USA), Andrew Sullivan (CSIRO, Canberra, Australia), Craig B Clements (San José state University, USA)

### Organization Committee

Céline Mari (LA, Toulouse), Jean-Pierre Pinty (LA, Toulouse), Paul Antoine Santoni (SPE, CORTE), Eric Leoni (SPE, Corte), Bénédicte Cuenot (CERFACS, Toulouse), Daniel Cariolle (CERFACS, Toulouse), Christine Lac (CNRM, Toulouse), Patrick Le Moigne (CNRM, Toulouse), Valéry Masson (CNRM, Toulouse), Vivien Mallet (INRIA, Paris), Dominique Morvan (M2P2, Marseille), Denis Veynante (EM2C, Paris), Nasser Darabiha (EM2C, Paris)

### Application and registration

<http://anridea.univ-corse.fr/cargese2013/>

<http://www.iesc.univ-corse.fr>

Registration fee : from 100€ to 350€

Deadline for application : January 10, 2013



# NUMERICAL SIMULATION OF FOREST FIRES, FROM COMBUSTION TO EMISSIONS.

13/05/2013 - 18/05/2013

**Jean Baptiste Filippi** [filippi@univ-corse.fr](mailto:filippi@univ-corse.fr)

CNRS UMR SPE (Corte) University 20250 Corte

## Scientific Board

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Dominique Morvan	M2P2 Univ. aix marseille Ecole	<a href="mailto:dominique.morvan@univmed.fr">dominique.morvan@univmed.fr</a>	FR

This conference marks the conclusion of the IDEA project (ANR COSINUS 2009), whose object was to create the first validated large-wildfire simulation system that takes into account the coupled effects (usually simplified in existing approaches) between combustion, propagation dynamics and meteorology. The coupling is performed by tabulation and development of a parametric combustion model of the flame, and then by nested grids from the fire front scale (mesh  $< 100\text{m}$ ) to the regional scale (mesh  $> 1\text{Km}$ ).

The main goal (i.e. scaling coupled wildfire simulation to the regional scale) has required thousands of hours of computational time on meshes composed of several million points.

These simulations are the first of these kinds to take into account all aspects of wildfire on a large domain, the resulting code and associated case studies will be made available to the scientific community to further investigate wildfire behaviour.

The atmospheric model Meso-NH and the wildfire propagation model ForeFire are used for the larger scales. The combustion code Firestar and AVBP are used at smaller scale to determine the reduced flame combustion models to be included in ForeFire.

The main purpose of the software available at the end of the project will be enhancing our understanding of the phenomenon; alternatively it may also be used to propose a relevant real time wildfire simulation system triggered in case of major natural disaster. Results, methods and software will be presented at the end of the meeting with operational decision makers.

Four main axis are identified, corresponding to the different and coupled scales of the study: 1) Study of the pyrolysis gas, their combustion and associated atmospheric emissions where will be determined the composition and behaviour of combustion gases for axis 2) Identification of the control parameters of flame models and implementation in reduced models that will determine a parametric combustion model to be used in the propagation model. Axis 3) Large Wildfire simulation, where simulation of selected cases will be performed. Finally Axis 4) Data intensive simulations is devoted to the most computational intensive studies, high resolution study of large fire plume chemistry and uncertainty analysis with an ensemble approach.

### Controlling the propagation of waves in complex media

May 27 – June 1st, 2013

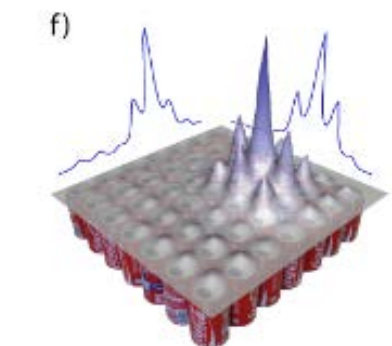
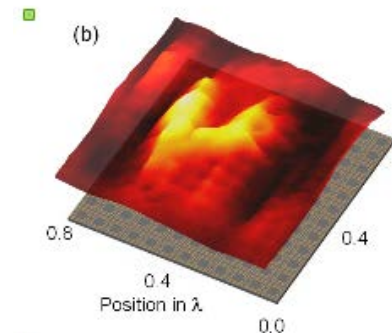
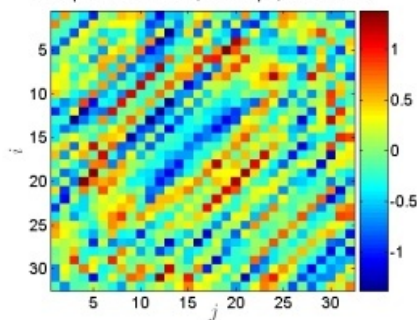
**Mathias Fink**

Institut Langevin 75000 Paris, France

mathias.fink@espci.fr

Tel : 0140795148

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Controlling the propagation of acoustic, electromagnetic and even matter waves, is of fundamental interest for many applications ranging from imaging the living and detecting hazardous components, to information processing and stealth technology. In the past decades, there has been many proposals in this regards, which can be separated within two main categories. On the one hand, it has been shown that one can tame wave fields in order to take advantage of the complexity of propagation media to for instance focus waves or image various objects. This can be realized in the temporal domain using the concept of time reversal, which was originally demonstrated in acoustics and then in electromagnetism, or in the spatial domain using the wave front shaping techniques developed in optics. On the other hand, one can force waves along desired paths through a careful design of manmade materials. This can be achieved using the concept of photonic and phononic crystals, which can guide and confine waves through Bragg interferences, or opting for metamaterials and related concepts such as conformal transformations, cloaking and negative refraction. Those concepts are closely intricate. Our school aims at gathering their main experts in a unique workshop which will be devoted to the control of waves, whatever their nature, in random and complex media.

#### Main topics will include

- wave front shaping
- waves in complex media
- photonic and phononic crystals
- optique
- acoustic imaging

#### Eminent scientists in the field will animate the school.

##### These include:

Hui Cao (Yale Univ. US), Mathias Fink (Inst. Langevin, ESPCI ParisTech FR), Ad Lagendijk (Univ. Amsterdam NL), Georg Maret (Univ. Konstanz DE), David A.B. Miller (Stanford Univ. USA), John Page (Univ. Manitoba CA), Morchedaï Segev (Technion IS), Lihong Wang (Washington Univ. St. Louis US), Martin Wegener (Karlsruhe Inst. of Technology DE), Nikolai Zheludev (Univ. Southampton UK), Claude Boccara (Inst. Langevin, ESPCI ParisTech FR), Rémi Carminati (Inst. Langevin, ESPCI ParisTech FR), Nick Fang (Massachusetts Inst. of Technology US), Didier Felbacq (Univ. Montpellier 2 FR), Sylvain Gigan (Inst. Langevin, ESPCI ParisTech FR), Sébastien Guenneau (Inst. Fresnel, CNRS FR), Allard Mosk (Univ. of Twente NL), José Sanchez-Dehesa (Univ. Politècnica de València ES), Sergey Skipetrov (Univ. Grenoble FR)

#### Scientific committee :

Mathias Fink (Inst. Langevin ESPCI, Paris FR), Hui Cao (Yale Univ. US), Claude Boccara (Inst. Langevin, ESPCI Paris FR), Ad Lagendijk (Univ. Amsterdam NL)

