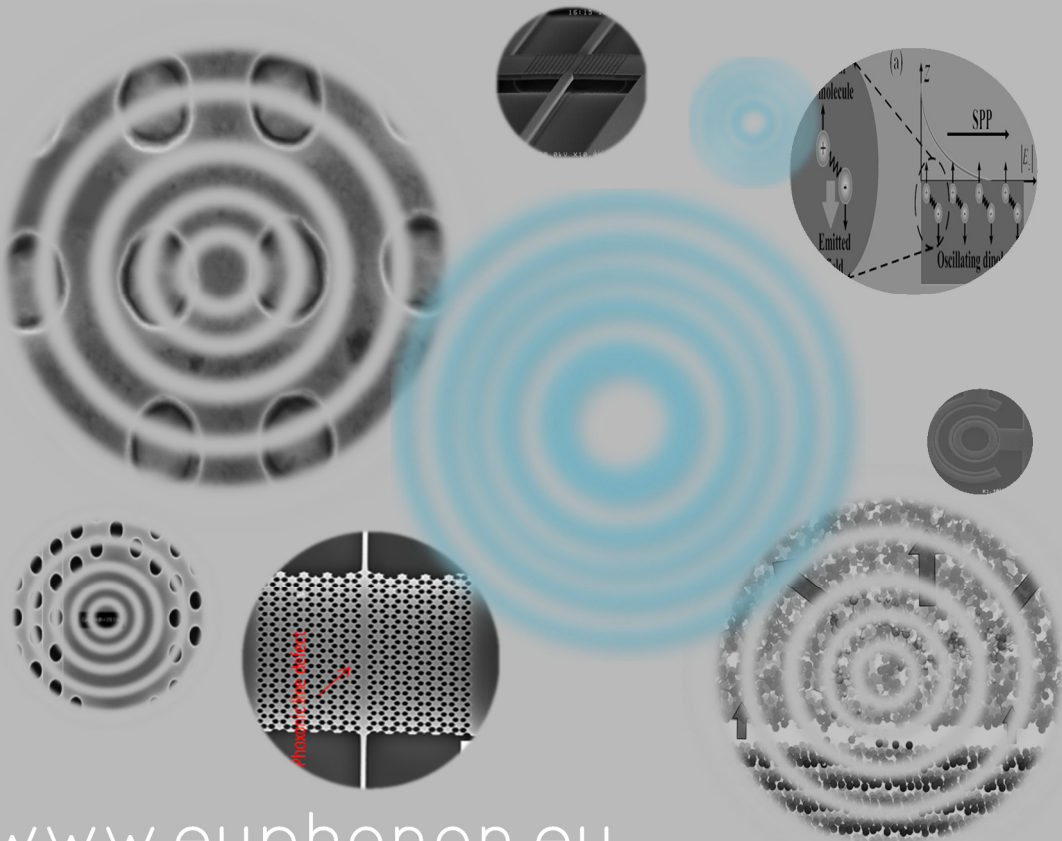


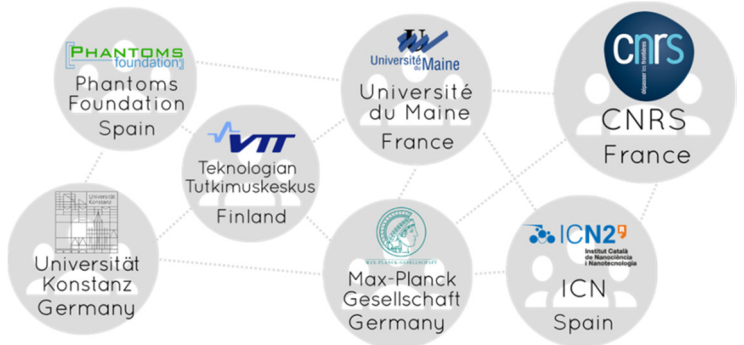
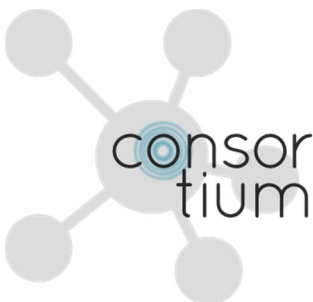
Funded by

EUPHONON

Building a European NanoPhononics Community



www.euphonon.eu



The mission of EUPHONON, an EU-funded Coordination Action, is to gather communities working on (nano)phononics in Europe, identify the main research challenges impacting ICT and related sectors to advance our understanding and to explore the possible applications areas.



