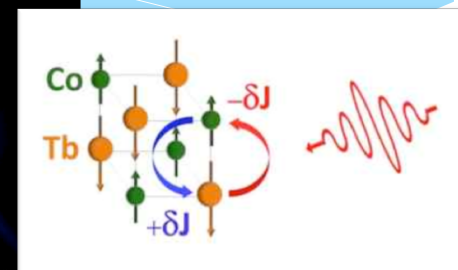
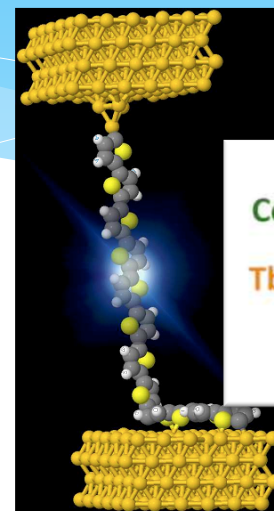
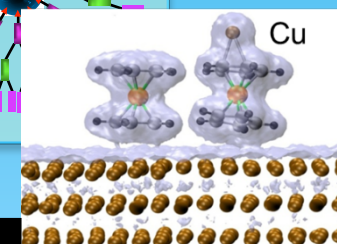
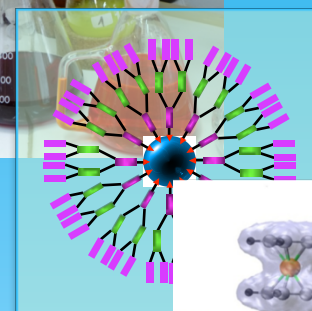
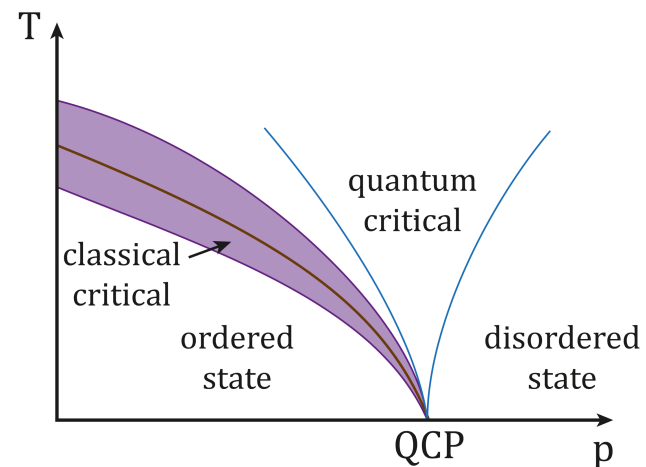


Institut de Physique et Chimie des Matériaux de Strasbourg



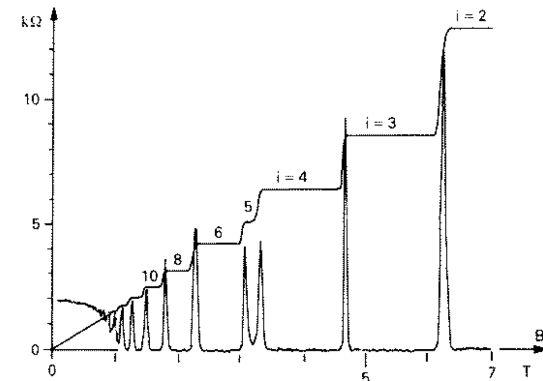
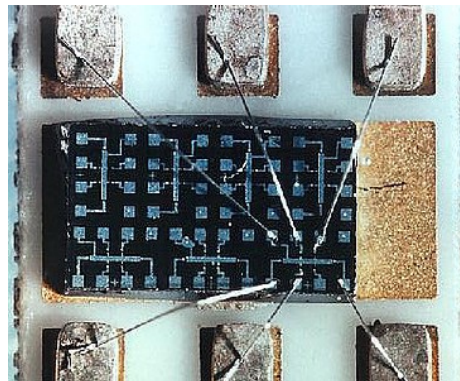
Physique de la Matière Condensée ?

