Title: Name of labs, (who is presenting ?)

Polytechnique de Poitiers : Recherche et Ingénierie en Matériaux, Mécanique et Énergétique, Pprime

(Younes Ezzahri)

⇨ Application au transport, à l'énergie et à l'environnement

- ❖ Institute Pprime was created in 2010. Merging of 6 laboratories:
  - CNRS Laboratory (CNRS UPR 3346).
  - 2 host institutions (University of Poitiers and ISAE-ENSMA).
- ❖ 3 Scientific Departments in Physics and Mechanical Engineering:
  - Physics and Mechanics of Materials **(PMM)**.
  - Fluids, Thermal Science and Combustion **(FTC)**.
  - Mechanical Engineering and Complex Systems **(MECS)**.

- Around **600** people.
- **16** research teams: 4 (PMM), 9 (FTC) and 3 (MECS).
- **9** people are involved in the GDR NAME 4 [team TNR (FTC): INSIS] and 5 [team PPNa (PMM): INP].

⇩

AXES
Elaboration
Properties measurements
Measurement of device performance.
Simulation/Theory.

N A M E

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS

INSTITUT P' UPR CNRS 3346 — Université de Poitiers — cnrs — isae ENSMA

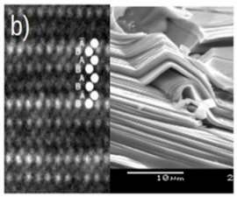
cnrs

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

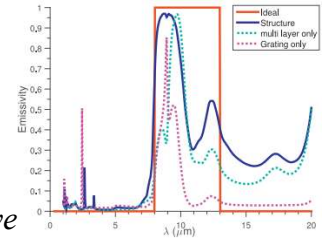
- **PMM:** Studies of the relations between the microstructure, the defects and the physical and mechanical properties of materials.
- **FTC:** A continuum in the study of flows and associated transfers in reactive or non reactive media.
- **MECS:** General analysis of mechanical structures and complex systems behavior from an integrated approach.

Energy carriers
Phonon
Electron
Photon

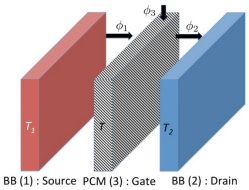
Energy conversion type
Thermoelectric
Photovoltaic
Thermophotovoltaic
Thermotronics

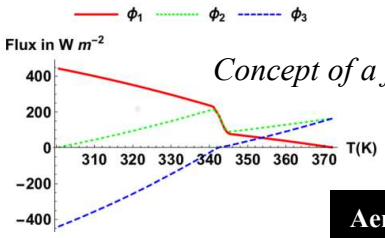


*« **MAX Phase» Elaboration, characterisation,** High-Resolution TEM and SEM images of nanolaminated structure.*

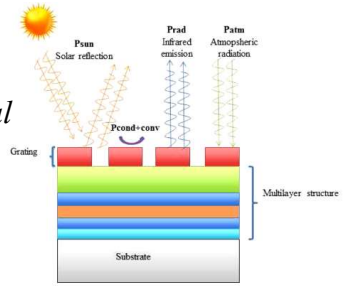


Assoociting a grating and multilayer strctures for radiative cooling application.

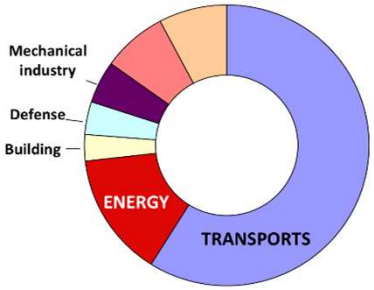




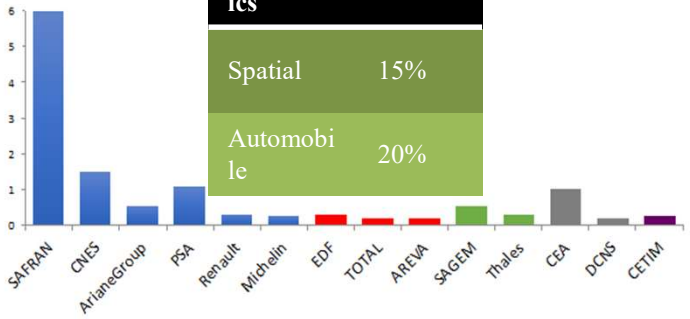
Concept of a far-field radiative thermal transistor



Energy related applications
Harvesting / scavenging
Storing
Sensors
Thermal management of nanodevices
Flexibles devices
Performance / reliablity of nanodevices
Supply / Nano-robotics



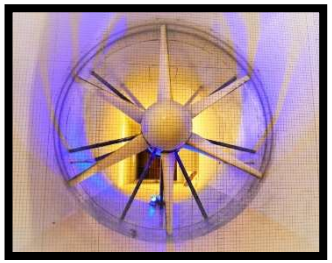
Aeronautics	60%
Spatial	15%
Automobile	20%



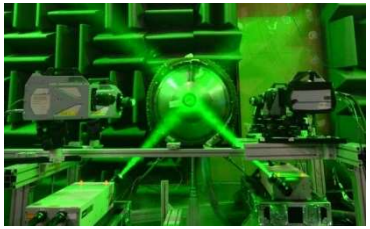
Technical or technological expertise in relation to the GDR issues

- Different kinds of materials are of interest: metals, semiconductors, dielectrics, ceramics, PTM.
- 2D materials, thin films and bulk materials.
- Different elaboration techniques: PVD, Powder, ionic bombardement.
- Different characterization techniques: Imaging (AFM, TEM SEM, …), Spectroscopy (EELS, EDXS, WDS, XRD, GISAXS, ...), Optical (Ellipsometry, FTIR, …), electrical (Hall effects, I(V), C(V), …), Thermal (TDTR, Flash, PR, …)
- Monte Carlo, FD, FE, RCWA, PSO algorithm, …
- PPMS+ several facilities in the lab:

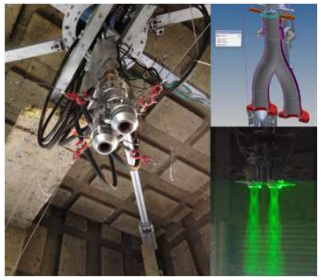
Physico-chemical characteristics
Microstructural characterization
Electrical
Thermal
Optical
Mechanical
Magnetic



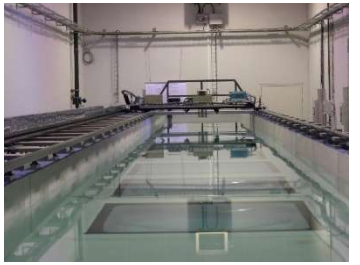
S620 wind tunnel



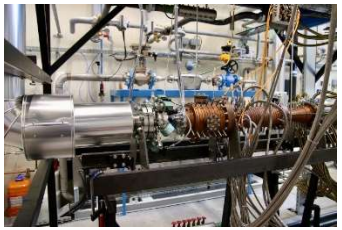
Noise and wind facility



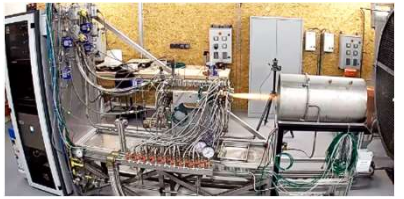
Martel Facility



30m-long Towing tank



BATH facility



Pergola Facility

We are open to all kinds of collaborations.

NAME
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