#### Organization Committee

Geoffroy Lerosey (Inst. Langevin, Paris FR), Alexandre Aubry (Inst. Langevin, Paris FR), Julien De Rosny (Inst. Langevin, Paris FR)

#### Application and registration

<http://www.institut-langevin.espci.fr/presentation,611>

Registration fee : 300 to 650 € (not definitive)

Deadline for applications : 1st March, 2013



# CONTROLLING THE PROPAGATION OF WAVES IN COMPLEX MEDIA

27/05/2013 - 01/06/2013

**Mathias Fink** [mathias.fink@espci.fr](mailto:mathias.fink@espci.fr)

Institut Langevin 10 rue Vauquelin 75005 Paris

## Scientific Board

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Hui Cao	Applied physics - Yale	<a href="mailto:hui.cao@yale.edu">hui.cao@yale.edu</a>	us
Mathias Fink	Institut Langevin	<a href="mailto:mathias.fink@espci.fr">mathias.fink@espci.fr</a>	fr
Ad Lagendijk	Complex Photonic Systems -	<a href="mailto:A.Lagendijk@amolf.nl">A.Lagendijk@amolf.nl</a>	nl
John Pendry	Dept. of physics, Imperial	<a href="mailto:j.pendry@imperial.ac.uk">j.pendry@imperial.ac.uk</a>	uk

Controlling the propagation of acoustic, electromagnetic and even matter waves, is of fundamental interest for many applications ranging from imaging the living to detecting hazardous components, and from information processing to stealth technology. In the past decades, there has been many proposals in this regards, which can be separated within two main categories. On the one hand, its has been shown that one can tame wavefields in order to take advantage of the complexity of propagation media to for instance focus waves or image various objects. This can be realized from the temporal domain using the concept of time reversal, which was originally demonstrated in acoustics and then in electromagnetism, or from the spatial domain using the wavefront shaping techniques developed in optics. On the other hand, one can force waves along desired paths through a careful design of manmade materials. This can be achieved using the concept of photonic and phononic crystals, which can guide and confine waves through Bragg interferences, or opting for metamaterials and related concepts such as conformal transformations, cloaking and negative refraction. Those concepts are closely intricate, and in the past few years there has been clear demands of convergence between the researchers of those various communities. Our school aims at gathering their main experts in a unique workshop which will be devoted to the control of waves whatever their nature in random and complex media. This will permit the more experienced scientists to share and confront the concepts developed in their own field of research with others, and the younger scientists to acquire a solid and broad knowledge of wave control in complex media from the best experts worldwide.

## Biomembranes : Molecular Architecture, Dynamics and Function

June 10 – June 20, 2013

**Gerrit Van Meer**

Utrecht University

Padulaan 8, CH Utrecht, Pays Bas

[g.vanmeer@uu.nl](mailto:g.vanmeer@uu.nl)



Biological membranes are necessarily very complex structures that vary considerably in composition depending on their function(s) and location. Multi-disciplinary approaches are vital to understanding the functional, structural and compositional complexity of membrane biogenesis and function. Detailed insights into the pathways and mechanisms leading to the assembly and proper functioning of membranes require co-operative research efforts of biochemists, biophysicists, structural biologists, and molecular and cell biologists. However, students, postdoctoral fellows and junior scientists who specialize in one particular experimental area often find it hard to grasp and apply this mixture of approaches without a broad overview of the field. The proposed Course is an excellent platform and opportunity to acquire an integrated overview of the structure, function and genesis of biological membranes and their components, to gain more insight in the possibilities offered by different disciplines and to discuss and learn about the multiple approaches, techniques and specialties in membrane research

### Main topics will include

- Phospholipid transfer proteins
- Lipid signaling
- Physical basis for lipid sorting and membrane traffic
- ABC transporters and lipids,
- Protein folding
- Dynamics of endocytosis,
- Dynamics of endocytosis
- Protein transport into the ER
- Mitochondrial function and dysfunction
- Cellular lipidomics

### Eminent scientists in the field will animate the school.

#### These include:

*Vytas Bankaitis (Chapel Hill, US), Giovanna Chimini (Marseille, FR), Ulrich Hartl (Martinsried, DE), Manajit Hayer-Hartl (Martinsried, DE), Tom Kirchhausen (Boston, US), Janet Shaw (Salt Lake City, US), Patricia Bassereau (Paris, FR), Eefjan Breukink (Utrecht, NL), Joost Holthuis (Osnabrueck, DE), Gerrit van Meer (Utrecht, NL), Tom Rapoport (Harvard, US), William Wickner (Dartmouth, US)*

This Lecture Course, will feature lectures, poster sessions and (in)formal discussions and will be open for graduate students, postdocs and specialists in this field

### Organization Committee

Gerrit van Meer (Utrecht, NL), Tom Rapoport (Harvard, US), William Wickner (Dartmouth, US), Ulrich Hartl (Martinsried, DE), Patricia Bassereau (Paris, FR)

### Application and registration

<http://web.science.uu.nl/cargese2013/>

Registration fee : 700 Euros

Deadline for applications : March 30, 2013



# BIOMEMBRANES: MOLECULAR ARCHITECTURE, DYNAMICS AND FUNCTION

11/06/2013 - 19/06/2013

**Gerrit Van Meer** [g.vanmeer@uu.nl](mailto:g.vanmeer@uu.nl)

Utrecht University Section Membrane Enzymology, CH Utrecht

## Scientific Board

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Patricia Bassereau	Institut Curie	Paris	<a href="mailto:patricia.bassereau@curie.fr">patricia.bassereau@curie.fr</a>	FR
Ulrich Hartl	Max-Planck-Institut fur	Martinsried	<a href="mailto:obermayr@biochem.mpg.de">obermayr@biochem.mpg.de</a>	DE
Manajit Hayer-Hartl	Max-Planck-Institut fur	Martinsried	<a href="mailto:mhartl@biochem.mpg.de">mhartl@biochem.mpg.de</a>	DE
Joost Holthuis	University of Osnabrueck	Osnabrueck	<a href="mailto:holthuis@uos.de">holthuis@uos.de</a>	DE

Biological membranes are necessarily very complex structures that vary considerably in composition depending on their function(s) and location. Multi-disciplinary approaches are vital to understanding the functional, structural and compositional complexity of membrane biogenesis and function. Detailed insights into the pathways and mechanisms leading to the assembly and proper functioning of membranes require co-operative research efforts of biochemists, biophysicists, structural biologists, and molecular and cell biologists. However, students, postdoctoral fellows and junior scientists who specialize in one particular experimental area often find it hard to grasp and apply this mixture of approaches without a broad overview of the field. The proposed Course is an excellent platform and opportunity to acquire an integrated overview of the structure, function and genesis of biological membranes and their components, to gain more insight in the possibilities offered by different disciplines and to discuss and learn about the multiple approaches, techniques and specialties in membrane research.

