SIMEM's 2013 JED

Join us for the 4th edition
of the Doctoral School Days (JED)

jedsimem2013.sciencesconf.org

24 - 25 June 2013

Café Mancel (Caen Castle)

These days are organized by Ph.D. Students and are specially thought for Ph.D. Students of our doctoral school. What will be happening :

1. Student talks and posters
2. Invited Speakers plenary conferences
3. « Relais d'Sciences »
   and « Club Agile » presentations
4. Prizes and Awards

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& CENTRE DE RECHERCHE

Practical Information

Symposium Venue The Conference will be organized in the Lecture Hall of the 'Musée des Beaux Arts' situated at the site of the Chateau de Caen.

Talks 20' Talks should be based on ppt- or pdf-format, the necessary equipment will be available. Your file should be handed over to the operator well in advance of your talk, latest in the break before the session. The talks so called 20 minutes include 5 minutes of discussion.

180" Challenge Talks should be based on ppt- or pdf-format with only one slide without animation, the necessary equipment will be available. Your file should be handed over to the operator well in advance of your talk, latest in the break before the session. The talks are without discussion.

Poster session Four poster sessions will be organized in parallel with coffee breaks (two on Monday and two on Tuesday). The poster boards are installed in the galerie between the Museum and the Café Mancel. The posters have to be installed freely the Monday morning. The posters might be at disposure during Monday and Tuesday. They have to be removed after the last session of Tuesday.

Social Program

Welcome reception On Monday morning a welcome reception will be organized during which the participants may receive the welcome pack, have to sign the attendance sheet and receive the certificate of participation. The reception will be open from 8h30 to 9h15. It will take place in the entrance Hall of the Café Mancel, right in front of the Lecture Hall.

Visit of Fine Arts Museum of Caen On Monday afternoon, a ticket will be distributed allowing to visit the fine arts museum of Caen free of charge. The visit will last from 17h45 to 19h00.

Lunch The lunches will be held on Monday and Tuesday at the Café Mancel at 12h30, which is close to the Meeting Place.

Dinner The Dinner will be held on Monday at the Café Mancel at 19h30. Please respect the commitments you made during your registration. The event will end at 23h00.

Committee

SIMEM committee
Fréderic Jurie (director)
Wilfried Prellier (Vice-director)
Sandrine Soro
Michèle Anne-Ribot

Student committee
Alexandre Fafin
Aline Dellicour
Anne-Laure Pelé
Germain Jolly
Sylvain Maclot
Xavier Fabian
Willy Leclerc

Program

Monday 24th June

8:30 - 9:15	**Participants subscription - Welcome coffee**	**Café Mancel**
9:15 - 9:30	**Opening speech by Frédéric Jurie, SIMEM director**	**Auditorium**
9:30 - 10:30	**Student talks, Session I** *Chairman: Sylvain Maclot*	**Auditorium**
9:30 - 9:50	C. Couratin (LPC) - *Status of the SPIRAL1 upgrade at GANIL*	
9:50 - 10:10	M. Roblin (CIMAP) - *Near-field optical imaging of Plasmonic Waveguides*	
10:10 - 10:30	D. Berrichon (LUSAC) - *Experimental study of congestion speed limits for an air cooled condense*	
10:30 - 11:00	**Coffee break - Poster Session 1**	**Lobby**
11:00 - 12:30	**Invited Speaker**	**Auditorium**
	Raphaël Haumont - *Lecturer at Université Paris-Sud XI* *Innovation in molecular gastronomy*	
12:30 - 14:00	**Lunch**	**Café Mancel**
14:00 - 15:30	**Invited Speaker**	**Auditorium**
	Stéphane Perries - *Lecturer at Université Claude Bernard Lyon I and ENS Lyon* *Search for the Higgs Boson : the quest of the origin of the mass*	
15:30 - 16:00	**Coffee Break - Poster Session 2**	**Lobby**
16:00 - 17:45	**Challenge "Your thesis in 180 seconds"** *Chairman: Xavier Fabian*	**Auditorium**
17:45 - 19:00	**Caen Fine Arts Museum Visit** *Jury deliberation*	
19:00 - 19:30	**180 seconds challenge awards**	**Auditorium**
19:30 - 23:00	**Dinner**	**Café Mancel**

Tuesday 25th June

9:00 - 9:30	**Participants subscription - Welcome coffee**	**Café Mancel**
9:30 - 10:30	**Student talks, Session 2** *Chairman: Germain Jolly*	**Auditorium**
9:30 - 9:50	H. Awala (LCS) - *Thermally induced conversion of zeolite polymorphism*	
9:50 - 10:10	F. Aymard (LPCC) - *An equation of State for subsaturation matter of Core Collapse Supernovae, proto-Neutron Stars and Neutron Stars*	
10:10 - 10:30	W. Leclerc (LMNO) - *On a numerical approach for better understanding the mechanical response of random composites*	
10:30 - 11:00	**Coffee break - Poster Session 3**	**Lobby**
11:00 - 12:30	**Invited Speaker**	**Auditorium**
	Patrick Bours - *Associate professor at Gjøvik University, Norway* *Continuous Authentication using Behavioural Biometrics*	
12:30 - 14:00	**Lunch**	**Café Mancel**
14:00 - 15:30	**Student talks, Session 3** *Chairman: Aline Dellicour*	**Auditorium**
14:00 - 14:20	G. Boissonnat (LPCC) - *Beam monitoring in Hadrontherapy*	
14:20 - 14:40	F. Starecki (CIMAP) - *Waveguide lasers of $LiYF_4$:Tm ans $LiYF_4$:Yb*	
14:40 - 15:00	F. Lozes (GREYC) - *Point clouds treatment with graphs*	
15:00 - 15:20	S. Kadam (LCS) - *Monomolecular cracking rates of light alkanes over H-MFI zeolites determined by IR operando spectroscopy*	
15:30 - 16:00	**Coffee Break - Poster Session 4**	**Lobby**
16:00 - 16:30	**Relais d'Sciences and club Agile talks**	**Auditorium**
16:30 - 18:30	**Relais d'Sciences and club Agile workshops** *Ledo4Scrum; 3D printer, FabLab, Billotron*	**Lobby**
18:30 - 19:30	**Awards ceremony** *JED SIMEM 2013 closing cocktail*	**Auditorium**

Abstracts of invited speakers

Innovation in molecular gastronomy

Raphaël Haumont[(1)]*

[(1)] *LPCES - ICMMO - Université Paris-Sud XI - 15, rue Georges Clémenceau 91405 Orsay, France FRANCE*

Enseignant-chercheur en chimie, et associé du chef Thierry Marx, Raphaël Haumont vous propose de plonger en plein cœur de la structure des aliments, dans les bulles du blanc d'œufs, dans les gouttelettes d'huile, dans les fibres végétales... afin de voir comment "ça cuit", pourquoi "ça monte", "ça tient" ou "ça coagule". de la "cuisine moléculaire"? De la science et de la cuisine? De la recherche appliquée? Un très bon moyen de vulgariser les sciences? Tout cela à la fois! La conférence proposera un tour d'horizon des nouvelles techniques et outils via démonstrations et explications. Utilisés à bon escients, les connaissances et outils nouveaux en cuisine ne font qu'une part plus belle à la créativité, via l'innovation. En effet, celui qui cherche à comprendre les phénomènes qui se produisent pendant qu'il prépare et associe des produits, pourra prétendre maîtriser, reproduire à l'exactitude, anticiper, donc créer des choses nouvelles et innovantes: De la cuisine un peu moins empirique, certes, mais plus créative et toujours plus gourmande !

* raphael.haumont@u-psud.fr

Search for the Higgs Boson : the quest of the origin of the mass

Stéphane Perries[(1)]*

[(1)] *Université Claude Bernard Lyon 1 - Bâtiment Dirac 4 Rue Enrico FERMI 69622 Lyon, France*

The standard model of particle physics describes the world of the elementary constituents of matter with a great accuracy, as it has been proved by the various experiments at the particle colliders. However, for the last 40 years an essential piece of this theory, the Higgs boson, has escaped the detection. On the 4th of July 2012, the experiments working on the Large Hadron Collider (LHC), the accelerator of the CERN near Geneva, have announced the observation of a new particle whose properties are compatible with the Higgs boson of the model Standard. The seminar will focus on the experimental techniques used for this discovery, as well as on the associated theoretical challenges.

*s.perries@ipnl.in2p3.fr

Continuous Authentication using Behavioural Biometrics

Patrick Bours[(1)*]

[(1)] *Norwegian Information Security Lab (NISLab) - Gjøvik University College (HiG) - Teknologivn. 22, P.O. Box 191, 2802 Gjøvik, Norway*

The best known authentication mechanism for a computer is using a username and (secret) password. Alternatives could be using a token or biometrics to get access to the computer. However, in all of these cases the access control takes place at a specific point in time and access to the computer is then available until the machine is locked automatically (*e.g.* via a screen saver) or manually. During the "open" period, there is no way to confirm that the current user is the same as the one that logged on. In continuous authentication, the genuineness of the identity of the user is checked during a session, and in case of doubt about the correctness of the identity, the computer can be locked as a security measure.

In this presentation I will describe how behavioural biometrics can be used to provide continuous authentication in a manner that does not disturb the daily business of the user, while at the same time it protects the privacy of the user to the highest level.