EUPHONON

Building a European NanoPhononics Community

EC
contribution

400.000 euros

No. of
partners

7

Coordinator

ECP-CNRS (France) / Prof. Sebastian Voltz

Running
time

Nov. 01, 2013 - Oct. 31, 2014



Symposium "Phonons & Fluctuations in low dimensional structures" (Lille, France)



EUPHONON Workshop
(Le Mans, France)



nanoICT Position Paper on
Nanophotonics and Nanophononics
www.phantomsnet.net/nanoICT/SRA



- N. Li et al. - Reviews of Modern Physics, 2012 – APS
- D. G. Cahill et al. - Applied Physics Reviews vol 1, 011305 (2014)
- E. Popo - Nano Research, Volume 3, Issue 3, pp 147-169 (2010)
- J. Cuffe et al. - Nano Letters 12 (7) 3569-3573 (2012)
- S. Voltz (ed.) - vol. 107, Topics in Applied Physics, Springer 2010



www.euphonon.eu/Reg

Project Summary

The aim of the EUPHONON project is to amalgamate the existing and future activities on phonon science and technology in Europe to establish a strong community in this emerging research field. The impact of EUPHONON will extend from academia to ICT-related industry by providing means for thermal management, optimisation of data handling and, in longer term, new methods for material characterisation and new paradigms for information processing. EUPHONON will set the definition for the phononics science and manifest the crucial goals in solid state physics, nanoelectronics and in bioscience in which the role of phonons has been overlooked. EUPHONON will create intimate collaboration between the various research fields, including theory, modelling, computation, information technologies and experimental science. A position paper on the importance and role of phonons will be one of the main outcomes of the project together with a research agenda, which could become the basis to guide, advance and prioritise the foci of the research resources in this field.

EUPHONON Objectives:

Nanophononics community building (mapping and benchmarking):

- To build and consolidate the emerging ICT-Nanophononics community
- To make the new European Nanophononics research community visible and prominent at both European and world scale
- To map research at European level and allow the identification of drivers/measures to assess research in ICT devices

- To network involving existing nanophononics national, regional or international activities/programs to exploit synergies, maximize impact and contribute to the definition of international cooperation strategies and/or the development of research collaborations

European Nanophononics Research Agenda:

- To define the scope of nanophononics, its tools, possible applications for ICT
- To document the findings and outcome of discussions in one position paper on definitions, tools, impact and applications
- To provide a Research Agenda to accelerate progress in identified R&D directions and priorities for ICT-Nanophononics-related FET program within Horizon 2020. This activity aims at guiding public research institutions and also at providing a valid source of guidance for Phononics and ICT industry (road mapping)

Dissemination of knowledge and outreach:

- To promote European research in ICT-Nanophononics related areas
- To disseminate knowledge and results

Project Main Goals

As a first step, a **Mapping of the NanoPhononics community**, in this emerging area will be created. This database will allow a comparison of the scope and strength of the European community vis-à-vis those in other continents. The research coverage will be an element of the Research Agenda.

The consortium will organise a **Nanophononic Workshop** to present

the draft Research Agenda and obtain the feedback from the active researchers in nanophononics. It will allow extended discussions among researchers from the gathered communities to foster cooperation between them. The special emphasis of this workshop will be to refine Definition and Tools, following the release of the corresponding position paper and working documents on Applications and potential Roadmap.

A **NanoPhononics Day** will be organised to spread the content of the initiative through Europe as an opportunity to increase awareness among the specialist communities in ICT as a whole.

In order to promote close collaborations with other international communities involved in activities related to phononics and to enhance the profile of FET at international level, a list of internationally renowned scientists in the field, including non-EU experts will be invited to join in the Research Agenda discussion. Scientists from academic research and industry will be invited to identify a selection of topics of interest and elaborate position papers.

[EUROPHONON position paper on Nanophononics to be released:](#)

The Definition of Nanophononics in the context of ICT and specially future ICT will be refined by: surveying existing European related research communities, nanophononics related fields and key people, finding out the public and private R&D investments in Europe in nanophononics, refining considerations on ethical and societal impact, with possible public awareness and in consultation with learned societies, professional organisations.

