



**WAVE PHENOMENA AND  
PHONON THERMAL TRANSPORT**  
Scientific school  
Oléron, Atlantic Coast (France)  
September 3-8, 2017



**GDR META**  
Métamatériaux acoustiques pour l'ingénierie

**Quantum Heat**

**PHONON SCHOOL 2017**

## Detailed Program

**Sunday, September 3<sup>rd</sup>:** Registration from 6:00pm / Welcome cocktail at 8:00 pm / Dinner at 9:00 pm

|             | Monday 4 <sup>th</sup>                         | Tuesday 5 <sup>th</sup>                   | Wednesday 6 <sup>th</sup>                     | Thursday 7 <sup>th</sup>   | Friday 8 <sup>th</sup> |
|-------------|------------------------------------------------|-------------------------------------------|-----------------------------------------------|----------------------------|------------------------|
| 9:00-9:45   | <b>Introduction<br/>to<br/>Elastic Waves</b>   | <b>Disordered<br/>materials</b>           | Numerical methods for<br>thermal conductivity | <b>Phononic crystals</b>   | <b>Metamaterials</b>   |
| 9:45-10:30  |                                                |                                           | Phonon Scattering                             | Elec. Acoustics            | <b>Optomechanics</b>   |
| 11:00-11:45 |                                                | Opt ILS                                   | <b>Elec. Thermal</b>                          | <b>Topological phonons</b> |                        |
| 11:45-12:30 |                                                | Opt Pump-probe                            |                                               |                            |                        |
| 16:00-16:45 | <b>Introduction<br/>to<br/>Heat Conduction</b> | <b>Design of 2D phononic<br/>crystals</b> |                                               | <b>Low T+Quantum</b>       |                        |
| 16:45-17:30 |                                                | Numerical methods for<br>elastic waves    |                                               | <b>Rectification</b>       |                        |
| 18:00-18:45 |                                                |                                           |                                               |                            |                        |
| 18:45-19:30 |                                                |                                           |                                               |                            |                        |
|             |                                                | Poster session                            | Round table                                   | Improved dinner            |                        |

| Sessions                                   | Topics covered by the lectures                                                    | Lecturers           |                                 |         |
|--------------------------------------------|-----------------------------------------------------------------------------------|---------------------|---------------------------------|---------|
| Introduction to Elastic Waves              | Acoustic wave equation, Phonon dispersion, phononic crystals, superlattices, etc. | J.F. Robillard      | IEMN Lille                      | France  |
|                                            |                                                                                   | B. Djafari-Rouhani  | IEMN Lille                      | France  |
| Introduction to Heat conduction            | Phonon dispersion, theory of thermal conductivity, Green-Kubo, Interfaces         | S. Merabia          | ILM Lyon                        | France  |
|                                            | Molecular dynamics, superlattices and thermal coherence                           | S. Volz             | LIMMS Tokyo                     | Japan   |
| Vibrations in disordered materials         | Vibration modes in disordered media, relaxation times by spectroscopy             | V. Giordano         | ILM Lyon                        | France  |
| Phonon Scattering                          | Relaxation times                                                                  | B. Perrin           | INSP Paris                      | France  |
| Design of 2D phononic materials            | Thermophononic crystals                                                           | M. Nomura           | Tokyo University                | Japan   |
| Inelastic Light Scattering                 | Raman and Brillouin scattering for phononic crystals                              | C. Sotomayor Torres | ICN2 Barcelona                  | Spain   |
| Metamaterials                              | Acoustic metamaterials, Transformation wave equation                              | F. Lemoult          | ESPCI Paris                     | France  |
| Phononic crystals                          | Local resonances and bandgaps                                                     | B. Bonello          | INSP Paris                      | France  |
| Acoustics generated electrically           | IDTs and piezoelectricity                                                         | B. Dubus            | IEMN Lille                      | France  |
| Heat conduction generated electrically     | Electrothermal devices                                                            | O. Bourgeois        | Institut Néel Grenoble          | France  |
| Low temperature and quantum devices        | SINIS junctions, quantum of thermal conductance, low-temperature phononics        | I. Maasilta         | University of Jyväskylä         | Finland |
| Rectification and reciprocity              | Rectification and reciprocity of heat and phonons                                 | B. Li               | University of Colorado, Boulder | USA     |
| Numerical methods for Elastic Waves        | PWE, FDTD, Green's functions for waves                                            | J.F. Robillard      | IEMN Lille                      | France  |
| Numerical methods for thermal conductivity | Ab initio, Force constants                                                        | M. Lazzeri          | IMPMC Paris                     | France  |
| Pump-probe spectroscopy                    | Pump-probe measurements of acoustical and thermal properties                      | B. Perrin           | INSP Paris                      | France  |
| Opto-mechanics                             | Cavity optomechanics in various configurations                                    | R. Braive           | C2N Paris                       | France  |