* patrick.bours@hig.no

Abstracts of 20 minutes presentations

Status of the SPIRAL1 upgrade at GANIL

Claire Couratin[(1)]*, Olivier Bajeat [(2)], Pierre Delahaye[(2)], Mickael Dubois[(2)], Joanna Grinyer[(2)], Patrice Lecomte[(2)], Marie Geneviève Saint-Laurent[(2)], Emil Traykov[(2)], Jean-Charles Thomas[(2)], Laurent Maunoury[(2)], Pascal Jardin[(2)], Nathalie Lecesne[(2)], Laurent Rousseau[(2)]

[(1)] *Laboratoire de Physique Corpusculaire de Caen (LPCC) - Université de Caen Basse-Normandie, IN2P3, CNRS : UMR6534, ENSICAEN - 6, boulevard du Marechal Juin 14050 Caen Cedex - France*

[(2)] *Grand Accélérateur National d'Ions Lourds (GANIL) - IN2P3, CNRS : UPR3266, CEA - Bvd Henri Becquerel - BP 55027 - 14076 CAEN - France*

The first Isotope Separator On Line system (ISOL) installed at GANIL, the so-called SPIRAL1 facility, delivers radioactive ions since 2001. Atoms produced by fragmentation of swift heavy ions (up to 95 MeV/A) on a carbon target are ionized in an ECR ion source before being post-accelerated in a cyclotron. The coupling between the target and the source is achieved by a cold transfer tube. In these conditions, mainly gaseous ions are produced. In order to extend the range of post-accelerated exotic beams available, a new target ion source system is currently under development. This new system is based on the coupling of the SPIRAL target with a FEBIAD ion source (Forced Electron Beam Induced by Arc Discharge) [1]. It was first developed by Kirchner and Roeckl in 1976 at GSI [2]. The aim of the SPIRAL upgrade is to produce beams of condensable elements with good optical quality and selectivity. Moreover, in this context, a charge breeder of Phoenix type will be installed before post-acceleration [3]. New beams should be available for 2016.

The ISOL technique will be first presented. Then, after a description of the new setup, experiments performed in 2011 and 2012 will be discussed.

References

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[3] P. Jardin et al., Rev. Sci. Instrum., 83 (2012) 02A911

* couratin@lpccaen.in2p3.fr

Near-field optical imaging of Plasmonic Waveguides

Matthieu Roblin[(1)]*, Sylvain Girard[(1)], Hervé Gille[(1)], Mathieu Laroche[(1)], Julien Cardin[(1)], Christian Dufour[(1)], Ulrike Lüders[(2)]

[(1)] *Centre de recherche sur les ions, les matériaux et la photonique (CIMAP) - CNRS : UMR6252, Université de Caen Basse-Normandie, ENSICAEN, CEA - Bd H. Becquerel BP 5133 14070 Caen - France*
[(2)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

The goal of the present work concerns the development of innovative Surface Plasmon-Polariton (SPP) components operating in the telecom spectral domain near a wavelength of 1.55 μm. Different dielectric-loaded SPP waveguides based on structured polymer layer on the top of thin gold film have been processed by e-beam lithography. The optical properties are experimentally characterized using a scanning near-field optical microscope (SNOM) operating by laser feedback interferometry. This experimental setup gives access simultaneously to the sample topography and the spatial distribution of the optical field of the SPP with a subwavelentgth spatial resolution.

*matthieu.roblin@unicaen.fr

Etude expérimentale des vitesses limites d'engorgement pour un aérocondenseur

Damien Berrichon[(1)]*

[(1)] *LUSAC - Université de Caen Basse-Normandie -Esplanade de la Paix - BP 5186 - 14032 Caen Cedex 5 - France*

Les é changeurs de chaleur à changement de phases vapeur-liquide sont très utilisés dans plusieurs applications industrielles. Dans le cas des condenseurs, l'efficacité énergétique de ces échangeurs peut être limitée à cause du problème d'engorgement de la phase liquide par l'écoulement de la vapeur en contre courant. Ce phénomène d'engorgement empêche l'évacuation du condensat et augmente la résistance thermique aux transferts de masse et de chaleur. Durant cette thèse, un banc d'essais expérimental a été réalisé afin d'étudier les limites d'engorgement pour un écoulement adiabatique air-eau en contre courant dans un tube. Les résultats d'essais sont présentés et analysés pour différents débits d'écoulement d'eau et pour différentes inclinaisons.

* damienberrichon@orange.fr

Thermally induced conversions of zeolite polymorphism

Hussein Awala[(1)]*, Svetlana Mintova[(1)]

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

Zeolites are thermodynamically metastable crystalline aluminosilicates with framework type structures.[1] As such, the crystallization of zeolites often involves structural transformation (polymorphism) from one metastable structure to more thermodynamically stable structure. Many factors such as pH of the initial solution, alkalinity, counter ion used, water content, and temperature affect directly the zeolite crystallization, and these parameters can be adjusted to tailor zeolite size and crystal habit. But it's not fully understood how many of these parameters influence the kinetics and thermodynamics of zeolite nucleation and crystallization that contribute when the target is a zeolite structure with high free energy that easily could be transformed to an energetically more favorable phase.[2]

In the present work we follow the phase transformation process in template free precursor system, where five zeolites with BPH, FAU, GIS, SOD, JBW type structures are synthesized. By controlling the ratio of the counter ions (Na or K) in the initial composition and changing the synthesis temperature, the transformation from less stable zeolite BPH to more stable dense JBW zeolite was observed. This process was described by Ostwald rule of stages, wherein the more metastable structures are dissolved and recrystallized into more thermodynamically stable structures.

References

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*hussein.awala@ensicaen.fr

An Equation of State for sub-saturation matter of Core Collapse Supernovæ, proto-Neutron Stars and Neutron Stars

François Aymard[(1)]*

[(1)] *Laboratoire de Physique Corpusculaire de Caen (LPCC) - Université de Caen Basse-Normandie, IN2P3, CNRS : UMR6534, ENSICAEN - 6, boulevard du Marechal Juin 14050 Caen Cedex - France*

At the end of their life, very massive stars can explode as a Core Collapse Supernova. Then it remains a hot and dense self-gravitating object called proto-Neutron Star that evolves into a cold Neutron Star. Theory currently fails to explain the observed macroscopic properties of Neutron Stars such as their maximal mass. Moreover, the processes that are implied are not sufficiently understood to correctly simulate the dynamics of the Core Collapse Supernova. In order to improve these models, one needs the microscopic behavior of the matter composing the star, which determines the Equation of State.
Fully realistic equations of state are not available yet. Indeed, most current simulations are using simplistic Equations of State employing obsolete effective interactions and where sub-saturation matter is described within the single nucleus approximation. EoS models considering the complete nuclei distribution at finite temperature start to be employed but these models employ phenomenological in-vacuum cluster energy functionals and the interaction between the nuclei and the medium is completely neglected.
In this presentation, we introduce the general context of Compact Stars, then we discuss the models that are employed for explaining their microscopic composition, and the expected theoretical improvements. These latter essentially concern the development of a realistic equation of state for stellar matter at finite temperature. A special focus is given on the energetic modifications induced by the interaction between the cluster and the medium.

Collaboration: F. Gulminelli (LPC, Thesis Supervisor), A. Raduta (NIPNE, Romania), J. Margueron and P. Papakonstantinou (IPNO and IPNL, France)

* aymard@lpccaen.in2p3.fr

On a numerical approach for better understanding the mechanical response of random composites

Willy Leclerc[(1)]*

[(1)] *Laboratoire de Mathématiques Nicolas Oresme (LMNO) - CNRS : UMR6139, Université de Caen Basse-Normandie - BP 5186 14032 Caen Cedex - France*

The talk is dedicated to a numerical study of the mechanical properties of random composites. The basic idea consists in conceiving a very stiff material from a one-phase medium, the matrix, which is reinforced by heterogeneities. These ones which are, for example, carbon or flax fibres are randomly spread within the matrix. In this presentation, we focus our study on a short fibre-reinforced polymer matrix composite. Purposes are as follows. First, we generate a numerical model of the material. Second, we assess mechanical properties from the numerical model. Finally, we investigate the impact of morphological or phenomenological parameters, as the length or the percolation of fibres, on the predicted mechanical properties.

* willy.leclerc@unicaen.fr

Beam monitoring in Hadrontherapy

Guillaume Boissonnat[(1)]*

[(1)] *Laboratoire de Physique Corpusculaire de Caen (LPCC) - Université de Caen Basse-Normandie, IN2P3, CNRS : UMR6534, ENSICAEN - 6, boulevard du Marechal Juin 14050 Caen Cedex - France*

Radiation therapy has been used since 1896 as a mean to treat cancer thanks to the discovery of x-rays by Wilhelm Röntgen one year earlier. It has become one of the three main tools for cancer therapy along with surgery and chemotherapy. The principle of Radiation therapy is relatively simple, when high energy photons path through matter they leave some of their energy (or dose) behind. Therefore if photon beams are correctly focalized on a tumor, the delivered dose will sterilize the cells. One of the main drawback of Radiation therapy is that photon get through healthy tissues before reaching the tumor and therefore give dose to those tissues.

Hadrontherapy is a specific kind of Radiation therapy using particles as protons or carbon ions instead of photons. The main advantage is that most of the particle energy is deposited as a specific depth in the tissue and this depth is a function of the particle energy and therefore can be chosen so that it coincides with the position of the tumor enabling to spare healthy tissues.

Caen is hosting a project of Hadrontherapy Research Center named ARCHADE which is supposed to open in the next few years. In this context my PhD thesis is organized around the simulation and the development of a beam monitoring devices for high flux proton beam. Indeed, as in conventional Radiation therapy, every Particletherapy center has to be equipped with monitoring devices to ensure that the radiation dose prescribed by the physician and the one delivered to the patient are the same.

* boissonnat@lpccaen.in2p3.fr

Lasers en guides d'onde de LiYF4: Tm et LiYF4: Yb

Florent Starecki[(1)*]

[(1)] *Centre de recherche sur les ions, les matériaux et la photonique (CIMAP) - CNRS : UMR6252, Université de Caen Basse-Normandie, ENSICAEN, CEA - Bd H. Becquerel BP 5133 14070 Caen - France*

Des couches de $YLiF_4$ (YLF) dopées Thulium et Ytterbium ont été élaborées par la méthode d'épitaxie en phase liquide. Le profil d'indice, ainsi que la spectroscopie de ces couches ont été établis. La grande qualité optique de ces guides d'ondes a permis d'obtenir des rendements très élevés autour de 1.9 μm dans un guide d'onde de fluorure dopé Tm^{3+} et autour de 1 μm dans un guide dopé ytterbium, atteignant des puissances respectives de 570 mW et 526 mW.