Membranes not only form a protective skin around the cell itself and its intracellular compartments, but they are also the sites where many cellular machines carry out their function. They are essential for cellular organization and play vital roles in most critical cellular functions including cell division, cellular defense, signal transduction, photosynthesis and oxidative phosphorylation, cell-cell interaction and selective transport of ions, nutrients and waste products. The basic building stones of membranes are the water-insoluble (phospho)lipids, required for stability and barrier functions, and proteins necessary to execute membrane-bound enzymatic and transport functions as well as signal recognition and protection. Thus, given the importance of membranes and their embedded proteins it is not unexpected that most drugs that are now available for treatment of illnesses are targeting membrane proteins. At this moment in time an increasing number of atomic structures of membrane proteins is being solved, novel technological developments have led the field of lipid research to explode in complexity, and the principles of membrane organization have to be rewritten. We will bring together a unique set of top scientists in this field that have proven over the years to be excellent teachers of students, post-docs and junior scientists.

## Topological Phases in Condensed Matter and Cold Atom Systems

June 24 – July 6, 2013

**Didier Poilblanc**

LPT Université Toulouse III, 31062

Toulouse, France

topo2013@irsamc.ups-tlse.fr

Tel : 05 61 55 60 39

The study of topological phases of matter has recently experienced a tremendous intensification, with much progress on both the experimental as well as theoretical side. Most notably are the newly discovered topological insulators, which combines physics from the quantum Hall effect and graphene. The theoretical prediction of (non-abelian) Majorana particles in topological insulators and closely related systems has recently boosted the quest for the discovery of emergent non-abelian particles beyond the realm of the quantum Hall effect. In parallel to the developments in condensed matter physics, tremendous progress has been made in the field of cold atomic systems. We propose a CFCAM-GSO/CECAM workshop, which will serve as a platform, in which physicists with different backgrounds can communicate their latest ideas and results.

### Main topics will include

- Topological Chern insulators and graphene
- Fractional quantum Hall physics
- Non-Abelian quasiparticles
- Cold atoms and non-Abelian synthetic gauge fields
- Topological spin liquids
- Topological quantum computing

### Eminent scientists in the field will animate the workshop

#### These include:

*Fabien Alet (CNRS & Univ. Toulouse FR), Emil Bergholtz (Free Univ. Berlin DE), Andrei Bernevig (Princeton Univ. US), Annica Black-Schaffer (Uppsala Univ. SE), Parsa Bonderson (Microsoft Station-Q, UC Santa Barbara US), Hans Peter Buechler (Stuttgart University DE), Philippe Corboz (ETH Zurich CH), Sebastian Eggert (TU Kaiserslautern DE), Eduardo Fradkin (Univ. Illinois US), Duncan Haldane (Princeton Univ. US), Henrik Johannesson (Göteborg Univ. SE), Thierry Jolicoeur (CNRS & Univ. Paris-Sud FR), Andreas Laeuchli (Univ. Innsbruck AU), Karyn Le Hur (CNRS & Ecole Polytechnique Palaiseau FR), Roger Melko (Univ. Waterloo CA), Roderich Moessner (Max Planck Inst. Dresden DE), Masaki Oshikawa (ISSP, Tokyo JP), Jiannis Pachos (Univ. Leeds GB), Tommaso Roscilde (ENS Lyon FR), Norbert Schuch (RWTH Aachen DE), Kirill Shtengel (Univ. California Riverside US), German Sierra (Univ. Autónoma Madrid ES), Simon Trebst (Köln Univ. DE), Frank Verstraete (Univ. Vienna AU), Ashvin Vishwanath (Univ. California Berkeley US), Shou-Cheng Zhang (Stanford Univ. US).*

### Organization Committee

Didier Poilblanc (CNRS & Univ. de Toulouse, FR), Eddy Ardonne (Stockholm University, SE), Nicolas Regnault (ENS, FR & Princeton Univ., US), Matthias Troyer (ETH Zurich, CH).

### Scientific Committee

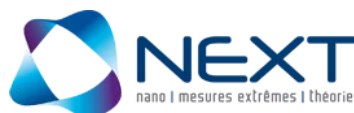
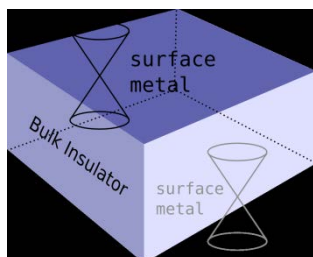
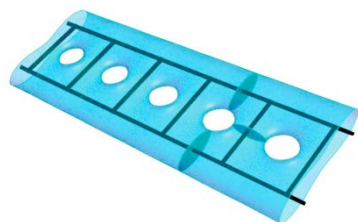
Ignacio Cirac (Max Planck Inst., Garching DE), Nigel Cooper (Univ. Cambridge GB), Eduardo Fradkin (Univ. Illinois US), Charles Kane (Univ. Pennsylvania US), Roger Melko (Univ. Waterloo CA), Roderich Moessner (Max Planck Institute, Dresden DE), Masaki Oshikawa (ISSP, Tokyo JP), Shou-Cheng Zhang (Stanford Univ. US), Peter Zoller (Univ. Innsbruck DE).

### Application and registration

<http://dr14.azur-colloque.cnrs.fr/>

Registration fees: 400 euros (12 nights accommodation, lunches, bus transportation from/to Ajaccio etc...)

Deadline for applications end of April



# TOPOLOGICAL PHASES IN CONDENSED MATTER AND COLD ATOM SYSTEMS

25/06/2013 - 06/07/2013

**Didier Poilblanc** [didier.poilblanc@irsamc.ups-tlse.fr](mailto:didier.poilblanc@irsamc.ups-tlse.fr)

Laboratoire de Physique Théorique Université Paul Sabatier, 118 rte de 31062 Toulouse

## Scientific Board

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Nigel Cooper	University of Cambridge	<a href="mailto:nrc25@cam.ac.uk">nrc25@cam.ac.uk</a>	UK
Eduardo Fradkin	Univ. of Illinois, Urbana-	<a href="mailto:efradkin@uiuc.edu">efradkin@uiuc.edu</a>	US
Charles Kane	University of Pennsylvania,	<a href="mailto:kane@physics.upenn.edu">kane@physics.upenn.edu</a>	US
Roderich Moessner	Max Planck Institute, Dresden	<a href="mailto:moessner@pks.mpg.de">moessner@pks.mpg.de</a>	DE
Shou-Cheng Zhang	Stanford University	<a href="mailto:sczhang@stanford.edu">sczhang@stanford.edu</a>	US

Most of the developments in the field of topological insulators have focused on the effects of the topological properties, without taking the electron interactions into account. While giving rise to very interesting physics, combining the topological effects with electron interactions, will most certainly lead to many interesting discoveries. The fractional quantum Hall effect is a good example of where this interplay indeed has led to very exciting new physics.

Investigation of effective lattice models of interacting particles with non-Abelian statistics (non-Abelian anyons) (as can originate spontaneously in some microscopic condensed matter systems) have proven to be another promising route to capture the unconventional properties of topological phases.

In parallel to the developments in condensed matter physics, tremendous progress has been made in the field of cold atomic systems. Such systems are extremely versatile, because of their tunability, and there are several proposals to exploit the properties cold atomic gases offer. Amongst these are the realization of interesting model lattice systems, which are known to exhibit interesting topological phases, such as Kitaev's honeycomb model, to name an interesting example. In addition, there are several proposals, to use atomic gases, to emulate non-abelian gauge-potentials. Success in this direction, in particular in combination with 'traditional' condensed matter physics, would open up a whole new realm of interesting topological phases of matter.

