



INTERNATIONAL CONFERENCE ON PHONONIC CRYSTALS,
METAMATERIALS & OPTOMECHANICS

First Call for Papers

You are cordially invited to **PHONONICS 2011: 1st International Conference on Phononic Crystals, Metamaterials and Optomechanics**, to be held in the renowned sea-resort city of Sharm El-Sheikh, Egypt, on May 29-June 2, 2011. PHONONICS 2011 is the first conference dedicated to analysis and manipulation of phonons (vibrations in condensed matter). Please feel free to peruse and distribute this document and be sure to visit the conference web site at <http://phononics2011.org>.

Background

The study of phonons – although a core discipline in the conventional condensed matter physics literature – is currently being viewed in a new light. Whether examined at the nanoscale, microscale or larger scales, the analysis and manipulation of phonons (aka *phononics*) is opening up a new technological frontier with a potential impact that could match that of electronics almost half a century ago. Indeed a rival field, photonics, is gathering similar momentum. Looking closely, phononics encompass a range of interconnected disciplines, usually labeled in terms of the type of host “material” that provides the medium for phononic wave propagation. These include *phononic crystals*, *phononic metamaterials*, *superlattices* and *periodic structures*. The application domains that these phononic materials are impacting, with increasing promise, range from vibration isolation in MEMS components, through frequency sensing in RF communications, to nano-scale thermal transport control in semiconductors. With the recent advent of metamaterials, exotic applications are now added to the list such as

acoustic cloaking and superlensing. The interaction of mechanical waves with their optical counterpart in a lattice, i.e., optomechanics, is opening up yet another barrage of opportunities especially in telecommunications.

The coming-of-age of these closely-related disciplines provides a converging point of historical significance for the science of phonons. Last year, an International Workshop on Phononic Crystals took place in Nice, France and was attended by around 30 experts in the field from around the world. Building on this effort, it is now timely for a larger-in-scale international forum to be established and inaugurated to unify all the emerging areas mentioned above and their respective experts under one scope. “PHONONICS 2011” – the first international conference of its kind – aims to fulfill this mission.

Organizers

Chair: Ihab El-Kady, Sandia National Laboratories / University of New Mexico (USA)

Co-Chair: Mahmoud I. Hussein, University of Colorado at Boulder (USA)

International Organizing Committee (IOC)

- Abdelkrim Khelif, Georgia Institute of Technology / CNRS (USA/France)
- Chiara Daraio, California Institute of Technology (USA)
- Jose Sanchez-Dehesa, Univ. Politecnica de Valencia (Spain)
- Massimo Ruzzene, Georgia Institute of Technology (USA)
- Peter Rakich, Sandia National Laboratories (USA)
- Roy H. Olsson III, Sandia National Laboratories (USA)
- Tsung-Tsong Wu, National Taiwan University (Taiwan)

Local Organizing Committee (LOC)

- Amal Esawi, American University in Cairo (Egypt)
- Ehab Abdel Rahman, American University in Cairo (Egypt)
- Hanadi Salem, American University in Cairo (Egypt)
- Hany Hamdy, Beni-Suef University (Egypt)
- Mohammed El-Beltagy, Cairo University (Egypt)
- Sherif Sedky, American University in Cairo (Egypt)
- Tamer Elnady, Ain Shams University (Egypt)

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- Osama R. Bilal, University of Colorado at Boulder (USA)
- Zayd C. Leseman, University of New Mexico (USA)

Scientific Advisory Board (SAB)

To be announced.

Sponsors (tentative)

The organizers acknowledge and thank the following institutions for their sponsorship:

- Sandia National Laboratories
- University of Colorado at Boulder
- University of New Mexico
- The American University in Cairo
- Ain Shams University
- Acoustical Society of Egypt
- Office of Naval Research - Global
- National Science Foundation

Important Dates

15 December, 2010:	Deadline for extended abstract submission
15 December, 2010:	Deadline for Student Fellowship application
15 January, 2011:	Notification of acceptance of extended abstract
15 February, 2011:	Deadline for early registration
29 May, 2011:	Reception and on-site registration
30 May-2 June, 2011:	Technical program
1 June, 2011:	Banquet (Bedouin night)
2 June, 2011:	A-Z Tutorial on Phononics
3-5 June, 2011:	Sinai/Sharm El-Sheikh excursion
	<i>Other excursions available:</i>
	Cairo, Alexandria, Luxor and Hurgada

Themes and Focus

The conference scientific focus will be on seven main themes underlying the various research tracks in the emerging field of phononics:

1. Phononic crystals
2. Phononic metamaterials
3. Nano-scale phonon transport
4. Wave propagation in periodic structures
5. Phononics MEMS and RF applications
6. Optomechanics
7. Fabrication and characterization for phononics

Submissions and Review

We encourage you to submit a **two-page extended abstract to the conference by December 15, 2010**. Research should be original and unpublished, and should not be under consideration for publication elsewhere. Sessions for oral and poster presentations will be available. Submissions will be through the conference web pages at

<http://phononics2011.org>. Authoring guidelines and formatting information are available on the website. Submissions will be reviewed by assigned conference track directors with expertise and authority in the field, or in rare conditions by qualified members of the organizational committees. The review evaluation criteria will be:

- Relevance to the purpose of the conference
- Significance of the submission's contribution to the field (as defined by the author)
- Soundness of theoretical framework and/or methodology (as situated in a discipline)
- Clarity of presentation
- Originality and creativity of ideas (as contextualized by the relevant literature)
- Potential for engaging conference participants
- Overall rating

Authors will be notified of **review results by January 15, 2011.**

Student Fellowships and Student Paper Competition

Limited number of fellowships to cover conference expenses is expected to be available to student participants. Details will be announced on the conference website.

The Scientific Advisory Board (SAB) will judge student papers to award best student-presented oral and poster papers. The competition will be held during the conference. Details for participation will be announced on the conference website.

Tutorial

A tutorial course on phononic crystals will be offered at the last day of the conference. The tutorial will be open to all participants and is chiefly intended for researchers and students wishing to enter the field. The tentative plan for the “A to Z Tutorial on Phononic Crystals” is as follows:

- **Part 1: Introduction to Phononic Crystals & Applications** (40 mins.) by Ihab El-Kady, Sandia National Laboratories/University of New Mexico
- **Part 2: Mathematical and Numerical Modeling** (40 mins.) by Mahmoud Hussein, University of Colorado at Boulder
- **Part 3: Design and Optimization** (25 mins.) by Mohammed El-Beltagy, Cairo University
- **Part 4: Material Selection** (25 mins.) by Hanadi Salem, American University in Cairo
- **Part 5: Fabrication** (25 mins.) by Sherif Sedky, American University in Cairo
- **Part 6: Measurement & Characterization** (25 mins.) by Tamer Elnady, Ain Shams University
- **Tutorial Closing Remarks** (5 mins.)

Venue

Sharm El-Sheikh is a city situated on the southern tip of the Sinai Peninsula, in Egypt, on the coastal strip between the Red Sea and Mount Sinai. It has a local population of approximately 35,000. It is a very popular sea-resort city attracting tourists from around the world throughout the year. It is also widely viewed as one of the world's premier ports for scuba diving.

In the past decade Sharm El-Sheikh has been known for its impressive conference-hosting capabilities. It has a newly constructed international airport that serves over 7 million passengers a year and has a major convention center. While a search for a suitable hosting site is planned, Sharm El-Sheikh Jolie Ville Maritim Resort & Casino is the most likely venue at this time.