*florent.starecki@ensicaen.fr

Traitements de nuages de points avec des graphes

François Lozes[(1)]*

[(1)] *Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen (GREYC) - ENSICAEN, Université de Caen Basse-Normandie, CNRS : UMR6072 - Boulevard du Maréchal Juin - 14050 Caen - France*

Avec l'avènement des scanneurs 3D, de plus en plus de nuages de points 3D colorés sont disponibles. Dans une première partie nous présenterons le formalisme des Equations aux différences Partiels (EdP) sur graphes. Puis dans une seconde partie nous présenterons le traitement de nuages de points 3D en utilisant le cadre des EdPs sur graphes. Différents exemples seront proposés sur des objets 3D scannés (débruitage, restauration, inpainting, segmentation).

* froncois.lozes@unicaen.fr

Monomolecular cracking rates of light alkanes over H-MFI zeolites determined by IR operando spectroscopy

Shashikant Kadam[(1)]*, Haoguang Li[(1)], Richard Wormsbecher[(1)], Alexandre Vimont[(1)], Arnaud Travert[(1)]

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

During 1942, in the middle of the World War II, a new petroleum refining process and catalysts were developed and commercialized. This technology, called fluid catalytic cracking (FCC), and provided a dramatic improvement in capital and operating costs relative to the previous fixed and moving-bed catalytic cracking processes. Cracking is a chemical reaction in which hydrocarbons are cut into shorter fragments. Acidic zeolites play a central role in petrochemical refining, catalyzing in particular the cracking of alkanes, a major reaction in the production of fuels from crude oil by fluid catalytic cracking.[1-3] The reaction mechanism for a monomolecular cracking has been thoroughly investigated both theoretically and experimentally. At low conversion ($< 5\%$), these reactions mostly occur through monomolecular cracking, where the alkane is protonated by a zeolite acid site and undergo subsequent C-C bond scission.[4] Mechanistic studies of these reactions are complicated by the interplay between adsorption, which governs the concentration of alkane - active sites complexes and their bond-breaking kinetics. Hence, conventional catalytic activity testing only allows for the measurement of an apparent cracking rate constant kapp = Kads kint, which lumps the alkane adsorption equilibrium constant Kads and the intrinsic rate constant kint. Currently, the experimental determination of the intrinsic activation energy Ea and activation entropy DS ‡requires an independent evaluation of the adsorption parameters DadsH and DadsS using extrapolations from low temperature adsorption measurements.[5-7] The responsible factors for the monomolecular cracking of alkanes by acidic zeolites are still not fully understood because the apparent rates are governed by both thermodynamic and kinetic parameters namely the equllibrium coverage of the acid sites by the alkane and the intrinsic cracking rate of the alkane adsorbed on the acid sites. Recent experimental [8,9] and theoretical [10,11] studies suggests that the increase of the cracking rates with the alkane size is mostly governed by the entropy of activation, DS ‡. However no study to our knowledge has determined the cracking rates while simultaneously measuring the coverage of the active sites at reaction conditions, which is key for the quantitative determination of the intrinsic reaction parameters. The objective of the present study was to determine experimentally the coverage of the H-ZSM-5 acid sites by light alkanes (C3-C7) at reaction conditions, hence allowing determination of the intrinsic cracking rate parameters directly.

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*shashikant.kadam@ensicaen.fr

Abstracts of 180" Challenge

Decapsulation techniques for polymer-encapsulated integrated circuits

François Kerisit[(1)]*

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Most integrated circuits in consumer electronics are encapsulated into a compound made of epoxy and silica spheres. Decapsulation is a sample preparation technique for failure analysis in micro-electronics that consists in removing the molding compound around the semiconductor die. The challenge is removing the molding compound while maintaining electrical integrity and not creating any new artifact. But new materials, such as copper, silver or polymer require developing new techniques.

*f.kerisit@gmail.com

Fluvial-tidal sequences in the Pleistocene terrace system: examples from the Lower Seine Valley (NW, France)

Guillaume Jamet[(1)]*, Olivier Dugue, Bernard Delcaillau, Dominique Cliquet, Hélène Tissoux

[(1)] *Laboratoire de Morphodynamique Continentale et Côtière (M2C) - UMR 6143 CNRS-Université de Caen Basse-Normandie -24 rue des Tilleuls - 14000 Caen, France*

The Pleistocene terrace system in the lower Seine valley provides an excellent opportunity for assessing the role of sea level and climatic changes on coastal fluvial system deposited in areas of slow tectonic uplift. On the one hand, the Seine River was an important braided-river flowing into the Channel during the Plio-Pleistocene cold periods. Height major cut-and-fill terraces have been recognized from Les Andelys to Le Havre. During major marine lowstands, the braided Seine River flow was able to erode, transport and rework bed material over large distances. On the other hand, marine highstands (e.g., Marine Isotopic Stages 5e, 7, 9 or 11) allow the lower valley to trap silty and sandy sediments supplied by a meandering reach as the present day valley. However, few studies focused on the effects of sea level change on fluvial architecture during the Pleistocene. A clear understanding of both fluvial and marine sources is required to discuss the long-term landscape evolution dominated by sea level changes.

In the meander of Elbeuf, new sedimentological investigations were conducted on the Tourville and Elbeuf terraces, respectively at + 5 m and + 30 m relative height above the maximum incision of the valley bottom. Recently-discovered outcrop profiles exhibit mixed fluvial and tidal deposits that settled down during the Middle Pleistocene (0.12 -Ű 0.78 ka BP). Results allowed us to describe a complete fluvial-tidal sequence characterized by a sedimentological change in fluvial architecture. The lower part of the vertical sequence show 5 to 15 m-thick fluvial deposits composed of coarse sands and gravels. Three types of fluvial styles were recognized on the basis of architectural element analysis and lithofacies distribution. The fluvial architecture corresponds to a gravel-bed braided river system which evolved toward a wandering gravel-bed system. These purely fluvial deposits are overlain by estuarine bodies (3 - 10 m) composed of sand and mud interbedding sequences. Then, the upper part evolves toward a slope context composed of reworked fluvial-tidal sands, local head deposits and loess-palaeosol successions. In summary, the fluvial-tidal sequence started by a gradient of high river discharges under periglacial conditions followed by the drowning of the Lower Seine valley during a marine incursion. Based on those field investigations but also numerical dating (IRSL and ESR/U-Th) and previous palaecological data, correlations were proposed between these fluvial-tidal records and the three major marine highstands at MIS 7, 9 and 11. Those results have important applications to improve an original answering model of glacio-eustatism in the context of a coastal fluvial system.

Keywords : Fluvial terraces, Tidal, Seine, Quaternary, facies, paleoenvironnemental.

*guillaume.jamet@unicaen.fr

Optimization of EMT-type Zeolite Synthesis

Veselina Georgieva[(1)]*, Valentin Valtchev, Svetlana Mintova

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

The optimization of the crystallization process of EMT-type zeolite from organic-template-free homogeneous suspensions will be presented. The formation of uniform suspensions utilizing sodium aluminate, sodium silicate and sodium hydroxide under controlled mixing is found to be of primary importance to control the nucleation and growth process of EMT type crystals. The zeolite intermediates have been investigated and the results reveal the formation of uniform in size gel particles. The mean hydrodynamic diameter of the ultimate EMT crystallites corresponds to the size of the amorphous particles formed after preparation of the clear precursor suspension.

The emphasis of this work is on the formation of EMT zeolites with diverse chemical compositions and particle sizes. Changes in the initial precursors and in the utilization of nucleation suppressing agents lead to the formation of EMT with bigger particle size. Together with the increase of zeolite crystals size undesired crystalline phases (SOD, GIS) appeared. Thus, it is of critical importance to control the nucleation kinetics in order to obtain the desire EMT type material as pure crystalline phase.

The careful control of gel chemistry combined with slow nucleation kinetics at low temperature provides access to nanoscale zeolites while avoiding the use of expensive organic templates. The role of each parameter influencing the nucleation process and the physicochemical properties of ultimate zeolite material will be discussed.

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* vgeorgieva@ensicaen.fr

Manipulations sur les systèmes de réputation

Thibaut Vallée[(1)]*

[(1)] *Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen (GREYC) - ENSICAEN, Université de Caen Basse-Normandie, CNRS : UMR6072 - Boulevard du Maréchal Juin - 14050 Caen - France*

De nombreux systèmes de services comme E'Bays, permettent aux utilisateurs de noter les autres utilisateurs. L'objectif de ces notes est de permettre à chaque utilisateur de se faire une opinion sur les autres. Ces systèmes de notation des utilisateurs par les autres utilisateurs sont appelés des systèmes de réputation. Malheureusement, des utilisateurs essayent de manipuler le système, notamment pour paraître digne de confiance alors qu'ils ne le sont pas. Nous présenterons ici comment à l'aide de système multi-agent il est possible de modéliser les notions de confiance, de réputation, ainsi que les manipulations que l'on souhaite empêcher.

*thibaul.vallee@unicaen.fr

Exploitation de l'intensité du signal LASER d'un lidar topographique aéroporté pour les environnements littoraux sableux.