From the above, it should be clear that the field of topological phases in condensed matter physics is an active field, where theoretical and experimental progress go hand in hand. It is therefore important to have a regular platform, where physicist with different backgrounds, but with the common interest of topological phases of matter, can report and discuss the recent developments in the field.



# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## Quantitative Population Genetics

July 8 – 20, 2013

### Desai Michael

Harvard University  
435.20 Northwest Building,  
Cambridge, Ma 02138  
mmdesai@fas.harvard.edu  
Tel : +1-617-496-3613

### Walczak Aleksandra

LPT ENS  
75000 Paris – FR  
awalczak@lpt.ens.fr  
Tel : 01 44 32 25 95

The basic laws of evolution are simple: mutations generate variation, while genetic drift, recombination, and selection change the frequencies of the variants. Yet it is surprisingly difficult to predict how these effects combine to determine how a population will evolve, or to use our observations of genetic variation in nature to infer how evolution has acted in the past. This summer school will give students, postdocs, and researchers in quantitative disciplines (physics, applied math, computer science, population genetics, statistics, and computational and systems biology) an overview of the challenges in the field, and introduce them to current analytical, computational, and experimental methods of addressing the open questions.

#### Main topics will include

- Theoretical population genetics
- Statistical Genetics
- Evolutionary Dynamics
- Experimental Evolution
- Viral Evolution

#### Eminent scientists in the field will animate the school.

##### These include:

Isabel Gordo (Instituto Gulbenkian PT), Anna Di Rienzo (University of Chicago US), Boris Shraiman (KITP, UCSB US), David Bensimon, (ENS-Paris FR) Bernard Dujon (Institut Pasteur-Paris FR), Oskar Hallatschek (Max Planck Institute, Goettingen DE), Michael Laessig (University of Cologne DE), Dmitri Petrov (Stanford US), Colin Russel (University of Cambridge GB), Thierry Mora (ENS-Paris FR), Richard Neher (Max Planck Institute, Tuebingen DE), Sheri Simmons (Marine Biology Laboratory US), Yun Song (UC Berkeley US), Sander Tans (AMOLF Amsterdam PB)

The course will consist of a set of pedagogical mini-courses and extended seminars. Participants are encouraged to present posters or short talks.

#### Organization Committee

Michael Desai, Harvard University, Cambridge US  
Aleksandra Walczak, LPT ENS Paris FR  
Massimo Vergassola, Institut Pasteur Paris FR

#### Application and registration

Dead line: April 2013

<http://www.oeb.harvard.edu/faculty/desai/Cargese.html>

Registration fees: 750€ for grad students 850€ for others  
Limited fellowships for participants will be available



# QUANTITATIVE POPULATION GENETICS

09/07/2013 - 20/07/2013

**Michael Desai** [mmdesai@fas.harvard.edu](mailto:mmdesai@fas.harvard.edu)

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The basic laws of evolution are simple: mutations generate variation, while genetic drift, recombination, and selection change the frequencies of the variants. Yet even in very simple circumstances, it is often surprisingly difficult to predict how these forces will act on millions of individuals to collectively determine the course of evolution in a population. This has left important gaps in our ability to learn from the genetic variation we see in nature, which have become increasingly important as sequence data describing evolution in nature becomes more prevalent.

There is a long history of theory aimed at addressing this question. This extensive body of work explains many aspects of evolutionary dynamics and population genetics, providing for example an excellent understanding of purely neutral variation and of selection acting on a few sites at once. However, in recent years it has become increasingly clear that selection and other evolutionary forces often act pervasively across genomes, influencing the dynamics of many mutations all at once. Existing methods in population genetics have struggled to address these situations. The problem they face is that every mutation occurs at first in one individual. The genetic background of this single individual determines the future correlations between this mutation and all others. This makes evolution crucially dependent on stochastic dynamics while mutations are rare, and tends to make existing methods intractable.

Over the past decade, numerous physicists have begun to develop new approaches to these problems, drawing on ideas from nonequilibrium statistical physics. These methods generally involve techniques which separate the linear stochastic dynamics of each individual mutation in each particular genetic background with the nonlinear but deterministic dynamics of the rest of the population, and then self-consistently couple them together to provide a complete analysis. The influx of physicists into population genetics has led to a surge in interest among graduate students in physics and related disciplines. At the same time, the increase in availability of sequencing data makes it possible to directly observe existing evolutionary patterns of variation better than ever before, provided one has the statistical knowhow. However, while these new methods are inspired by statistical physics, problems in population genetics have crucial differences from seemingly analogous physical systems, and physical intuition is often misleading. For example, attempts to treat adaptation as a front propagation problem have struggled with the fact that number fluctuations drive dynamics in the population genetics context in a way that they cannot in any analogous physical system. This makes it important and timely to give the many physics graduate students interested in population genetics a systematic and mathematically sophisticated introduction to the opportunities and challenges in this field.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## 2013 International Nano-Optoelectronics Workshop (iNOW'2013) A Summer School jointly organized by ITN-PROPHET, DFG School of Nanophotonics (Berlin) and iNOW consortium August 19-30, 2013

**Abderrahim Ramdane**  
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This School will provide a forum for international nano-photonics community to present their latest research results as well as a networking platform to develop friendship and collaboration between young scientists for future advances in photonics. The program will feature outstanding series of lectures by internationally recognized scientists and industrial leaders as well as poster sessions for participating students to present and discuss their own research results.

### Main topics will include

- Growth of nanostructures
- Nanophotonic devices: novel concepts and modelling
- Widgap semiconductors (LEDs and UV lasers)
- Solar cells
- Telecom high bit rate devices, quantum communications
- Optical interconnects, signal processing, future high performance computing and photonic systems
- Photonic devices for life sciences and environment

### Eminent scientists in the field will animate the school.

#### These include:

A. Arakawa (Univ of Tokyo JP), J. Harris (Univ. of Stanford US), E. Yablonovitch (UC Berkeley US), A. Forchel (Univ. of Würzburg DE ), H. Riel (IBM Zurich CH), A. Willner (Univ. Southern California US), YH Lee (KAIST Daejeon KR), E. Weber (Fraunhofer Inst. Friburg DE), Y. Luo (Univ. of Tsinghua CN ), CC Yang (National Taiwan Univ. CN), F. Koyama (Tokyo Inst. of Technology JP)

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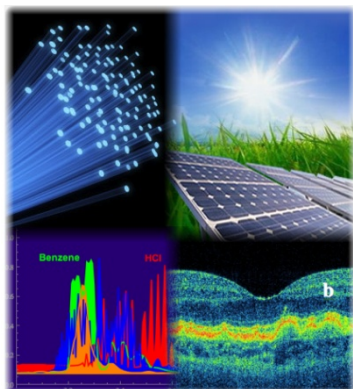
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### Application and registration

Contact : [contact-iNOW2013@lpn.cnrs.fr](mailto:contact-iNOW2013@lpn.cnrs.fr)  
<http://www.iesc.univ-corse.fr>

Registration fee : to be announced  
Deadline for applications : 15<sup>th</sup> March, 2013



**PROPHET**  
Postgraduate Research on Photonics as an Enabling Technology



# PHOTONICS AS AN ENABLING TECHNOLOGY FOR TELECOM, LIFE SCIENCES , ENVIRONMENT. ENERGY

20/08/2013 - 29/08/2013

**Abderrahim Ramdane** [abderrahim.ramdane@lpn.cnrs.fr](mailto:abderrahim.ramdane@lpn.cnrs.fr)

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The summer school is planned in the framework of the FP7 ITN PROPHET network. Please see <http://www.prophet-itn.eu>

The summer school is scheduled for approximately the 15th month of the network, and will be held in Cargèse, Corsica. This time placement is designed so that it is early enough in the network for the fellows to be able to usefully apply the skills gained at the school to their research, but late enough to ensure that all the researchers have been recruited and are settled at their host institutions. The one week school will be organised by LPN, and will be open to external participants in addition to the network fellows.