The section on Nanophononic Tools will be prepared by: assessing progress so

far in physical concepts, modelling and experimental methods, identifying the needs in tools, surveying publicly available computer codes to compute phonon properties of materials and phonon transport at an atomistic level (a key task will be to identify gaps in the landscape of software for nanophononics), monitoring novel conceptual approaches representing radical departures from the mainstream.

The section on Applications and Impact of Nanophononics will be prepared by: establishing the state of the art in technological achievements and scientific concepts with current hidden impact and prospective impact in ICT, carrying out a comparative analysis with the state of the art in the USA and Far East (strengths, weaknesses, opportunities, funding, etc.) with respect to applications.

[Nanophononics Research Agenda:](#)

Based on the findings of the Nanophononics Day and the Nanophononics Workshop, a Research Agenda will be prepared. It will contain statements emphasizing key scientific concepts and technological challenges to be developed under Horizon 2020 to keep Europe at the forefront in this emerging field of research and anticipate next ICT paradigms.

[Draft Nanophononics Road Map:](#)

A Draft Nanophononics Roadmap will be prepared with a timeline and connections among topics. Considerations will be taken from the project findings and other major roadmaps.

[Dissemination of knowledge and outreach:](#)

A crucial activity of the project will consist of developing and maintaining a website

aimed at widely disseminating results, thus spreading excellence in order to promote European research in ICT-Nanophononics related areas and enhance collaboration among partners.

Euphonon Partners



CNRS: The Laboratoire d'Énergétique Moléculaire et Macroscopique, Combustion, (UPR CNRS 288) involves world leading teams in the fields of Combustion and Transport Physics. Among those latter teams, the Thermal NanoSciences group headed by Sebastian Volz has developed a long-term expertise in the field of Nanoscale Heat Transfer in terms of physical computational modelling at macro-to-nanoscales. This covers phonon heat conduction in nanostructures and nanomaterials as well as near field radiation. In parallel, this group also proposed new nanoscale thermal metrologies based on Scanning Thermal Microscopy. More recently, thermoelectric and thermal interface materials are under focus.

Sebastian Volz

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www.em2c.ecp.fr



ICN2: The Catalan Institute of Nanotechnology (ICN2) is a research centre of the Generalitat de Catalunya. ICN2 has about 90 researchers. The 15- strong Photonic and Phononic Nanostructures (P2N) group is led by Prof. Clivia M.Sotomayor Torres and works on nanophononics (phonon confinement, nanoscale heat transport and phononic crystals in semiconductor, organic and oxide nanostructures). The group is constantly

developing novel approaches and methods for nano-scale device-relevant research. It has pioneered research in nanofabrication (nanoimprint lithography, self-assembly and others) to realise 3D nanostructures.

Clivia M.Sotomayor

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VTT: VTT Microsystems and Nanoelectronics is part of the VTT Technical Research Centre of Finland (Teknologian tutkimuskeskus VTT). The group is active in IC fabrication, MEMS, radiation detectors, thin films, RF-technologies, superconductors, nanoelectronics, nanophotonics, nanophononics and nanobioelectronics. The facilities include a 1900 square meter clean room of which 550 square meters is of class 10, equipped with 150 mm wafer processing line for BiCMOS and MEMS devices, thin film devices, nanoelectronics and micro and nanophotonics, wafer bonding, thinning and polishing processes, flipchip bonding and packaging, e-beam lithography up to 200 mm wafers, ALD, graphene CVD and nanoimprinting lithography.

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LEMANS: The Photoinduced-Dynamicsin-Condensed-Matter Group (DPMC) of the Institute of Molecules and Materials has a long-standing experience in ultrafast acoustics and optoacoustics. The scientific interests include fundamentals of laser-matter interaction and applied ultrafast acoustics aiming at controlling the photogeneration of coherent acoustic phonons by ultrafast light (photonphonon

and electron-phonon coupling physics). Acoustic nanowaves are used for directly probing the elasticity of nanostructures (studying acoustic eigenmodes of nanostructures, nanorheology, etc.). Colloids, semiconductors, nanoporous, confined liquids and correlated oxides are the systems currently under investigation.