Emilie Poullain[(1)]*, Franck Garestier[(1)], Franck Levoy[(1)]

[(1)] *Laboratoire de Morphodynamique Continentale et Côtière (M2C) - UMR 6143 CNRS-Université de Caen Basse-Normandie -24 rue des Tilleuls - 14000 Caen, France*

Les littoraux sableux sont par nature très mobiles et très variés du point de vue lithologique et des conditions de surface (rugosité, humidité,...). Ces dernières ont une grande importance dans les processus sédimentaires à l'origine de réajustements morphologiques permanents.
Le LiDAR a prouvé son efficacité pour la surveillance des zones côtières en décrivant la topographie avec une très grande précision sur de grandes étendues. L'intensité du signal laser retour, acquis simultanément avec les mesures de topographie peut-être étudiée en complément. La conjugaison de ces deux informations indépendantes permettra de mieux caractériser l'environnement côtier étudié.
La première partie du travail réalisé consiste à calibrer des mesures d'intensité en exploitant les propriétés de réflexion du LiDAR utilisé (l=1064 nm) sur l'eau, élément largement présent dans l'environnement côtier.
L'angle d'incidence joue un rôle majeur sur les mesures d'intensité. Le comportement de l'intensité en fonction de l'angle d'incidence est donc analysé pour différents types de surfaces et pour des conditions de surfaces variés. La réflexion de la lumière est définie selon deux composantes :

- Diffuse : la lumière est réfléchie isotropiquement. Elle est définie suivant la loi cosinus de Lambert. L'intensité retour est indépendante de l'angle d'incidence.
- Spéculaire : le rayonnement réfléchi par la surface l'est dans une seule et même direction. L'intensité retour dépend de l'angle d'incidence et de l'angle d'observation.

Torrance et Sparrow [1] considère que la surface éclairée est composée de nombreuses microfacettes. Leur distribution peut être définie par le modèle de Beckmann [2], qui dépend de l'écart-type des pentes, défini comme étant la rugosité de la surface.
Un modèle théorique est établi pour étudier le comportement en angle de l'intensité de différentes surfaces naturelles côtières couvertes pas les acquisitions de notre LiDAR.

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*emilie.poullain@unicaen.fr

Lower Bound for Canonical Height of Drinfeld Modules

Hugues Bauchere[(1)]*

[(1)] *Laboratoire de Mathématiques Nicolas Oresme (LMNO) - CNRS : UMR6139, Université de Caen Basse-Normandie - BP 5186 14032 Caen Cedex - France*

I present succinctly the objects and result of my thesis.

*hugues.bauchere@unicaen.fr

Image Dating for Temporal Information Retrieval

Paul Martin[1]*

[1] *Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen (GREYC) - ENSICAEN, Université de Caen Basse-Normandie, CNRS : UMR6072 - Boulevard du Maréchal Juin - 14050 Caen - France*

I will present you my thesis subject: "Image time stamping based on text and image features for temporal image retrieval" in less than 180 seconds.

* paul.martin@unicaen.fr

Texture effect and oxygen doping dependence of superconducting bulk samples of $Bi_2Sr_2CaCu_2O_{8+x}$

Aline Dellicour[(1),(2)]*, Bénédicte Vetruyen[(2)], Luca Lutterotti[(3)], Alain Pautrat[(1)], Daniel Chateigner[(1)]

[(1)] *Laboratoire de Chimie Inorganique Structurale (LCIS) - University of Liège - Chemistry Institute B6 - Allée de la Chimie 3 - 4000 Liège (Sart-Tilman), Belgium*

[(2)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

[(3)] *University of Trento - Via Rodolfo Belenzani, 12, 38122 Trento, Italy*

Superconductors are materials having zero resistivity under a certain value of temperature T, magnetic field H, and current density J. $Bi_2Sr_2CaCu_2O_{8+x}$ is a superconducting material used in industrial applications such as current leads, magnetic screens, or fault current limiters. Bulk materials of $Bi_2Sr_2CaCu_2O_{8+x}$ are synthesized by Nexans SuperConductors using the melt casting process. Despite of almost isotropic grain orientation, critical current densities Jc(77 K) in bulk samples may reach very high values of an order of 4 kA/cm^2 comparable with those in well aligned tapes and wires (10 kA/cm^2). Such a behavior is difficult to understand within the known models of high-temperature superconductivity. The aim of this work is to study in detail the texture, its effects on Jc, and Jc dependence on the doping state (oxygen contents x in $Bi_2Sr_2CaCu_2O_{8+x}$). First results show that values of critical temperature as a function of oxygen content in our bulk samples follow the same behavior as single crystals. This behavior demonstrates that bulk annealing process is well implemented and controlled. Maximum values of critical current density and critical temperature are not observed for the same value of oxygen content suggesting that both physical parameters are not linked to the same physical phenomena. Texture path is studied to explain variation of critical current densities between samples differently oxygenated but preliminary results tend to show that texture does not differ much from one sample to another. Deeper texture studies have to be performed to confirm these preliminary results.

*aline.dellicour@ensicaen.fr

Monomolecular cracking rates of light alkanes over H-MFI zeolites determined by IR operando spectroscopy

Shashikant Kadam[(1)]*, Haoguang Li[(1)], Richard Wormsbecher[(1)], Alexandre Vimont[(1)], Arnaud Travert[(1)]

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

During 1942, in the middle of the World War II, a new petroleum refining process and catalysts were developed and commercialized. This technology, called fluid catalytic cracking (FCC), and provided a dramatic improvement in capital and operating costs relative to the previous fixed and moving-bed catalytic cracking processes. Cracking is a chemical reaction in which hydrocarbons are cut into shorter fragments. Acidic zeolites play a central role in petrochemical refining, catalyzing in particular the cracking of alkanes, a major reaction in the production of fuels from crude oil by fluid catalytic cracking.[1-3] The reaction mechanism for a monomolecular cracking has been thoroughly investigated both theoretically and experimentally. At low conversion ($< 5\%$), these reactions mostly occur through monomolecular cracking, where the alkane is protonated by a zeolite acid site and undergo subsequent C-C bond scission.[4] Mechanistic studies of these reactions are complicated by the interplay between adsorption, which governs the concentration of alkane - active sites complexes and their bond-breaking kinetics. Hence, conventional catalytic activity testing only allows for the measurement of an apparent cracking rate constant kapp = Kads kint, which lumps the alkane adsorption equilibrium constant Kads and the intrinsic rate constant kint. Currently, the experimental determination of the intrinsic activation energy Ea and activation entropy DS ‡requires an independent evaluation of the adsorption parameters DadsH and DadsS using extrapolations from low temperature adsorption measurements.[5-7] The responsible factors for the monomolecular cracking of alkanes by acidic zeolites are still not fully understood because the apparent rates are governed by both thermodynamic and kinetic parameters namely the equllibrium coverage of the acid sites by the alkane and the intrinsic cracking rate of the alkane adsorbed on the acid sites. Recent experimental [8,9] and theoretical [10,11] studies suggests that the increase of the cracking rates with the alkane size is mostly governed by the entropy of activation, DS ‡. However no study to our knowledge has determined the cracking rates while simultaneously measuring the coverage of the active sites at reaction conditions, which is key for the quantitative determination of the intrinsic reaction parameters. The objective of the present study was to determine experimentally the coverage of the H-ZSM-5 acid sites by light alkanes (C3-C7) at reaction conditions, hence allowing determination of the intrinsic cracking rate parameters directly.

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*shashikant.kadam@ensicaen.fr

Dépôts de films minces d'oxydes sur substrats céramiques polycristallins

Morgane Lacotte[(1)]*

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Un film mince est une fine pellicule, de quelques nanomètres à quelques micromètres d'épaisseur, d'un matériau déposé sur un autre matériau, que l'on appelle substrat. L'intérêt est d'utiliser les propriétés du substrat pour influencer, voire imposer, la croissance du matériau déposé.
Le plus souvent, les substrats sont monocristallins, c'est-à-dire que les atomes sont agencés de façon uniforme dans tout le matériau, et sont disponibles commercialement dans différentes orientations cristallines. Ainsi, toutes les orientations ne sont pas disponibles facilement, et il est parfois difficile de synthétiser certaines compositions sous forme de monocristaux.
Pour notre étude, nous avons donc choisi de développer une approche originale, en utilisant des substrats céramiques polycristallins. A la surface de l'échantillon, on a donc accès à une infinité d'orientations, représentées sous forme de différents grains de matière de quelques micromètres de diamètre soudés les uns aux autres.
L'enjeu est donc d'optimiser la croissance de films minces sur des substrats céramiques polycristallins. Pour ce faire, il est nécessaire de choisir judicieusement les compositions du substrat et du film, en fonction notamment de l'arrangement des atomes au sein de chaque matériau, qui doit être le plus proche possible.

*morgane.lacotte@ensicaen.fr

Hybrid Materials for Thermoelectric Applications

Marion Galmiche[(1)]*, Jean-Michel Rueff[(2)]

[(1)] *Bernard Nysten*
[(2)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Currently energy and environment are of major concern for the future. Thermoelectric materials are interesting due to their ability to convert energy for cooling (Peltier effect) and electric power generation (Seebeck effect). It is known that the performance of thermoelectric materials depends on the dimensionless figure of merit, ZT.

$ZT = T(\alpha^2/\rho \times \kappa)$, where T is the temperature, α is the Seebeck coefficient, ρ is the electrical resistivity and κ is the thermal conductivity. Based on this relationship, a good thermoelectric material would be a compromise between a good electronic conductor (metal) and a good thermal insulator (insulating material). In other words, a degenerate semiconductor or a highly doped semiconductor could be a good candidate for this work. Presently, for the best known materials, ZT values at room temperature are close to one.

These main characteristics demonstrate an interesting aspect of hybrid materials and present an innovative alternative to oxide or intermetallic materials. Indeed, hybrid thermoelectric materials can combine an organic network (bad thermal conductivity) and an inorganic network (good electronic conductivity and charge capacity), particularly when it has low dimensionality (1D, 2D).

These materials are made of an organic network connected to an inorganic network whose composition and structure can be tuned in order to obtain desired properties. Also, they can be used as host structures for the in-situ polymerization of conducting polymers.