- > **Propriétés** microscopiques et macroscopiques de la matière dans son état « condensé », lorsque $N \gg 1$
- > **Outils** : mécanique quantique, physique statistique, électromagnétisme
- > **Emergence** : le tout est plus que la somme de ses parties (e.g., transitions de phase)
- > **Elementaire \neq Fondamental**

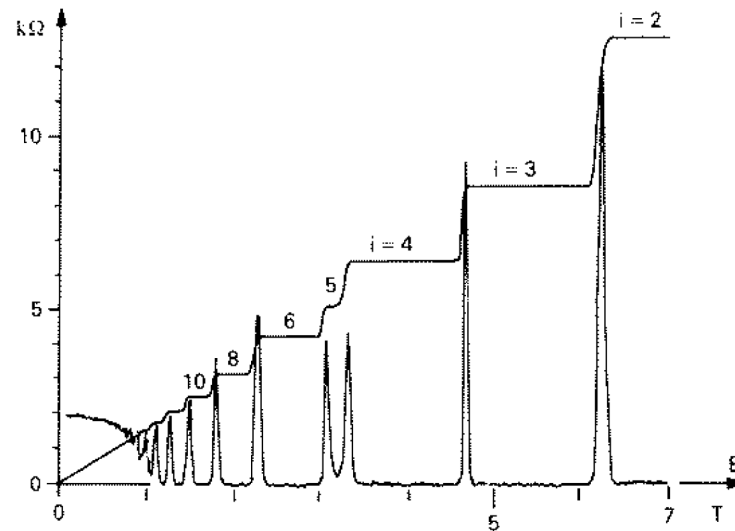
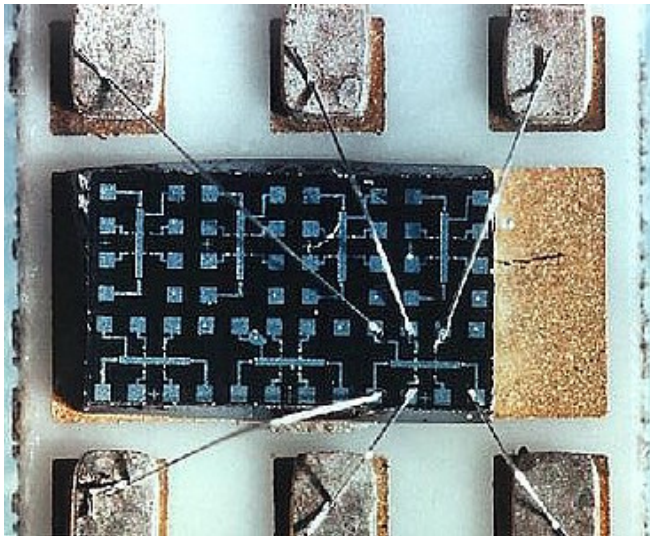


Nanosciences et Nanotechnologies ?

- > **Propriétés** de la matière pour des tailles du nm au μm , lorsque $N \gg 1$ (e.g., nanoparticules, boîtes quantiques, etc.)
- > « There's plenty at the bottom » (Richard Feynman, 1959)
- > **Transition** quantique \Rightarrow classique ???
- > **Applications** $\gg \gg \gg 1$ (ordinateur et calcul quantique, stockage de l'information, nanomédecine, nouvelles sources d'énergie, thermoélectricité, etc., etc.)



Effet Hall quantique



Klaus von Klitzing
(Prix Nobel 1985)

From the design of **advanced materials and nanostructures** to the study of the **associated physical properties**, with a pronounced effort on **magnetism, electronics and optics and their applications.**

Physics

- Surfaces & Interfaces
- Magnetism of Nanostructures
- Ultrafast Optics & Nanophotonics

Chemistry

- Inorganic Materials
- Organic Materials

230 people :