Pascal Ruello

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<http://immm.univ-lemans.fr>



MAX-PLANCK-GESSELLSCHAFT

MPGP: The Max Planck Institute for Polymer Research (MPGP) of the Max Planck Society (MPG) is one of the world leading research centres in the field of soft matter, polymer and materials science. The Research Group for Nanostructures and Transport performs theoretical and computational research on the growth and aggregation mechanisms of nanostructures and nano-structured materials, and on their electronic and thermal transport properties. The group current focus is on assembly and thermal transport in carbon- and silicon-based nanostructures for electronic and thermoelectric applications. To this aim atomistic simulations, mostly based on molecular dynamics are performed and problem-inspired methodological development is undertaken.

Daive Donadio

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www.MPGp-mainz.mpg.de/~donadio



Uni-Konstanz: The Department of Physics of the Konstanz University is focussed on the physics of nanostructures, mesoscopic systems

and nanotransport both in theory and experiment. The Modern Optics and Photonics Group (Prof. Thomas Dekorsy) is specialized in time-resolved femtosecond spectroscopy of coherent phonon excitation processes in different material systems and their nanostructures. The Nanomechanics group (Prof. Eva Weig) focusses on cavity nano-opto- and electromechanics, the origins of dissipation in nanomechanical systems, and integrated transduction schemes.

Thomas Dekorsy

(thomas.dekorsy@uni-konstanz.de)
<http://cms.uni-konstanz.de/en/physik/dekorsy/research/>



PH: The Phantoms Foundation was established in 2002 (Madrid, Spain) in order to provide high level Management profile to scientific projects. The Phantoms Foundation focuses its activities on Nanoscience & Nanotechnology (N&N) and is a key actor in structuring and fostering European Excellence and enhancing collaborations in this field. The Phantoms Foundation plays an important role as a dissemination platform to spread excellence and increase the impact of Nanotechnology worldwide.

Antonio Correia

(antonio@phantomsnet.net)
www.phantomsnet.net

• **PhD Position**

Contribution to thermal microscopy by means of thermoelectric probe for nanostructures thermophysical characteristics quantification

Contact person: Laurent Thiery

laurent.thiery@univ-fcomte.fr

(FEMTO-ST Institute, France)

Deadline: September 13, 2014

Near-field thermal measurement tools represent a highly strategic field which exceeds by far the only problem of the imaging techniques. The measurement techniques of the temperatures and the thermal flows at short scales of space and of time are closely related to expected improvements in the field of the nanotechnologies.

• **Job Position**

Group Leader in nanotechnologies applied to food areas

Contact person: RRHH

reo@inl.int

(INL, Portugal)

Deadline: September 15, 2014

Applicants are expected to have an outstanding international research track record in one or several fields that are relevant in the current fields of research in nanotechnologies applied to food.

• **PhD Position**

Optical force & manipulation

Contact person: Manuel Nieto Vesperinas

mnieto@icmm.csic.es

(National University of Singapore, Singapore)

Deadline: September 17, 2014

• **Job Opportunities (3)**

Sales manager, marketing assistant, director of operations (PhD)

Contact person: Eurne de Pedro

d.marketing@nanoimmunotech.es

(nanoimmunotech, Spain)

Deadline: October 03, 2014

nanoimmunotech is a successful nanobiotechnology company that values your talent and offers you a professional development opportunity and an attractive work environment. nanoimmunotech is looking for a SALES MANAGER for their facilities in Zaragoza. We are looking for a driven and self-motivated person to be responsible for the growth and development of new diagnostic and commercial accounts. This position will involve contacting potential business prospects and maintaining good relationships with established customers.

• **Job Position**

Research Engineer position: Development of hybrid graphene/quantum dot photodetectors for image sensing applications

Contact Person: Frank Koppens

frank.koppens@icfo.es

(ICFO, Spain)

Deadline: December 15, 2014

ICFO – The Institute of Photonic Sciences, a centre based in Castelldefels (Barcelona, Spain), devoted to research and education of the optical and photonic sciences at the highest international level, is offering a research engineer position to a well-qualified, highly motivated and dynamic young scientist who wishes to enhance his/her scientific career in a friendly and stimulating environment.

✳ More info and other jobs available at: www.phantomsnet.net/jobs