* marion.galmiche@ensicaen.fr

Développement de microcapteurs d'ambiance couches minces

Tetiana Toloshniak[(1)]*, Bertrand Boudart[(1)], Yannick Guhel[(1)], Jérôme Bernard[(1)], Anthony Besq[(1)]

[(1)] *Laboratoire Universitaire des Sciences Appliquées de Cherbourg (LUSAC) - Rue Louis Aragon, BP 78, 50 130 Cherbourd Octeville, France*

L'installation de capteurs est devenue omniprésente dans notre vie de tous les jours. L'exemple de l'automobile est probant : ce n'est pas moins de 50 capteurs différents qui équipent nos véhicules actuels !
Depuis des années, le LUSAC développe des nouveaux matériaux destinés à des applications de capteurs de température pour des pots d'échappement ou d'humidité afin de répondre à des problématiques spécifiques industrielles auxquelles les capteurs commercialisés ne peuvent répondre. Les capteurs sont aussi qualifiés par leur sensibilité et leur temps de réponse. Nous avons montré qu'il était possible d'augmenter la sensibilité des capteurs, tout en diminuant leur temps de réponse, en les miniaturisant. Cette miniaturisation nécessite le développement de matériaux en couches épaisses ou minces et l'utilisation des techniques de microélectronique pour la réalisation des contacts.
Pour accomplir sa mission adsorber et de désorber ces molécules d'eau un capteur d'humidité doit avoir plusieurs propriétés physiques et chimiques :

- une bonne sensibilité sur une gamme large de taux d'humidité et température ;
- une sensibilité sélective aux molécules d'eau ;
- une stabilité et une robustesse aux attaques chimiques et physiques ;
- un temps de réponse le plus court possible.

Les études se font dans un contexte pluridisciplinaire (physique du composant, rhéologie des fluides, matériaux céramiques) au sein de la thématique "Matériaux Céramiques et Composants" du LUSAC sur le site universitaire de Cherbourg.
Le travail expérimental de ce projet de thèse est axé d'une part sur la réalisation et la caractérisation structurelle de matériaux céramiques en couches épaisses et en couches minces et d'autre part sur la fabrication et la caractérisation électrique de structures en salles blanches.
La fabrication totale des capteurs est réalisée et contrôlée sur place, en partant des poudres jusqu'au dispositif. Les microcapteurs ainsi réalisés sont testés en ambiance contrôlée.

*tetiana.toloshniak@unicaen.fr

Soft Biometrics For Keystroke Dynamics

Syed Zulkarnain Syed Idrus[(1)]*, Estelle Cherrier[(1)], Christophe Rosenberger[(1)], Patrick Bours[(2)]

[(1)] *Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen (GREYC) - ENSICAEN, Université de Caen Basse-Normandie, CNRS : UMR6072 - Boulevard du Maréchal Juin - 14050 Caen - France*

[(2)] *Norwegian Information Security Laboratory (NISlab) - Department of Computer Science and Media Technology, Gjøvik University College, P.O.Box 191, N-2802 Gjøvik - Norway*

Keystroke dynamics is a viable and practical way as an addition to security for identity verification. It can be combined with passphrases authentication resulting in a more secure verification system. This paper presents a new soft biometric approach for keystroke dynamics. Soft biometrics traits are physical, behavioral or adhered human characteristics, which have been derived from the way human beings normally distinguish their peers (e.g. height, gender, hair color etc.). Those attributes have a low discriminating power, thus not capable of identification performance. Additionally, they are fully available to everyone which makes them privacy-safe. Thus, in this study, it consists of extracting information from the keystroke dynamics templates with the ability to recognise the hand(s) used (*i.e.* one/two hand(s)); the gender; the age category; and the handedness of a user when he/she types a given password or passphrase on a keyboard. Experiments were conducted on a keystroke dynamics database of 110 users and our experimental results show that the proposed methods are promising.

* syed-zulkarnain.syed-idrus@ensicaen.fr

Abstracts of posters

Detection of uremic Toxins using zeolite films

Hacan Ali Ahmad[(1)]*, S. Tomas[(1)], R. Retoux[(2)], T. Hamieh[(3)], S. Mintova[(1)]

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*
[(2)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*
[(3)] *Agricultural Engineering and Veterinary Medicine, Lebanese University, Lebanon*

Here we report on the preparation of zeolite films (thickness of 100-400 nm) with three types of nanosized EMT-, LTL- and MFI-type zeolites. The zeolite films were exposed to a single gas (o-cresol and p-cresol) or gas mixtures in the presence of water. The detection of a single or mixed analytes was followed by IR spectroscopy. The low concentrations of the analytes (5-50 ppm) in the presence of water vapor with the zeolite films are detected. The three types of zeolite films show high sorption ability for p-cresol in comparison to the o-cresol, which is explained with their differences in size, dipole moment, density, and vapor pressure. The EMT film reaches fast saturation at low concentration (5 ppm), while the pure silica MFI film has the highest sorption capacity due to its hydrophobic nature.

The high adsorption capacity, surface area and porosity, presence of mobile ions, and remarkable catalytic activity make the zeolites attractive candidates for chemical sensing (detection).

* hacan.ali-ahmad@ensicaen.fr

Thermally induced conversions of zeolite polymorphism

Hussein Awala[(1)*], Svetlana Mintova[(1)]

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

Zeolites are thermodynamically metastable crystalline aluminosilicates with framework type structures.[1] As such, the crystallization of zeolites often involves structural transformation (polymorphism) from one metastable structure to more thermodynamically stable structure. Many factors such as pH of the initial solution, alkalinity, counter ion used, water content, and temperature affect directly the zeolite crystallization, and these parameters can be adjusted to tailor zeolite size and crystal habit. But it's not fully understood how many of these parameters influence the kinetics and thermodynamics of zeolite nucleation and crystallization that contribute when the target is a zeolite structure with high free energy that easily could be transformed to an energetically more favorable phase.[2]

In the present work we follow the phase transformation process in template free precursor system, where five zeolites with BPH, FAU, GIS, SOD, JBW type structures are synthesized. By controlling the ratio of the counter ions (Na or K) in the initial composition and changing the synthesis temperature, the transformation from less stable zeolite BPH to more stable dense JBW zeolite was observed. This process was described by Ostwald rule of stages, wherein the more metastable structures are dissolved and recrystallized into more thermodynamically stable structures.

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*hussein.awala@ensicaen.fr

Modeling of ALS intensity behavior as a function of incidence angle for coastal zone surface study

Emilie Poullain[(1)]*, Franck Garestier[(1)], Franck Levoy[(1)]

[(1)] *Laboratoire de Morphodynamique Continentale et Côtière (M2C) - UMR 6143 CNRS-Université de Caen Basse-Normandie -24 rue des Tilleuls - 14000 Caen, France*

The objectives of this paper are to study the effects of incidence angle on the intensity of laser backscatter of LiDAR.
The coastal environments are directly influenced by hydrodynamic conditions and then present high morphological variations, which are traduced by permanently varying surface conditions (roughness, moisture, grain size and lithology). Quantification of the morphological evolution of the coasts is of a great importance since the topography constitutes an indicator of complex sedimentary processes. That's why several indirect methods have been realized to characterize the sand surfaces of the coastal environments and particularly the aerial imagery, which presents the advantage of covering wide areas with a high point density.
LiDAR technology has proven to be efficient for coastal survey since it allows to estimate the topography with a high accuracy for large scale investigations. In the recent years, the intensity of the LASER backscatter, acquired simultaneously with the discrete topography measurements, has started to be investigated, providing complementary information for the study of the coastal environments.
In the lab M2C, we own a LEICA ALS60 airborne laser scanner (CLAREC project) dedicated to the survey of the NW coasts of France. The measurements were carried out at flying heights of about 800 or 1500 m with a 1064-nm laser source. At this wavelength, the laser beam is totally reflected by the water, then, the acquisition campaigns are realized at low tide.
Our work concerns LiDAR intensity investigation for surface parameter extraction. The first part of this work concerns the calibration of the intensity measurements without necessarily using commercially available reference targets [1] or naturally available reference targets [2], but by exploiting the reflection properties of our LiDAR with the water table, widely present over the coastal environments.
Different works have investigated the relation between the LiDAR intensity and the system parameters. Ahokas et al [3] showed that the intensity was a complex function of several parameters: 1) range [4], 2) incidence angle [4] and 3) atmospheric attenuation [5]. Concerning the natural surface parameters, a sensitivity of the LiDAR intensity has been brought into evidence to the roughness [6], the moisture [7], and the brightness [8].
Since the incidence angle has a predominant influence on the intensity measurements, we first analyzed the intensity-incidence behavior over different surface types and under different surface conditions. The overall reflection process over a surface can be decomposed into two components [9]: a diffuse reflection and a specular one, the most surfaces being characterized by a combination of this two reflection types. For diffuse reflection, light is reflected isotropically, i.e. with an incidence independent intensity, as defined by the Lambert's cosine law. The specular reflection is the mirror-light reflection of light from a surface. Then its intensity depends on the incidence angle and on the location of the observer. Torrance and Sparrow [10] considered the illuminated surface is composed of numerous small mirror-like facets. The scattering of microfacets is defined by the Beckmann distribution [11], depending on the root mean square slope, which is defined as the surface roughness [12].
We then propose a theoretical model established on the intensity-incidence analyses of a wide variety of coastal natural surfaces covered by our LiDAR acquisitions.