80 Research & University staff

60 Engineers and technicians

90 PhD &-post-doc

11000 m²

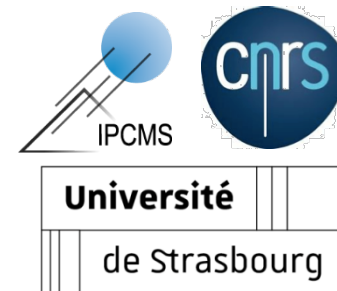
Bureau de direction

Conseil de Laboratoire
Conseil scientifique

Responsable Qualité
H. Majjad

Institut de Physique et Chimie des Matériaux de Strasbourg UMR 7504

Directeur : P. Rabu
Directeur adjoint : R. Jalabert
Administratrice: J. Lacava



PLATEFORMES

Nanofabrication

B. Doudin - H. Majjad

Microscopie MET

O. Ersen - C. Bouillet

Microscopie MEB

G. Pourroy - J. Faerber
(commune avec l'ICPEES)

Diffraction des RX

C. Lefevre - M. Lenertz

Calcul

R. Hertel - F. Muller

DEPARTEMENTS DE RECHERCHE

DMONS

Magnétisme des Objets
NanoStructurés

Y. Henry

DON

Optique ultra rapide &
Nanophotonique

P. Hebraud

DSI

Surfaces & Interfaces

H. Bulou

DMO

Matériaux Organiques

L. Douce

DCMI

Chimie des Matériaux
Inorganiques

N. Viart

SERVICES GENERAUX

J. Lacava

Services d'appui à la
Recherche

J. Lacava

Atelier Mécanique

A. Boulard

Bureau d'Etude

N. Beyer

Service Informatique

F. Muller

INTERDISCIPLINARY SCIENCE – FUNDAMENTAL RESEARCH ON NANOMATERIALS

Physics

Magnetism

Optics

Nano / quantum
transport

Ultrafast processes

Theor. physics

TEM & near-field
microscopy

Instrumentation

Chemistry

Modeling &
Comput. Sc.

NP growth &
organization

Molecular
synthesis

Thin film growth

Synthesis of hybrid
materials

Material Science

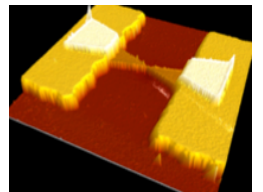
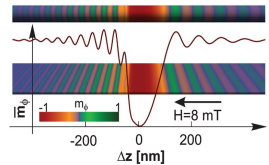
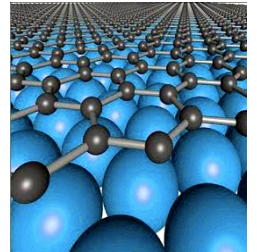
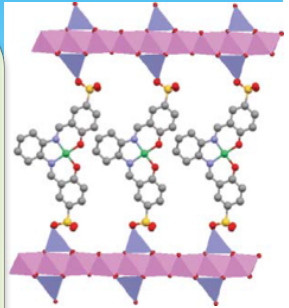
Ferromagnet –
organic interfaces

Multiferroic
nanosystems

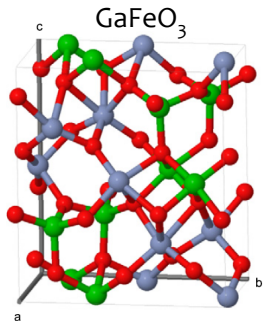
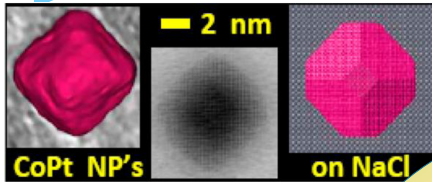
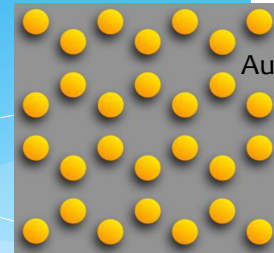
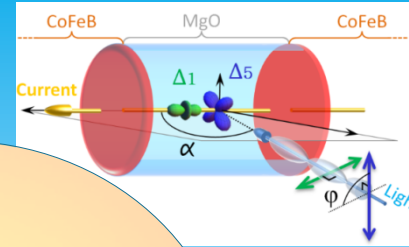
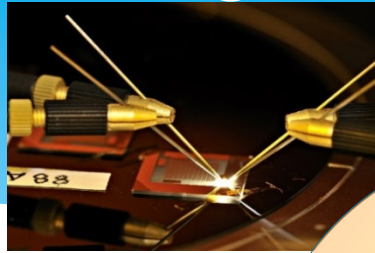
Graphene &
2D materials

Biomaterials

Comp. Mat. Sci.