The backbone of the summer school will be a series of lectures and discussion sessions presented by the 3 visiting researchers (VRs), all of whom are well-established and well-respected experts in their fields. In order that the fellows are familiar with related and competing technologies, the VRs include Prof. Yasuhiko Arakawa (Tokyo), the original proposer and pioneer of QD lasers, Prof. Joseph Izatt, Associate Professor of Ophthalmology at Duke University, and Prof. Eicke Weber, Director of the Fraunhofer Institute for Solar Energy Systems. The VRs will give intermediate-level seminars to all attendees, thereby ensuring that each and every fellow of the network obtains a solid grounding in the full skill set of photonic device physics.

In addition, there will be a series of parallel sessions where the VRs give intensive high-level training to a smaller group of young researchers whose projects directly involve the VR's area of expertise. These core activities will be supplemented with additional courses on the industrial aspects of research, given by external speakers with experience in industry, and courses on the commercialisation of photonic devices and management topics. There will also be a series of team-building exercises such as mini-projects, problem solving sessions and outdoor activities, as well as social occasions.

### Preliminary list of lecturers:

Prof. Abderrahim Ramdane: CNRS Laboratory for Photonics and Nanostructures, Marcoussis, France

Dr François Lelarge: Alcatel-Thales III-V Lab, Marcoussis, France

Prof. Dieter Bimberg: Technische Universität Berlin, Germany

Dr. sc. Andrei Vladimirov: Weierstrass Institute for Applied Analysis & Stochastics, Berlin, Germany

Dr Guillaume Huyet: Tyndall Institute, University College Cork, Ireland

Prof. Anthony Krier: Lancaster University, UK

Prof. Thomas Krauss: University of St. Andrews, UK

Prof. Maciej Wojtkowski: Nicolaus Copernicus University, Poland

Dr. Fabio Iacona: Consiglio Nazionale delle Ricerche, IMM-UNICT, Italy

Prof. Lucio Andreani: Università degli studi di Pavia, Italy

### Invited distinguished lecturers:

- ° Prof. Yasuhiko Arakawa (Tokyo), the original proposer and pioneer of QD lasers,
- ° Prof. Joseph Izatt, Associate Professor of Ophthalmology at Duke University
- ° Prof. Eicke Weber, Director of the Fraunhofer Institute for Solar Energy Systems.

# INSTITUT D'ETUDES SCIENTIFIQUES DE CARGÈSE

Cargèse International School 2013

## Small Scale Plasticity October 13 – 19, 2013

### Muriel Hantcherli

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### Marc Legros

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The school will provide an overview of both experimental and theoretical tools necessary to understand the mechanical behavior of objects whose external or internal dimensions are reduced down to the micro - or nanoscale. Emphasis will be put on the plastic behavior of crystalline materials. The aim of this school is to bring to students the basis of dislocation theory, in relation with geometrical confinement. And establish for the research community a state of the art of the current theories and most recent experimental results in the field.

### Main topics will include

- Basic courses on dislocation, single and polycrystals
- Alternative deformation mechanisms
- Thin films and multilayer's
- Nanocrystals
- Pillars and nanowires
- Micro and nanomechanical testing
- RX and synchrotron investigations
- Electron Microscopy (Transmission, Scanning)

### Eminent scientists in the field will animate the school.

#### These include:

S. Brochard (P-Prime Poitiers FR), D. Caillard (CEMES Toulouse FR), J. Douin (CEMES Toulouse FR), D.S. Gianola (Univ. Penn US), C. Kirchlechner (ESI Leoben AUT), L. Kubin (Onera, Paris FR), J. Michler (EMPA Thun CH), A. Minor (Univ. Berkeley USA), A. Misra (LANL Los Alamos USA), F. Momprou (CEMES Toulouse FR), H. Mughrabi (Nuremberg University Erlangen DE), W.D. Nix\* (Stanford Univ. USA), O. Robach (CEA Grenoble FR), D. Rodney (SIMAP Grenoble FR), G. Saada (Onera, Paris), L. Thilly (P-Prime Poitiers FR), C. Tromas (P-Prime Poitiers FR), H. vanSwygenhoven (PSI Zurich CH), B. Warrot (CEMES Toulouse FR), D. Weygand\* (KIT Karlsruhe DE).

*\*to be confirmed*

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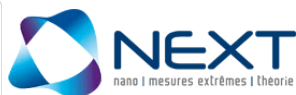
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### Application and registration

Contact : to be announced

Registration fee : 250 to 400 Euros.

Deadline for application : 10<sup>th</sup> June, 2013



# SMALL-SCALE PLASTICITY

14/10/2013 - 19/10/2013

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En 2004, Michael Uchic inventait un nouveau type d'essai mécanique, consistant à tailler à l'aide d'un faisceau d'ions un pilier de taille micrométrique dans un métal massif et à appuyer dessus avec un nano-indenteur plat [1]. Cette expérience révélait un effet de taille considérable dans un domaine de 0,5 à 40 microns, à l'opposé de la conception classique de propriétés physiques indépendantes des dimensions de l'éprouvette. Elle a largement contribué à multiplier les études expérimentales et théoriques des effets de taille sur les propriétés mécaniques à travers le monde.

On sait depuis longtemps qu'il suffit de bloquer les dislocations d'un métal pour qu'il devienne plus résistant à la déformation. C'est le cas des métaux à petits grains dans lesquels la multiplication des joints de grains oppose autant d'obstacles à la propagation des dislocations et induit une augmentation de la limite d'élasticité selon la fameuse loi de Hall-Petch. Transposée dans le domaine du nanomètre, cette loi prévoit que la résistance mécanique des métaux pourrait devenir colossale. Ce scénario n'a jamais eu lieu à cause de la difficulté à stabiliser de si petites tailles de grains et à l'activation de mécanismes de déformation "alternatifs" comme la plasticité liée aux joints de grains [2] encore méconnue.

Les effets de taille observés sur les micropiliers monocristallins, les whiskers ou les films minces sont par contre liés à l'absence ou au tarissement des dislocations qui n'ont à priori pas d'obstacle et peuvent librement s'échapper par les surfaces libres [3]. L'effet de taille serait alors dû à la nucléation ou à la multiplication des dislocations et non pas à leur interaction mutuelle ou avec des obstacles, comme dans le massif.