* emilie.poullain@unicaen.fr

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Capacitance Enhancement in $LaNiO_3$ - based Strongly Correlated Electrode System

Qiran Li[(1)*]

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

In order to miniaturize the passive devices such as capacitor, the geometric capacitance has to be enhanced. Nowadays, most of the efforts dedicated to this development for enhancing the capacitance are attached to the manipulation of the dielectric layer and the structure of the device. Nevertheless, another promising solution on the subject is to exploit the electrodes. It was shown theoretically that capacitance can be enhanced above the geometric capacitance by a careful choice of the electrode material and ultra-thin dielectric layer [1]. The most promising candidates are materials with a 2D electron gas or strong electron-electron correlation. A 40% of capacitance enhancement by using the 2D electron gas in the interface of $LaAlO_3/SrTiO_3$ has been shown by recent experimental studies [2].

We will present the results on strong correlated electrodes: $LaAlO_3/SrTiO_3$ system prepared by Pulsed Laser Deposition (PLD) under optimum deposition conditions. Multilayer samples with various structural designs have been processed and investigated on their structural and electrical properties. Results from the X Ray Diffraction (XRD) and X Ray Reflectivity (XRR) indicate a good thin film growth quality. We observed that the ultrathin films of $LaNiO_3$ as the electrode undergo a transition from metallic to semiconducting behaviour abcribed to weak localization. The strong electron-electron correlation has been proved by temperature dependence measurements with varied magnetic field. These samples yielded interesting results on the capacitance values beyond the geometric capacitance and low leakage current given by the impedance spectroscopy. A careful analysis of this study enables us to explore the further applications of this system with comparaison to other alternative systems.

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*qiran.li@ensicaen.fr

Toward a quantification of long-term evolution coastal landscapes? Drainage developed on marine terraces sequences on the north Cotentin peninsula (France)

Maëlle Nexer[(1)]*, Kevin Pedoja, Bernard Delcaillau

[(1)] *Laboratoire de Morphodynamique Continentale et Côtière (M2C) - UMR 6143 CNRS-Université de Caen Basse-Normandie - 24 rue des Tilleuls - 14000 Caen, France*

Sequences of Plio-Quaternary shorelines generated by sea-level cyclicity and tectonics massively shape the coasts worldwide. Except in desert area they are covered by aerial drainage. Surprisingly, we know of few studies dealing with both geomorphic features. In our point of view, we can quantify the evolution of drainage on these area newly won on the sea and this can be a major result in academic research.

North Cotentin is a key sites for the study of quaternary paleo-shoreline. The coastal landscapes in this area were shaped on Paleozoic and Precambrien rocks during the Plio-Pleistocene with the alternation of interglacial and glacial stage. During interglacial stages, the zone is characterized by the formation of high shore-platform (future marine terrace). During glacial stages cold climates (periglacial) lead to the deposition of head (solifluction cast composed by heterometric blocks in a clayey matrix) and Loess sequences, overlapping wave cut platforms and marine terrace. Glacial are marked by important incision due to the base-level retreat.

We made field work (geophysics, dGPS) and, satellite images and MNTs (10m, 30m) analyses to do morphometry (SLI, Ks, asymmetry, hypsometry, drainage area, length profile, sinuosity, incision).

Our preliminary results allowed us to bettering map the lower sequences of four marine terraces which are correlated to the MIS 5e to the MIS 11. This sequence of marine terrace is overlooked by an upper sequence of rasa. The paleo-shoreline of the rasa sequence, delimit what could be an archipelago. The preliminary study of the longitudinal profile of 10 rivers which are developed on sequences of marine terrace shows knickpoints. They are possibly related to the evolution of the base level.

Our study is exploratory but could be applied to any coast where Plio-Quaternary sequences and aerial drainage are both present.

*maelle.nexer@unicaen.fr

IR to visible energy conversion in Er^{3+} doped chalcogenide fibers for CO_2 detection

Anne-Laure Pelé[(1)]*, Jean-Louis Doualan[(1)], Alain Braud[(1)], Virginie Nazabal[(2)], Richard Moncorgé[(1)], Patrice Camy[(1)]

[(1)] *Centre de recherche sur les ions, les matériaux et la photonique (CIMAP) - CNRS : UMR6252, Université de Caen Basse-Normandie, ENSICAEN, CEA - Bd H. Becquerel BP 5133 14070 Caen - France*
[(2)] *INSTITUT DES SCIENCES CHIMIQUES DE RENNES (ISCR) - Université de Rennes I - Campus de Beaulieu - Bât. 10 Avenue du Général Leclerc 35042 Rennes, France*

CO_2 detection can effectively be done around 4.3 μm. Er^{3+} doped chalcogenide fibers are used to convert a 4.3 μm optical signal into an 800 nm radiation with the aim of developing an all-optical infrared gas sensor with a detection in the visible. To realize this energy conversion, a pump signal at 980 nm excites Er^{3+} ions into the 4I11/2 level. The probe IR signal at 4.3 μm allows the transition of excited Er^{3+} ions into the 4I9/2 level by excited state absorption. Then, a 800 nm signal from the 4I9/2 level is resulted.

* anne-laure.pele@ensicaen.fr

High-precision branching-ratio measurement for the superallowed Fermi β^+ emitter ^{18}Ne

Haifa Bouzomita[(1)]*

[(1)] *Grand Accélérateur National d'Ions Lourds (GANIL) - IN2P3, CNRS : UPR3266, CEA - Bvd Henri Becquerel - BP 55027 - 14076 CAEN - France*

Through obseravation of the spectra of β-delayed γ-rays, the branching ratio of the superllowed Fermi transition has be determined to be (7.70(21)%) ± 2.7% precision. In this work we will determine this branching ratio for at the level of 0.2%, and significantly improve the precision on the half-life to 0.03% to establish the ^{18}Ne ft value at a comparable level of precision to the 13 wellknown cases. This result will assess the relative accuracy of the ISB shell-structure enhancement near the N = 8 shell closure and provide important information on the validity and accuracy of recent ISB calculations.

*bouzomita@ganil.fr

Datation d'Images pour la Recherche Temporelle d'Information

Paul Martin[(1)]*

[(1)] *Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen (GREYC) - ENSICAEN, Université de Caen Basse-Normandie, CNRS : UMR6072 - Boulevard du Maréchal Juin - 14050 Caen - France*

Ce poster s'inscrit dans le contexte de la recherche temporelle d'information qui est une thématique en plein essor depuis ces cinq dernières années. La temporalité peut être vue comme un axe de diversification permettant de raffiner les résultats des requêtes formulées par les utilisateurs. Nous présentons dans ce poster une étude sur la datation automatique de photographies pour la recherche temporelle d'images de la Toile. Ce processus de datation impose de nombreuses considérations à la fois théoriques et techniques caractérisant cette tâche particulière. Nous essayons ici de résumer quelles sont les difficultés et les problématiques associées à ce sujet, avant de chercher à désamorcer les problèmes soulevés en proposant des solutions et des pistes de travail futures.

* paul.martin@unicaen.fr

Study of astrophysical explosion called Nova. Measurement of the nuclear structure properties of ^{19}Ne

Florent Boulay[(1)*]

[(1)] *Grand Accélérateur National d'Ions Lourds (GANIL) - IN2P3, CNRS : UPR3266, CEA - Bvd Henri Becquerel - BP 55027 - 14076 CAEN - France*

Classical novae occur in close binary star systems consisting of white dwarf accreting matter from its companion, main sequence or red giant star. The accreting material provides fuel and the conditions necessary to initiate a thermonuclear explosion on the White Dwarf surface, leading to the synthesis of some heavier types of nuclei and the ejection of material into space.

Among else, novae produce radioactive isotopes, such as ^{18}F, that could be detected by their gamma-ray emission (one of the scientific objective of the INTEGRAL satellite) . Why do we focus on ^{18}F? Because the annihilation of positrons generated by its β^+ decay is the dominant source of gamma rays during the first hours of a nova explosion. So, The knowledge of the abundance of the ^{18}F in novae is essential because its gamma rays (=511 keV) are one of the observables, which give insight into nuclear processes of novae.

Depending on the temperature, the β^+ decay and two nuclear reactions are in competition for the destruction of ^{18}F : ^{18}F(p,α)^{15}O and ^{18}F(p,γ)^{19}Ne. Unfortunately, present radioactive beams intensities are not sufficient for a direct measurement of those reactions. Nevertheless, these two reactions rates strongly depend on the structure of ^{19}Ne. In particular, the energies, spins, and decay widths of important ^{19}Ne resonances must be determined in order to reduce their uncertainty. Today, only a few intrinsic properties of states have been measured yet experimentally in the excitation energy range of astrophysical interest (commonly called the Gamow window).

Based on the success of the experiment performed at Louvain-La-Neuve (Belgium) in the past, we will realize soon at GANIL a new and accurate spectroscopy of ^{19}Ne inside the Gamow window via an improved p,p' inelastic scattering reaction. The experimental setup combines an annular silicon detector and the magnetic spectrometer VAMOS. The latter will be used for the first time to detect protons at zero degree, on the spectrograph mode, thus it will be required to configurate it.

This poster will present the topic, the motivations and the present status of experiment preparation.

*boulay@ganil.fr

Eu and Tb codoped zinc oxide thin films for optoelectronic applications

Chrisitan Davesnne[(1)*]

[(1)] *Centre de recherche sur les ions, les matériaux et la photonique (CIMAP) - CNRS : UMR6252, Université de Caen Basse-Normandie, ENSICAEN, CEA - Bd H. Becquerel BP 5133 14070 Caen - France*

Zinc oxide (ZnO) is a II-VI semiconductor material. It has remarkable electronic and optical properties and it is cheap and non toxic for environment. ZnO can be doped by different rare earth elements in order to obtain a given light emission in the visible spectral region. The green light is emitted by terbium ion (Tb^{3+}) and the red emission is achievable by europium ions (Eu^{3+}). The contributions of these two rare earth emissions in addition to that of ZnO lead to white light. The possible application for this material is a new generation of white light emitting diodes. In the present study, rare earths (Eu/Tb) codoped ZnO (Eu,Tb:ZnO) thin films were grown by radiofrequency (RF) magnetron sputtering using a pure ZnO target. Doping is obtained by arranging calibrated Eu and Tb oxides (Eu_2O_3/Tb_4O_7) pellets on the surface of the ZnO target. Depositions were performed at substrate temperatures ranging from 100°C and 400°C on (100) silicon substrates, using different RF powers. Thin films were characterized by several techniques such EDX for their chemical properties, TEM and XRD for their structural properties, spectroscopic ellipsometry and photoluminescence (PL) for their optical properties and by I(V) measurements for their electrical properties. We demonstrate an enhancement of the PL properties upon annealing treatments. This feature is explained by an energy transfer mechanism from Tb towards Eu ions. At last, a PL model of Eu,Tb:ZnO thin films is proposed.