Department of Magnetism and Nano-Structured Objects



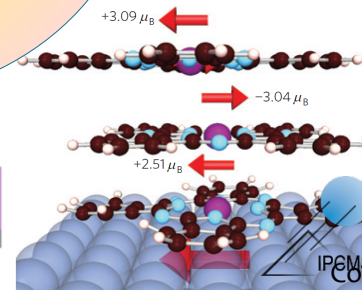
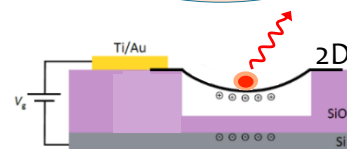
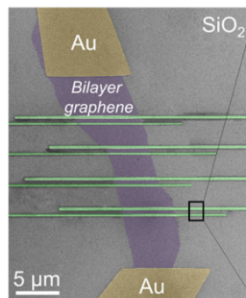
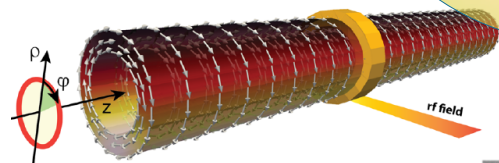
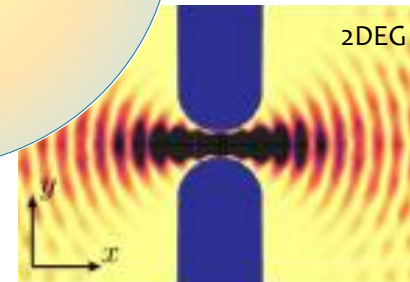
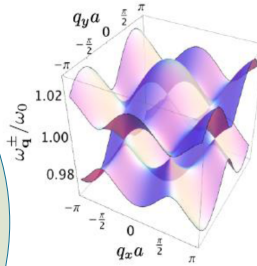
Magnetism in thin films & nanostructures

Devices for spintronics & magnonics

Electronic Properties of Condensed Matter

Mesoscopic Quantum physics

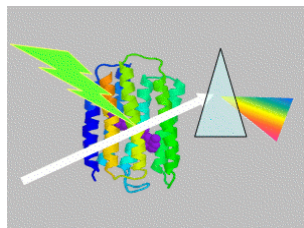
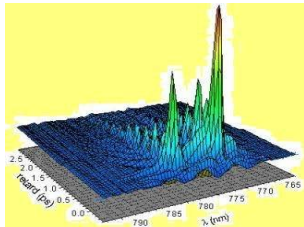
Organic, hybrid & 2D Nanostructures



Department Ultrafast optics and Nanophotonics

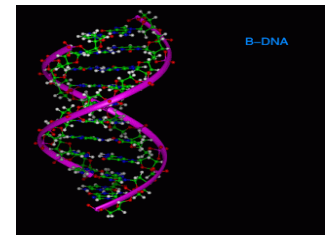
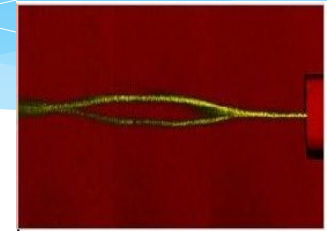
Ultrafast processes in functional nanostructures

Metals, semiconductors, polymers, biomolecules, hybrid organic/inorganics



Nanophotonics

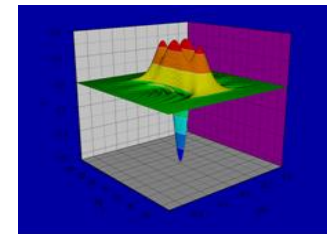
Single biomolecules, organic materials and self-written waveguides, laser nanostructuring, cellular biophysics



