INSTITUT LANGEVIN, Ondes et Images
(Yannick DE WILDE)

- **~100 members**
- Waves in complex media
- New concepts for imaging and sensing
- Subwavelength physics

Institut **Langevin**
ONDES ET IMAGES

ESPCI PARIS PSL

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- Number of people involved in the GDR: **5**

- Area of expertise of the lab:

WAVES: from fundamental studies to applications

- **Mechanical waves** (acoustic, seismic, and water surface waves)
- **Optical waves** (infrared and visible)
- **Electromagnetic waves** (radio frequency, microwave, Terahertz radiation)

- UMR7587: CNRS (3; 4; 5; 8; 9; 11) + ESPCI Paris, PSL University
  (+ Sorbonne Université & Université de Paris)

- Which preferential axes: A2 (Measurement & Metrology) ; T2 (Transport properties)

N A M e

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS

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Scientific expertise, overview, major themes in relation to the GDR

- Back bone of the labs regarding chemistry or physics (main research subject)

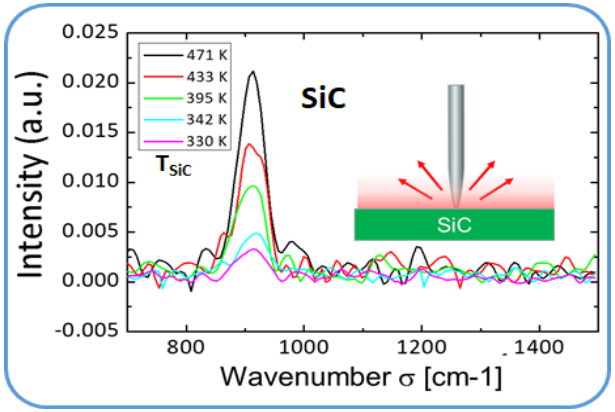
- Thermal radiation at subwavelength scales
- Infrared imaging and spectroscopy (near-field and far-field)
- Near-field microscopy (SNOM, TRSTM, …)

- Which heat carriers

- Mainly Photons and Surface polaritons

- Type of energy conversion

? Thermophotovoltaic, …



TRSTM spectroscopy

- What kind of applications are targeted ?

- Control & characterization of radiative properties, thermal management, test of performances, …

Relevant scales: pW ; mK ; nm ; µm

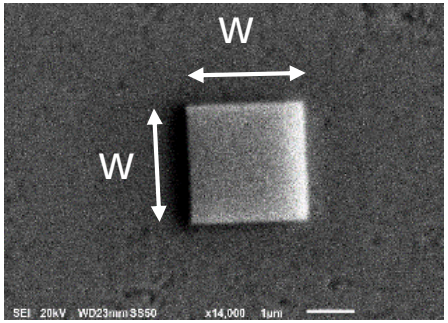
Technical or technological expertise in relation to the GDR issues

- What kind of materials/dimensions: No materials are produced at Institut Langevin, but we are interested by

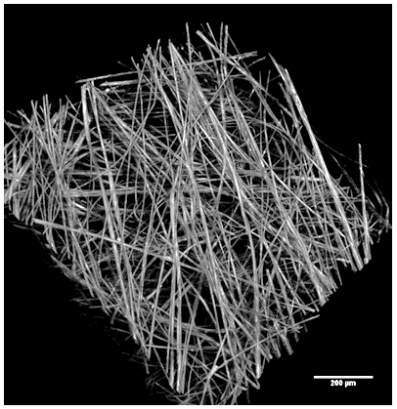
- Plasmonic materials: Polar materials, Metals, Semiconductors
(typical sample size: 1 cm x 1 cm)

- **Micro/nanostructures:** metallic or dielectric antennas, graphene…
(size typically: 100 nm to ~ µm)

- **Complex** materials (glass fibers, etc)



Plasmonic antennas



Glass fibers

- Bottom-up or top-down ?

Both

- What kind of characterization technique are mastered by the lab/group/team

- Imaging and spectroscopy of thermal radiation in near-field and far-field
- Near-field microscopy: TRSTM, etc. (spatial resolution: 100 nm in the mid-infrared range, i.e. $\lambda \approx 10$ µm)
- FTIR spectroscopy combined with IR microscopy (thermal radiation from objects with size down to 1 µm)
- Thermography with infrared cameras

- Looking for collaboration: Always open if exciting subject