Pour caractériser mécaniquement ces petits objets, de nouvelles techniques expérimentales permettant d'imposer des déplacements à l'échelle sub-nanométrique et de mesurer des forces dans la gamme du micro et nano-Newton. Ces techniques souvent issues de la nanoindentation ont ensuite été couplées à des techniques de caractérisation fines (TEM, SEM, RX, Raman...) afin de suivre dynamiquement l'évolution de la structure, lors de la déformation. En parallèle, un effort très important des simulations atomistiques (Ab initio dynamique moléculaire) a permis de mettre en lumière certains mécanismes spécifiques de déformation à l'échelle nanométrique comme la nucléation de boucles de déformation à partir de marches atomiques, le démaclage...

Cette école s'attachera à donner aux participants un aperçu des outils expérimentaux et théoriques nécessaires à la compréhension du comportement mécanique lié aux effets de taille, ainsi qu'un état de l'art des différentes théories en cours dans le domaine, en lien avec un exposé exhaustif des artefacts connus et résultats expérimentaux récents



# INTEGRATED OCEAN DRILLING PROGRAM - EXPEDITION 335 - 2ND POST-CRUISE MEETING

13/05/2013 - 15/05/2013

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Department of Geology Southern Illinois University 62901 Carbondale

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The meeting has to take place, by agreement between participating countries in the Integrated Ocean Drilling Program, in the 12-36 months period following the expedition.

The main purpose of the second post-expedition meeting is to maximize scientific impact through review and coordination of post-expedition investigations in advance of publication of scientific results in accordance with the IODP Sample, Data, and Obligations Policy. It is the responsibility of the Co-chief scientists with help from the staff scientist to plan for and chair an efficient and timely meeting. The meeting requires authorization by the IODP-MI Science Managers.

The staff scientist will on behalf of the Co-chief scientists, and with the consent of the Implementing Organization (IO), submit a meeting request to the IODP-MI science managers for meeting authorization. This request must be made a minimum of 6 months pre-meeting and should include primary and alternate choices for a meeting site, a draft agenda, comments on timeliness in relation to progress of work and publication obligations, a named host, indications of the level of costs (accommodations and facilities) and an initial roster. It should also briefly explain the rationale behind the choices of meeting venue. A majority of the expedition participants must support the choices of meeting venues submitted for approval.

Second post-expedition meetings should take place in an IODP member country and must have a host, preferably an expedition participant. The host will be responsible for all costs associated with the meeting facilities, excluding accommodations and meals. The meeting facility will require suitable meeting room(s), audio-visual facilities, internet access, and printing and copying equipment, as deemed necessary for a specific meeting. Meeting attendees travel on their own travel funds and may seek support from their national IODP program. An appropriate balance of meetings among IODP member countries is desirable. Meeting locations requiring complex and/or expensive travel should be avoided. The national IODP support programs are encouraged to provide guidelines for the level of travel support that meeting attendees can expect to obtain.

Holding meetings in conjunction with related scientific conferences or at locations of specific scientific relevance (e.g., geology, institution, outreach) is encouraged. If an associated field excursion is proposed the rationale for this and possible travel and cost implications it might impose on the meeting participants must be documented. Authorization by the IODP-MI of a meeting with an associated field excursion does not imply that meeting attendees will be reimbursed for participation in the field excursion by their national support program.

# SEARCH AND EXPLORATION

03/06/2013 - 08/06/2013

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Search processes are ubiquitous in many physical, chemical, and biological systems. Representative examples include diffusion-limited encounters of molecules involved in chemical reactions; the dynamical or stochastic search for a global minimum in a complex energy landscape, relevant to systems such as glasses, protein (folding), and others; proteins searching for their specific target sites on DNA in gene regulation; animal foraging; survival at the edge of extinction due to low availability of energetic resources; automated search of registers in high-capacity databases, search engines (e.g., "crawlers") that explore the internet, and even pizza delivery in a jammed traffic system of a medium-size town. In this way, the subject is interesting, challenging and inherently multidisciplinary, and has very recently become an important scientific area of investigation.

Although the applications are diverse, the underlying physical mechanisms are often the same. Moreover, the inherent complexity of the problem, the abundance of ideas and methods found in this interdisciplinary, innovative field of research is studied in many areas of physics. In particular, the concepts and methods of statistical mechanics are particularly useful to the study of random search. On the one hand, it centers on how to find the global or local maxima of search efficiency functions with incomplete information. This is, naturally, related to the long tradition in physics of using different conceptual and mathematical tools to optimize relevant quantities, e.g., energy, entropy, and action. Such ideas and approaches are very important to solve computationally complex problems involving optimizations in very high dimensional energy landscapes, e.g., in protein folding.

The highly innovative character of the subject stems from a cross-fertilization of approaches, ideas and fruitful synergies between condensed matter and statistical physics, quantitative biology and mathematics. In particular, analyzing the data gathered by biologists on the trajectories of lizards, fish, or birds searching for food, one introduces random search strategies, based either on Lévy-type or on intermittent random motion, (in which slow search phases alternate with fast relocations), which explore most of the available space within a minimal time, with minimal oversampling and having the best chances of success.

The aim of our workshop is to bring together leading scientists working in this field to exploit and to advance the synergies between the communities working in condensed matter and statistical physics, quantitative biology and mathematics. We will exchange recent theoretical and experimental advances in the understanding of various search processes ranging from the ones taking place in living cells up to the search of animals for food. The workshop presumes a wide participation from across Europe, as well as an attendance of scientists from USA and Israel.

# MATHEMATICAL ASPECTS OF GEOPHYSICAL AND ASTROPHYSICAL FLUID DYNAMICS

22/07/2013 - 27/07/2013

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Andrew Soward	University of Exeter	<a href="mailto:A.M.Soward@exeter.ac.uk">A.M.Soward@exeter.ac.uk</a>	GB

La mécanique des fluides géophysique et astrophysique est caractérisée par un rôle important des effets de rotation (rotation des planètes et des étoiles) ainsi que du champ magnétique. Elle constitue un champ de recherche à part au sein de la mécanique des fluides, qui est souvent appelé "GAFD".

Ce domaine de la mécanique des fluides couvre donc un champ très large d'applications (intérieurs planétaires et stellaires, mais aussi convection dans les enveloppes fluides, l'océan ou l'atmosphère).

Le Workshop organisé à Cargèse se concentrera particulièrement sur les aspects mathématiques de cette discipline. Les objets considérés (planètes et étoiles) sont de tailles telles qu'ils impliquent des régimes de paramètres extrêmes dans les équations de la mécanique des fluides. Ces paramètres extrêmes, s'ils sont souvent un obstacles pour les simulations numériques, ouvrent la voie à des développements asymptotiques qui ont permis au cours de ces dernières années des avancées majeures sur ces questions.

# SUMMER SCHOOL ON PLASMONICS

29/07/2013 - 03/08/2013

**Nicolas Bonot** [nicolas.bonot@fresnel.fr](mailto:nicolas.bonot@fresnel.fr)

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La plasmonique est une discipline émergente consacrée à l'étude du renforcement lumière matière offert par l'oscillation collective des électrons libres de métaux comme l'or ou l'argent. Elle est à la base de nombreux projets de recherches en biophotonique (spectroscopie Raman, biosenseurs, thermoplasmonique), physique (Spaser (plus petit laser au monde), optique non linéaire (génération de seconde harmonique, transmission optique extraordinaire, nanoantennes), chimie (fonctionnalisation de particules d'or, photosynthèse). Les métamatériaux, quant à eux, sont au cœur d'une thématique jeune qui a tout au plus une quinzaine d'année et qui connaît un engouement très important. Des propositions aussi médiatiques que porteuses d'applications potentielles telles que des lentilles parfaites ou des capes d'invisibilité ont permis un développement rapide de ce thème. Ces matériaux artificiels dont les propriétés effectives transcendent celles des matériaux naturels font largement appel aux métaux. Ainsi lorsque les longueurs d'ondes optiques sont visées il existe de nombreuses convergences avec la plasmonique. D'une part les plasmons sont présents dans la conception de ces métamatériaux, d'autre part les métamatériaux peuvent permettre un contrôle des plasmons.