* kurisuchan@hotmail.fr

Playing with electrical resistivity: coupling doping and texturing methods to improve thermoelectric properties of n-type $Bi_2(Te_{1-x}Se_x)_3$

Quentin Lognoné[(1)*], Franck Gascoin[(1)]

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Though bismuth telluride is now studied for more than 50 years, this material still continues to keep researchers' attention thanks to its good thermoelectric properties around room temperature. Different techniques have been separately used to improve the transport properties by adjusting the Se content, texturing the material or adding some dopants.

In this work, n-Bi_2Te_3 is doped with different transition metals in order to change the carrier concentration. Indeed, a decrease of carrier concentration is observed, causing a large increase of the Seebeck coefficient. Consequently, the electrical resistivity increases as well in a first time, but can be then reduced by a texturing process (two consecutives hot pressing). We use here the Wiedemann Franz law to show that it is worth to have a higher resistivity at the beginning of the process - which can seem contradictory in a first approach to improve ZT factor - to take the full advantage of the anisotropy of the material. Thus, the rise of thermal conductivity between the two steps of pressing is limited by a weak rise of the electronic component, while keeping a large Seebeck coefficient, leading to an interesting way of improving ZT.

Transport properties are measured from 293 to 473 K in both directions *e.g.* perpendicularly and parallel to the direction of pressing, before and after the texturing process. SEM observations are carried out to link the evolution of the properties with the evolution of the microstructure and TEM investigations are undertaken in order to understand how the dopants interact with the matrice.

*quentin.lognone@ensicaen.fr

What limiting temperature can support nuclei before "exploding"?

Elodie Legouée[(1)]*

[(1)] *Laboratoire de Physique Corpusculaire de Caen (LPCC) - Université de Caen Basse-Normandie, IN2P3, CNRS : UMR6534, ENSICAEN - 6, boulevard du Marechal Juin 14050 Caen Cedex - France*

During nuclear reactions, an important transfer of energy takes place between the projectile and the target. During this process, a part of the initial mechanical energy is stored in the form of thermal energy in the nuclei.

To follow the behavior evolution of nuclei when this stored energy increases, we realized excitation energy measurements, using a new calorimetric method, said 3D, aiming to be optimal. This study continued by measures of temperature. All theses works allowed to determine for what temperature and what excitation energy by nucleon, nuclei seem to change from a hot nuclear liquid state, to a nuclear gas state.

* legouee@lpccaen.in2p3.fr

Elaboration and characterization of thermoelectric composites

Thibault Parein[(1)]*, Loïc Le Pluart[(1)], Richard Retoux[(1)], Franck Gascoin[(1)]

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Although thermoelectric materials properties are becoming more and more attractive nowadays, they still have drawbacks. They are usually expensive, relatively heavy and their forming is often difficult. Incorporating thermoelectric fillers into an insulating matrix would be a solution to these problems.

The aim of this work is to elaborate Polyethylene/Bismuth Telluride composites and to determine their electrical properties.
Bismuth Telluride has been used as fillers since it is the best current thermoelectric material around room temperature. To improve its properties, this material has been doped with Selenium. Its stoichiometry is $Bi_2Te_{2.4}Se_{0.6}$. The fillers have been synthesized by mechanical alloying. The polymer matrix used is Polyethylene because of its low cost and its easy forming. A micro-extrusion/injection process has been used to elaborate the composites.
An electrical characterization has been led using a megohmmeter in order to study the evolution of the composites conductivity with the filler loading.

*thibault.parein@ensicaen.fr

Beam tracking with micromegas and wire chambers in secondary electron detection configuration

Marija Vostinar[(1)]*, Begona Fernandez[(2)]

[(1)] *Grand Accélérateur National d'Ions Lourds (GANIL) - IN2P3, CNRS : UPR3266, CEA - Bvd Henri Becquerel - BP 55027 - 14076 CAEN - France* [(2)] *University of Sevilla - Calle San Fernando, 4, 41004 Sevilla, Spain*

S^3 (Super Separator Spectrometer) is a device designed for experiments with the very high intensity stable beams of LINAC, the superconducting linear accelerator of GANIL, which will be built in the framework of SPIRAL2. The aim of this project is to open new opportunities in several physics domains like: very-heavy, and super-heavy nuclei, spectroscopy at and beyond the drip line, isomers and ground state properties, multi-nucleon transfer and deep inelastic reactions.

For nuclei identification purposes at the focal plane of S^3it is necessary to reconstruct their trajectories. Considering that classical tracking detectors in beam would generate a lot of angular and energy straggling, due to their thickness, it was decided that SeD (Secondary electron Detector) system will be used. It consists from a thin emissive foil in beam with a low pressure gaseous detector off-beam to detect the secondary electrons ejected from the foil.

Since 2008, several low pressure gaseous detectors (wire chambers and micromegas) were constructed and tested. Results obtained in the tests with the small prototype detectors convinced us that building a real size 2D prototype wire chamber and a small prototype bulk 2D micromegas is a right decision. Different tests for spatial and time characterization of the new prototype detectors were preformed. The obtained results, among which the results from the first spatial characterization of the micromegas, will be presented.

* vostinar@ganil.fr

Optimisation du dépôt de Ca_2MnO_4 sur des substrats de Sr_2TiO_4 polycristallins

Morgane Lacotte[(1)]*, Adrian David[(1)], Dhanapal Pravarthana[(1)], Wilfrid Prellier[(1)]

[(1)] *Laboratoire de cristallographie et sciences des matériaux (CRISMAT) - UMR 6508 CNRS-ENSICAEN-Université de Caen - 6 Boulevard Maréchal JUIN, 14050 Caen, France*

Un film mince est une fine pellicule, de quelques nanomètres à quelques micromètres d'épaisseur, d'un matériau déposé sur un autre matériau, que l'on appelle substrat. L'intérêt est d'utiliser les propriétés structurales du substrat pour influencer, voire imposer, la croissance du matériau déposé.
Pour notre étude, nous avons développé une approche originale, en utilisant un substrat polycristallin que nous avons synthétisé par la technique du Spark Plasma Sintering : Sr_2TiO_4. C'est le premier terme de la série de Ruddlesden-Popper $Sr_{n+1}Ti_nO_{3n+1}$, de structure dérivée de la pérovskite, connue pour ses propriétés électroniques particulières. La structure de Sr_2TiO_4 est donc proche de celle de $SrTiO_3$, mais il est encore peu utilisé comme substrat.
Parmi les structures proches de Sr_2TiO_4, nous avons choisi de déposer des films minces de Ca_2MnO_4 par ablation laser pulsé. L'enjeu était donc d'optimiser le dépôt de Ca_2MnO_4afin d'obtenir un film polycristallin avec un très bon état de surface, en faisant notamment varier les températures et les pressions utilisées lors des dépôts.
Un suivi par Diffraction des Electrons Rétrodiffusés (EBSD), à la fois du substrat mais aussi des différents films, nous a permis de juger de la bonne qualité cristalline et de l'état de surface de ces matériaux, et donc de parvenir à une bonne optimisation.

*morgane.lacotte@ensicaen.fr

Optimization of EMT-type Zeolite Synthesis

Veselina Georgieva[(1)]*, Valentin Valtchev, Svetlana Mintova

[(1)] *Laboratory of catalysis and Spectroscopy (LCS), ENSICAEN, 6 Boulevard Maréchal JUIN, 14000 Caen, France*

The optimization of the crystallization process of EMT-type zeolite from organic-template-free homogeneous suspensions will be presented. The formation of uniform suspensions utilizing sodium aluminate, sodium silicate and sodium hydroxide under controlled mixing is found to be of primary importance to control the nucleation and growth process of EMT type crystals. The zeolite intermediates have been investigated and the results reveal the formation of uniform in size gel particles. The mean hydrodynamic diameter of the ultimate EMT crystallites corresponds to the size of the amorphous particles formed after preparation of the clear precursor suspension.

The emphasis of this work is on the formation of EMT zeolites with diverse chemical compositions and particle sizes. Changes in the initial precursors and in the utilization of nucleation suppressing agents lead to the formation of EMT with bigger particle size. Together with the increase of zeolite crystals size undesired crystalline phases (SOD, GIS) appeared. Thus, it is of critical importance to control the nucleation kinetics in order to obtain the desire EMT type material as pure crystalline phase.

The careful control of gel chemistry combined with slow nucleation kinetics at low temperature provides access to nanoscale zeolites while avoiding the use of expensive organic templates. The role of each parameter influencing the nucleation process and the physicochemical properties of ultimate zeolite material will be discussed.