Femto - & Attoseconds

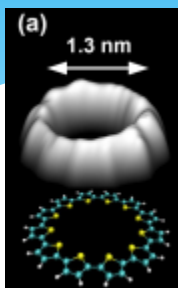
Sub-diffraction limit < 100 nm

Quantum optics

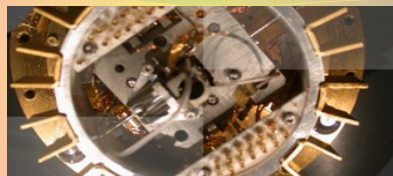


Biophysics and soft Matter

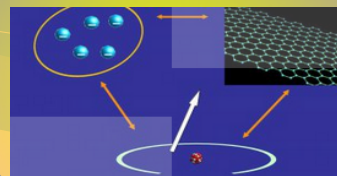
Department Surfaces – Interfaces



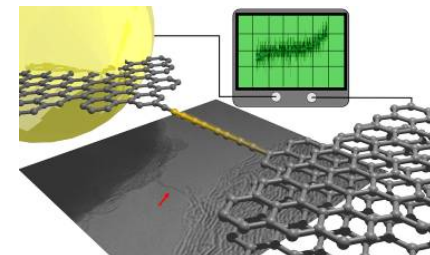
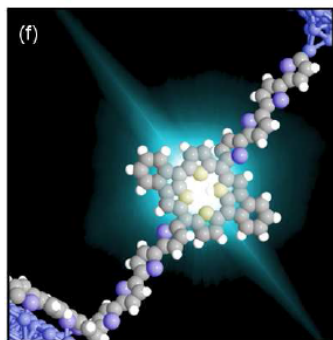
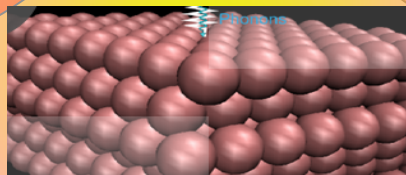
STM



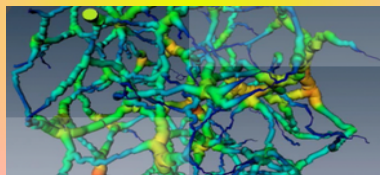
Dynamic Processes



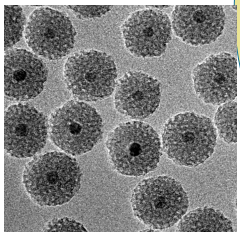
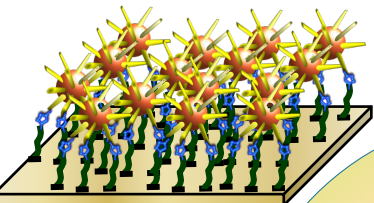
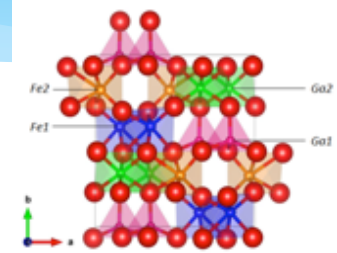
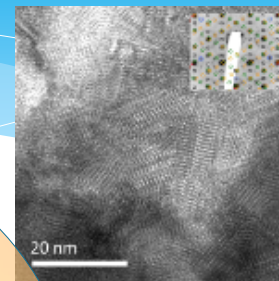
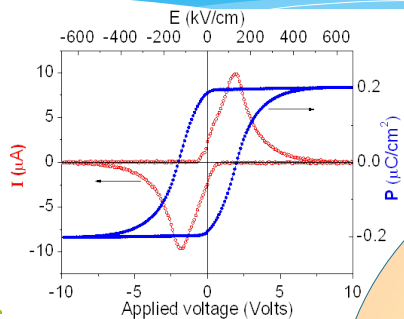
Modelling



Nanomaterials
Electron Microscopy



Department of Chemistry of Inorganic Materials

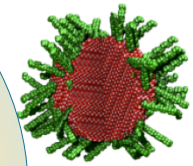


Functionalized Nanoparticles (Self assembling, functionalization)
Sensors, Bio-imaging, Theranostic

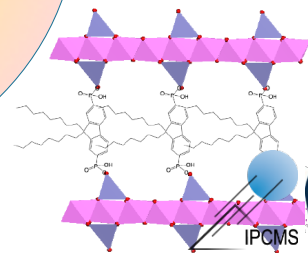
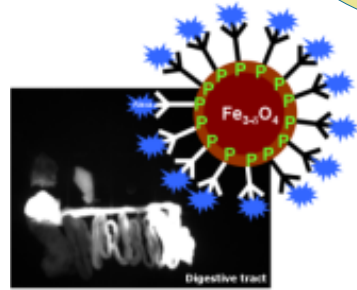
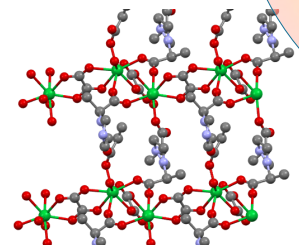
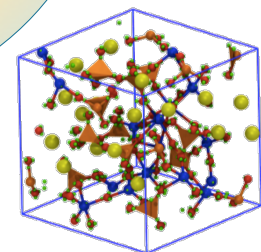
Thin Films & Oxides (PLD – Sputtering)
Spintronics & photovoltaics