Cette convergence est parfaitement visible dans les conférences que se soient celles dédiées aux métamatériaux ou celles dédiées aux plasmons. A contrario à notre connaissance aucune école ne couvre les deux thèmes. Nous proposons donc de couvrir ce champ qui est large même si un certain nombre de concepts tels que les résonances électromagnétiques sont communs d'où le format de deux semaines.

Nous avons l'expérience de deux écoles SSOP (Summer School On Plasmonics) l'une qui a eu lieu en septembre 2009 à Porquerolles (environ 120 participants) et la seconde qui aura lieu en septembre 2011 (toujours à Porquerolles) et cette expérience nous confirme le besoin d'étendre le thème sur une durée plus longue.

Par ailleurs ces thèmes sont très peu présents dans les programmes d'enseignements supérieurs et de nombreux doctorants et post-doctorants sont impliqués dans des projets ambitieux sans avoir les bases électromagnétiques nécessaires à une bonne compréhension. Ceci est encore plus critique pour les convergences des deux thèmes.

Cette école a pour objectif d'expliquer dans un premier temps à un public large les concepts fondateurs des plasmons et des métamatériaux avant d'aborder en profondeur les concepts les plus innovants de ces thématiques.

# SUPERCONDUCTIVITY 2013 – MECHANISMS, CRITICALITY AND TOPOLOGICAL PROTECTION (SUPERMCT-2013)

06/08/2013 - 17/08/2013

**Andrey Chubukov** [chubukov@physics.wisc.edu](mailto:chubukov@physics.wisc.edu)

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We propose a school/workshop on modern aspects of superconductivity. Superconductivity is a well-known phenomenon – it has been around for over 100 years, and BCS theory for conventional, s-wave superconductors is over 50 years old. Over the last decade, however, the field of superconductivity witnessed a remarkable renewal of interest in the physics community. One of the reasons for this is the discovery of unconventional (not ordinary s-wave) superconductivity in cuprates, heavy-fermion, and organic superconductors, and, more recently, in Fe-pnictides and Fe-chalcogenides. The other reason is that in these materials indications have been found that superconducting pairing involves strong correlation effects induced by the Coulomb interaction, rather than purely from electron-phonon interaction. Another, arguably the most fundamental reason, is that superconductivity in novel materials emerges from normal states which are often very different from a conventional Fermi liquid. And yet another reason is the real hope, based on specific theoretical predictions and non-stop improvement of the experimental technique, to obtain chiral superconductivity, which breaks time-reversal symmetry and exhibits a wealth of fascinating properties which are highly sought after for nano-science applications.

These new facts required critical re-thinking of the origin of superconductivity in strongly correlated electron systems. We plan to invite leading specialists in the field to give lectures on how superconductivity emerges from nominally repulsive electron-electron interaction, what is the interplay between superconductivity and non-Fermi liquid physics near various quantum-critical points, how superconductivity is affected by Mott physics, what are non-trivial feedbacks from superconductivity on various electronic properties, and whether superconducting and density-wave order may co-exist. We plan to have a number of pedagogical lectures on topological superconductivity, on superconductivity in cold atom systems, and on the quest for novel superconductors.

In addition to lectures on the topics of current research, we also plan to have several lectures intended to teach students how to relate what experimentalists measure and what theorists calculate, i.e., how to relate measured observables in a superconductor with various bubble diagrams which theorists like to calculate.

# INTERNATIONAL SCHOOL OF OXIDE ELECTRONICS (ISOE2013)

03/09/2013 - 14/09/2013

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For many decades electronics has been based on the electron charge and built from semiconductors, typically Si and III-Vs. Even though semiconducting nanostructures will certainly be the basis of microelectronics for a few more years, a massive research effort is being made worldwide to unveil new physical effects, design better performing and multifunctional materials, devise novel circuit architectures, invent paradigms for information processing. All these advances will ultimately be the basis of information processing/storage devices beyond 2020.

On the materials research front, one of the routes currently being investigated relies on the use of transition metal oxides. This family of compounds presents many advantages : (i) as for III-V systems, atomically sharp heterostructures can now be grown ; (ii) oxides exhibit a wide range of physical properties and thus of functionalities (superconductors, ferromagnets, ferroelectrics, multiferroics, etc) within only a few crystallographic families; (iii) they can have extremely high responses to external stimuli (such as strain, magnetic field or electric field as in colossal magnetoresistance manganites).

Initiated by the progress in thin film growth since the discovery of high TC superconductors, the field of oxide electronics really took off at the end of the 1990's and is now growing at an exponential pace (with ~20 articles being published in major journals such as Nature, Science or Nature Materials each year). Major breakthroughs over the last 5 or 6 years include the advent of multiferroics (discovery of BiFeO<sub>3</sub> as a room-temperature multiferroic, discovery of several novel mechanisms of coupling between ferroelectricity and magnetism, etc) and the unveiling of several unexpected phases at oxide interface, epitomized by the high-mobility two-dimensional electron gas found at the interface between two band insulators, LaAlO<sub>3</sub> and SrTiO<sub>3</sub>. The topics of multiferroics and oxide interfaces have been recognized by Science magazine as one of the ten major scientific discoveries of 2006 and 2007, respectively.

Despite this impressive flurry of scientific advances, the community of oxide electronics is still not well structured. Researchers of the field meet annually at the Workshop on Oxide Electronics that gathers ~200 scientists. However, no major efforts have really been made so far to build a community of young researchers and give them opportunities to spend several days in company of world-class experts.

The time thus seems perfectly right to organize an extensive Summer School on Oxide Electronics during which selected high-quality PhD students, post-docs and young researchers will acquire new knowledge - both basic and technological - from the best internationally recognized experts. Just to mention a few of them, J. Santamaria (Madrid), Andrew Millis (Columbia University, New York), Jean-Marc Triscone (Geneva), Olf Karris (Uppsala, Sweden), Laurent Bellaiche (University of Arkansas)

# MODÉLISATIONS PHYSIQUES ET NUMÉRIQUES POUR LES ÉCOULEMENTS MULTIPHASIQUES

16/09/2013 - 24/09/2013

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La session sera consacrée à la simulation des écoulements multiphasiques couplés à certains autres phénomènes comme la magnétohydrodynamique, le transport de particules en phase dispersée. Nous aborderons aussi la simulation des plasmas complètement ionisés apparaissant notamment en fusion par confinement inertiel, en insistant sur la confrontation des modèles fluides et cinétiques.

Cette école est par essence multidisciplinaire et elle regroupe des spécialistes de trois domaines : modélisation des phénomènes physiques ci-dessus, conception et analyse des méthodes numériques appliquées à ces problèmes, implantation sur machines parallèles.