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* vgeorgieva@ensicaen.fr

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List of Participants

LASTNAME	FIRSTNAME	Laboratory	MAIL
Aboudagga	Karima	ALQUDS OPEN UNIVERSITY OF PALESTINE	kam_melzi@yahoo.fr
Achouri	Lynda	LPC Caen	achouri@lpccaen.in2p3.fr
Ali Ahmad	Hacan	LCS	hacan.ali-ahmad@ensicaen.fr
Anne-Ribot	Michèle	SIMEM	michele.anne-ribot@unicaen.fr
Awala	Hussein	LCS	hussein.awala@ensicaen.fr
Aymard	François	LPCCAEN	aymard@lpccaen.in2p3.fr
Bacquey	Nicolas	GREYC	nicolas.bacquey@unicaen.fr
Bauchere	Hugues	LMNO	hugues.bauchere@unicaen.fr
Berrichon	Damien	LUSAC	damienberrichon@orange.Fr
Boissonnat	Guillaume	LPCCAEN	boissonnat@lpccaen.in2p3.fr
Bonte	Yoann	M2C	yoann.bonte@unicaen.fr
Boulay	Florent	GANIL	boulay@ganil.fr
Bours	Patrick	NISLAB	patrick.bours@hig.no
Bouzomita	Haifa	GANIL	bouzomita@ganil.fr
Chen	Jianjun	LCS	chenjianjun2002@gmail.com
Cherrier	Estelle	GREYC	estelle.cherrier@ensicaen.fr
Copie	Olivier	CRISMAT	olivier.copie@ensicaen.fr
Couratin	Claire	LPCCAEN	couratin@lpccaen.in2p3.fr
Davesnne	Christian	CIMAP	kurisuchan@hotmail.fr
David	Adrian	CRISMAT	adrian.david@ensicaen.fr
Delaunay	Rudy	CIMAP	rudy.delaunay@gmail.com
Dellicour	Aline	CRISMAT	aline.dellicour@ensicaen.fr
Demeslay	Florent	LMNO	florent.demeslay@unicaen.fr
Dupont	Emilie	CRISMAT	emilie.dupont@ensicaen.fr
Durand	Dominique	LPC Caen	durand@lpccaen.in2p3.fr
El Siblani	Hussein	LCS	hussein.elsiblani@ensicaen.fr
Fabian	Xavier	LPCCAEN	fabian@lpccaen.in2p3.fr
Fafin	Alexandre	CIMAP	alexandre.fafin@ensicaen.fr
Flechard	Xavier	LPCCAEN	flechard@lpccaen.in2p3.fr
Fossez	Kévin	GANIL	fossez@ganil.fr
Galmiche	Marion	CRISMAT	marion.galmiche@ensicaen.fr
Georgieva	Veselina	LCS	vgeorgieva@ensicaen.fr

LASTNAME	FIRSTNAME	Laboratory	MAIL
Gleitz	Anne-Sophie	LMNO	anneso.gleitz@gmail.com
Gokelaere	Ingrid	UCBN	ingrid.gokelaere@unicaen.fr
Grenier	Pierre-Anthony	GREYC	pierre-anthony.grenier@ensicaen.fr
Gueydan	Antoine	CRISMAT	antoine.gueydan@ensicaen.fr
Haumont	Raphaël	Univ Paris-Sud XI	aphael.haumont@u-psud.fr
Haw	Kok-Giap	LCS	kghaw@hotmail.com
Henares	Jose	GANIL	henares@ganil.fr
Hervas	Isabel	CRISMAT	isabel.hervas@ensicaen.fr
Jamet	Guillaume	M2C	guillaume.jamet@unicaen.fr
Jolly	Germain	GREYC	germain.jolly@ensicaen.fr
Jurie	Frederic	GREYC	frederic.jurie@unicaen.fr
Kadam	Shashikant	LCS	shashikant.kadam@ensicaen.fr
Kerisit	Francois	CRISMAT	f.kerisit@gmail.com
Lacotte	Morgane	CRISMAT	morgane.lacotte@ensicaen.fr
Langlinay	Thomas	CIMAP	langlinay@ganil.fr
Leclerc	Willy	LMNO	willy.leclerc@unicaen.fr
Legouée	Elodie	LPCCAEN	legouee@lpccaen.in2p3.fr
Lepailleur	Alexandre	GANIL	lepalleur@ganil.fr
Li	Qiran	CRISMAT	qiran.li@ensicaen.fr
Lognone	Quentin	CRISMAT	quentin.lognone@ensicaen.fr
Lozes	François	GREYC	francois.lozes@unicaen.fr
Maclot	Sylvain	CIMAP	maclot@ganil.fr
Martin	Paul	GREYC	paul.martin@unicaen.fr
Mauge	Françoise	ENSICAEN	jedsimem2013@gmail.com
More-Chevalier	Joris	CRISMAT	joris.more-chevalier@ensicaen.fr
Mouillard	Gwladys	CRISMAT	gwladys.mouillard@ensicaen.fr
Mutelet	Brice	CRISMAT	brice.mutelet@ensicaen.fr
Navarro	Fabien	LMNO & GREYC	fabien.navarro@unicaen.fr
Nexer	Maëlle	M2C	maelle.nexer@unicaen.fr
Oliviero	Laetitia	LCS	laetitia.oliviero@ensiacen.fr
Palcic	Ana	LCS	ana.palcic@ensicaen.fr
Parein	Thibault	LCMT/CRISMAT	thibault.parein@ensicaen.fr

LASTNAME	FIRSTNAME	Laboratory	MAIL
Pelé	Anne-Laure	CIMAP	anne-laure.pele@ensicaen.fr
Perez	Olivier	CRISMAT	olivier.perez@ensicaen.fr
Perries	Stéphane	UCBL	s.perries@ipnl.in2p3.fr
Pham	Nhàn	LCMT	nhan.pham@ensicaen.fr
Porquet	Christine	GREYC	christine.porquet@ensicaen.fr
Poullain	Emilie	M2C	emilie.poullain@unicaen.fr
Prellier	Wilfrid	CRISMAT	wilfrid.prellier@ensicaen.fr
Roblin	Matthieu	CIMAP	matthieu.roblin@ensicaen.fr
Rotella	Hélène	CRISMAT	helene.rotella@ensicaen.fr
Rueff	Jean-Michel	CRISMAT	jean-michel.rueff@ensicaen.fr
Sall	Mamour	CIMAP	mamour.sall@gmail.com
Sauvageot	Elodie	LCMT	elodie.sauvageot@ensicaen.fr
Scamps	Guillaume	GANIL	scamps@ganil.fr
Sénoville	Matthieu	LPCCAEN	senoville@lpccaen.in2p3.fr
Soro	Sandrine	SIMEM	sandrine.soro@ensicaen,fr
Starecki	Florent	CIMAP	florent.starecki@ensicaen.fr
Syed Idrus	Syed Zulkarnain	GREYC	syed-zulkarnain.syed-idrus@ensicaen.fr
Toloshniak	Tetiana	LUSAC	toloshnyak@list.ru
Vallée	Thibaut	GREYC	thibaut.vallee@unicaen.fr
Van Thinh	Nguyen	LUSAC	van-thinh.nguyen@unicaen.fr
Ventura	Aude	CIMAP	aude.ventura@yahoo.fr
Vostinar	Marija	GANIL	vostinar@ganil.fr
Yao	Zhigang	GREYC	zhigang.yao@ensicaen.fr

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MONDAY, 24 JUNE PROGRAM

8h30-9h15	Participants subscription – Welcome coffee
9h15-9h30	Opening speech by Frédéric Jurie, SIMEM director
9h30-10h30	**Student talks, Session 1 - Chairman : Sylvain Maclot**
9h30	*"Status of the SPIRAL1 upgrade at GANIL"*, C. COURATIN (LPC)
9h50	*"Near-field optical imaging of Plasmonic Waveguides"*, M. ROBLIN (CIMAP)
10h10	"*Experimental study of congestion speed limits for an air cooled condense"*, D. BERRICHON (LUSAC)
10h30-11h00	Coffee break – Poster session 1
11h00-12h30	**Raphaël Haumont,** lecturer at Université Paris-Sud XI
	« Innovation in molecular gastronomy »
12h30-14h00	Lunch at Café Mancel
14h00-15h30	**Stéphane Perries,** lecturer at Université Claude Bernard Lyon I and ENS Lyon
	« Search for the Higgs Boson : the quest of the origin of the mass »
15h30-16h00	Coffee break – Poster session 2
16h00-17h45	**Challenge « Your thesis in 180 seconds » - Chairman : Xavier Fabian**
17h45-19h00	Jury deliberation
	Caen Fine Arts Museum visit
19h00-19h30	180 seconds challenge awards
19h30	Dinner at Café Mancel

TUESDAY, 25 JUNE PROGRAM

9h00-9h30	Participants subscription
	Welcome coffee
9h30-10h30	**Student talks, Session 2 – Chairman : Germain Jolly**
9h30	*"Thermally induced conversion of zeolite polymorphism"*, H. AWALA (LCS)
9h50	*"An equation of State for sub-saturation matter of Core Colla pse Supernovae, proto-Neutron Stars and Neutron Stars"*, F. AYMARD (LPC)
10h10	*"On a numerical approach for better understanding the mechanical response of random composites"*, W. LECLERC (LMNO)
10h30-11h00	Coffee break - Posters session 3
11h00-12h30	**Patrick Bours,** associate professor at Gjøvik university, Norway
	«Continuous Authentication using Behavioural Biometrics»
12h30-14h00	Lunch at Café Mancel
14h00-15h30	**Student talks, Session 3 - Chairman : Aline Dellicour**
14h00	*"Beam monitoring in Hadrontherapy"*, G. BOISSONNAT (LPC)
14h20	*"Waveguide lasers of LiYF4:Tm ans LiYF4:Yb"*, F. STARECKI (CIMAP)
14h40	*"Point clouds treatment with graphs"*, F. LOZES (GREYC)
15h00	*"Monomolecular cracking rates of light alkanes over H-MFI zeolites determined by IR operando spectroscopy"*, S. KADAM (LCS)
15h30-16h00	Coffee break - Posters session 4
16h00-16h30	Relais d'Sciences and club Agile talks
16h30-18h30	Relais d'Sciences and Club Agile workshops
	Lego4Scrum, 3D printer, FabLab, Billotron
18h30-19h30	Awards ceremony
	JED SIMEM 2013 closing cocktail