Synthesis, structure, modeling, properties of multifunctional / multiscale materials

Computational material science (DFT, QMMM)
Molecules, surfaces, biological functions, glasses



Organic-Inorganic Hybrids
magnetic & multifunctional materials

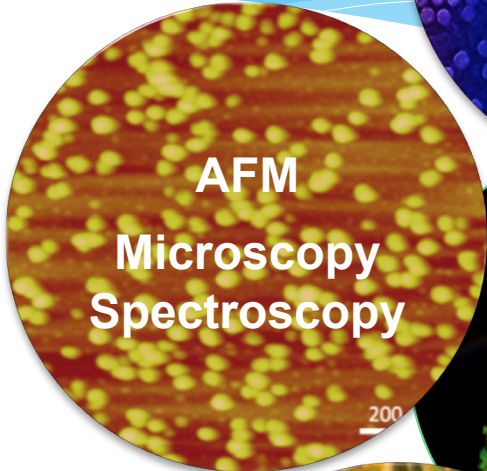


DMO – Organic Materials



Materials
for
Health

A circular graphic with a dark blue background. It features a central green sphere with a network of yellow and red branching structures extending outwards, resembling a biological or chemical network. The background is composed of a grid of small purple and blue dots.




AFM
Microscopy
Spectroscopy

A circular graphic showing a top-down view of a surface with a grid of yellow and orange dots. A scale bar at the bottom right indicates 200 nm.



Chemistry

A circular graphic with a dark background. It features a central green and blue molecular structure, possibly a protein or a complex molecule, surrounded by other smaller structures in various colors.



Nano-
Materials

A circular graphic showing a top-down view of a surface with a grid of dark grey and black dots. A scale bar at the bottom right indicates 100 nm.



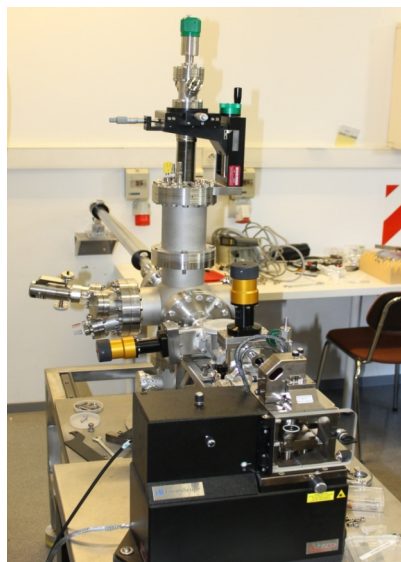
Molecular
Materials

A circular graphic showing a top-down view of a surface with a grid of yellow and orange dots, similar to the AFM Microscopy Spectroscopy graphic.



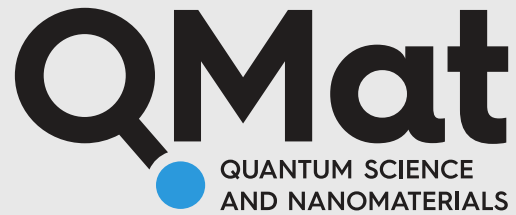
Catalysis

A circular graphic showing a top-down view of a surface with a grid of blue and orange dots. The dots are arranged in a pattern that suggests a catalytic reaction or a specific material structure.



Université

de Strasbourg



Quantum Science and Nanomaterials

University of Strasbourg International Graduate School

- **Shape** the future in quantum science and nanotechnology
- **Learn** from world leading experts: quantum physics, nano-materials fabrication, experimental and computational nanoscience, device engineering, and more.
- **Profit** from international and industrial internships

“Putting outstanding students at the forefront of international research”

- Fully integrated five-year program in Physics
- “Q-Master” and doctoral fellowships
- Call opens on Jan-Feb 2020 (for Master or PhD starting Autumn 2020)
- **Pre-register now by sending an email to: qmat@unistra.fr**

qmat.unistra.fr