Plus précisément, seront traités les thèmes suivants :

A - Modélisation des phénomènes physiques :

- écoulements multimatériaux,
- approche gaz et particules comparée à l'approche diphasique,
- transport de particules chargées ou neutres,
- plasmas de fusion inertielle,
- magnétohydrodynamique.

B - Méthodes numériques :

- méthodes numériques pour les problèmes à plusieurs fluides (Lagrange, Euler, particulières),
- traitement des interfaces et modèles de sous-maillages,
- méthodes de Monte-Carlo et méthodes déterministes pour le transport des particules,
- confrontation de codes numériques avec des cas-tests, validation.

C - Implantation sur machines parallèles.

- performances comparées sur processeurs classiques et sur cartes graphiques.

# LES RENCONTRES DE CARGÈSE

24/09/2013 - 27/09/2013

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Cette école réunit divers acteurs de l'innovation : responsables de la R&D (Recherche et Développement), experts de la R&D du management de projet, représentants d'entreprises et d'institutions engagées dans des activités d'innovation ; mais aussi des scientifiques, des chefs de projets, des ingénieurs...

Il est rappelé que l'originalité de ces rencontres repose, d'une part, sur une approche interdisciplinaire sur le thème de l'innovation et d'autre part, sur une confrontation entre experts académiques et professionnels des entreprises et des organismes de recherche.

# 4TH CARGESE WORKSHOP ON COMBINATORIAL OPTIMIZATION

30/09/2013 - 05/10/2013

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Combinatorial optimization seeks efficient methods for finding an optimal solution in a finite collection of feasible solutions. For such problems, the number of feasible solutions is typically huge, thus considering all the solutions one after the other is highly impractical. In order to avoid a complete enumeration of the solutions, combinatorial optimization develops mathematical insight and algorithmic techniques for the problems it seeks to solve. A central idea is to encode the feasible solutions of a given instance as points in a high-dimensional space and consider the convex hull of these points, which is a convex polytope. This allows one to unleash the power of linear programming. For the hardest problems, linear programming is combined with branch-and-bound techniques. Such an approach to combinatorial optimization problems has proved to be extremely successful.

Topic for this 4th Edition: Submodular functions

In mathematics and computer science, submodular functions are a prominent tool. These are functions defined on all the subset of a finite set that have the diminishing returns property, and which behave similarly to convex functions. These functions appear frequently in combinatorial optimization, but also in other fields like game theory (as functions modeling user preferences). A lot of optimization problems can be cast as maximizing or minimizing submodular functions subject to various constraints. Submodular functions are tightly related to convex polyhedra called polymatroids, which are the geometric counterpart of submodular functions. We will focus on recent structural and algorithmic advances about submodular functions.

Target:

The yearly Cargese workshop aims to bring together researchers in combinatorial optimization around a chosen topic of current interest. It is intended to be a forum for the exchange of recent developments and powerful tools, with an emphasis on theory. Other goals include: promotion of interactions between participants, training of PhD students and discussion of open problems. The workshop will have approximately 60/70 participants, including PhD students (~15/20) and postdocs.

Website of previous editions (30 people only)

<http://homepages.ulb.ac.be/~sfiorini/Cargese12/Overview.html>

[http://www.math.u-bordeaux1.fr/~gstauffe/Cargese\\_workshop/Overview.html](http://www.math.u-bordeaux1.fr/~gstauffe/Cargese_workshop/Overview.html)

[http://www.math.u-bordeaux1.fr/~gstauffe/Cargese\\_workshop\\_2010/Overview.html](http://www.math.u-bordeaux1.fr/~gstauffe/Cargese_workshop_2010/Overview.html)

# ECOLE IN2P3

07/10/2013 - 12/10/2013

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Dans la conception des instruments de l'IN2P3 le calcul numérique par éléments finis (principalement pour la mécanique ou la thermique) prend une part stratégique.

Les fonctionnalités du nouveau logiciel de référence pour l'institut, ANSYS, permettent d'envisager d'approfondir l'aspect mécanique des fluides pour le développement de nos instruments afin d'optimiser par exemple les systèmes de refroidissement qui sont souvent des éléments critiques de nos équipements.

En effet, dans nos expériences les interactions entre contraintes purement mécaniques et contraintes thermiques sont de plus en plus souvent couplées.

L'école mise en place en 2013 sera dédiée à la mécanique des fluides et portera aussi sur les calculs, à destination d'un public de concepteurs en mécanique. Il y aura un certain nombre de TP dans cette école.

La précédente école s'est déroulée en 2011, et a regroupé 33 participants, sur une durée de 4 jours. Elle était consacrée aux calculs en thermique et thermomécanique

Les écoles calculs IN2P3 sont organisées tous les 2 ans et sont destinées aux personnels IN2P3, CNRS et CEA.

Ces écoles intéressent principalement les ingénieurs et techniciens des services mécaniques qui doivent développer des instruments pour les expériences de physiques.

Chaque école est organisée autour d'un thème (thermique, vibration, de la CAO au calcul).

L'objectif des ces écoles est d'apporter une formation aux agents mais l'école permet aussi aux agents de se rencontrer et d'échanger sur des disciplines communes.

# ORGANISATIONAL PRINCIPLES OF MEMBRANE SIGNALING

21/10/2013 - 26/10/2013

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Despite the rapid acceleration of discoveries in life sciences in the past few decades, our understanding of biological processes is mostly qualitative and insufficiently quantitative. Indeed, we now know the list of components underlying many fundamental biological processes such as cell division and differentiation, as well as their organization in functional networks. Our models lack, however, scientific rigor and are rarely predictive, because of a lack of quantitative data. While this may be regarded as an imperfection of biology due to biological complexity, it can be reasonably argued that future scientific breakthroughs and therapeutic application, will necessitate a more rigorous foundation of mechanisms on quantitative description and their incorporation into mathematical models. Via the LABEX "INFORM" we have recently established an interdisciplinary basic research consortium based at Aix-Marseille University aimed at a quantitative understanding of the flow of biological information at the cell surface. The central theme of this consortium is the study of biochemical and mechanical signals involved in numerous biological processes that are received and processed at the plasma membrane. The cell surface is a central organelle, and is accessible to advanced imaging approaches. The consortium thus focuses on two parallel information flows: biochemical signaling (for example immune signaling) and mechanical information (adhesion). Several key issues are being addressed and compared in complementary experimental models using similar experimental and quantitative computational strategies. Using a series of innovative imaging approaches from the molecular to cellular scale, the consortium aims to acquire quantitative information on the organization and dynamics of signaling complexes. In each case, we study the mechanisms in both simplified systems and in more complex in vivo contexts. This work will set the stage for an analysis of how specific biochemical or mechanical input stimuli modify signal organization. In the context of this consortium we are organizing the first of a series of workshops dedicated to Quantative Biology of Signaling to which both leading researchers in the field as well as members of INFORM will be invited to present their work. This action will foster exchange between the small but effective interdisciplinary research community in Marseille and a larger national and international network of engineers and scientists. The workshop programmed for the fall of 2013 will be entitled "Organizational principles of membrane signaling" with a particular emphasis on lipid protein interactions and activ membrane interactions on both the cellular and tissular level.