FACULTÉ DES SCIENCES ET TECHNOLOGIES

Université de Lille

MME
Matter Molecules and their Environments

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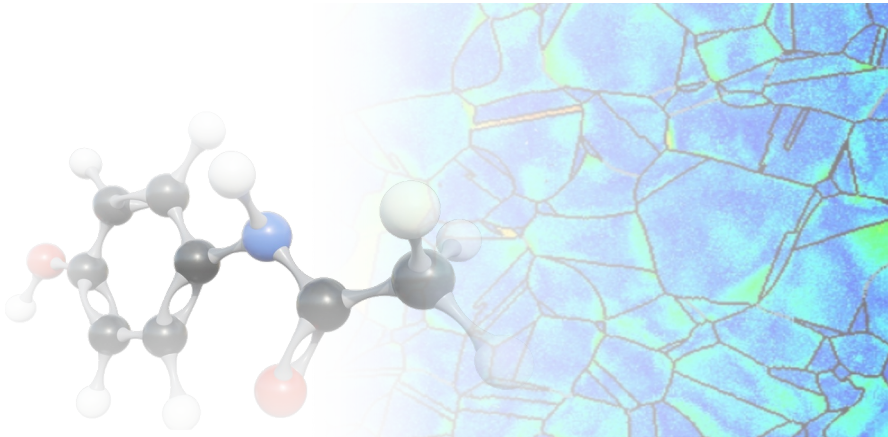
Presentation March 2025
Homepage of the MME 2nd year Master Track

Matter Molecules
AND THEIR ENVIRONMENTS

Science for a changing planet

PLANET HUB



Introduction for MME

Options

- Condensed Matter and Materials Science
- Condensed Matter and Atmospheric Sciences

Entry requirement

- Master or 4th year university degree in physics or physical chemistry

Jobs and careers

- Research in academia
- Public or private research laboratories
- Industry

Attached laboratories

- UMET: Unité Matériaux et Transformations
- PhLAM: Physique des Lasers, Atomes et Molécules
- IEMN: Institut d'Electronique, Microélectronique et Nanotechnologie
- LOA: Laboratoire d'Optique Atmosphérique

Training objectives

Train physicists capable of tackling the major scientific questions of the 21st century

- From concrete, applied issues such as the design of new materials for tomorrow's industry
- To fundamental questions such as the behavior of matter within planets and atmospheres, calculation methods on the atomic scale or the use of major international research instruments.

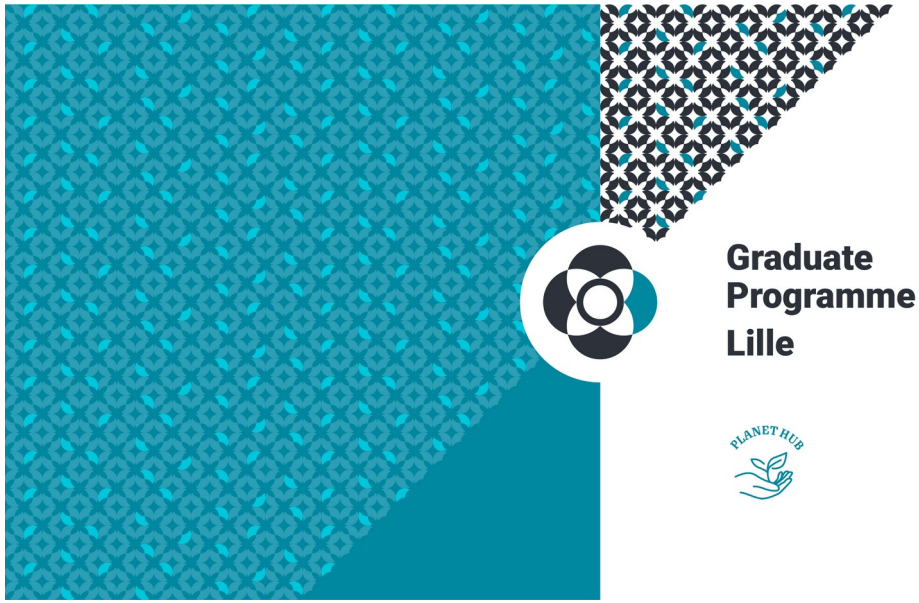
Aimed at two types of students

- Students in search of ***solutions***, who will be trained in the latest advances in the sciences of matter, and will be able to develop and exploit new materials, the latest analytical methods, and the analytical tools to tackle today's societal issues;
- students in search of ***discoveries***, who will be able to understand the fate of matter in a variety of environments and conditions, from the core of a nuclear power plant, to polymers, metals, pharmaceutical materials, up to the interior of planets or the atmosphere.

Graduate program

MME is part of the Science for a Changing Planet Graduate Program

Limited number of scholarships are available

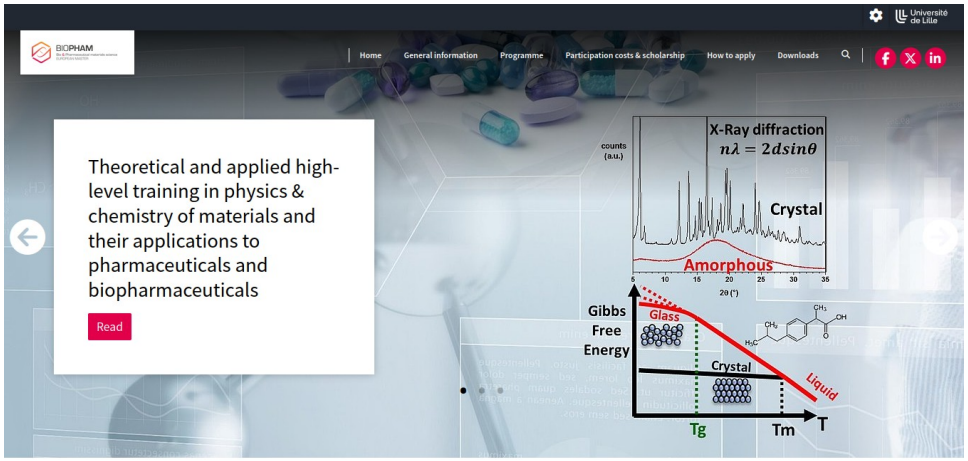


Science for a changing planet

The Graduate Programme ‘Science for a Changing Planet’ has three objectives:

1) understanding and monitoring planet changes;
2) seeking alternative solutions to the exploitation of fossil resources, and
3) evaluating the impact of global changes on people, the earth and societies.

BIOPHAM sister's program



~50% of classes in the condensed matter options are shared with BIOPHAM

BIOPHAM

- Erasmus Mundus Joint Master Degree
- Training in materials science and physics & chemistry of materials and their applications to pharmaceutical
- Semester 1 in Pisa, semester 2 in Barcelona, semester 3 in Lille

Curriculum

Condensed Matter / Materials Science

Thermodynamics 6 ECTS	Transport Properties 6 ECTS
Defects 6 ECTS	Spectroscopy 3 ECTS

Condensed Matter / Atmospheric Sciences

Thermodynamics 3 ECTS	Atmospheric Sciences 3 ECTS
Transport Properties 3 ECTS	
Defects 6 ECTS	Spectroscopy 3 ECTS

Labs

Atomic Scale Modeling 6 ECTS	Spectroscopy, Diffraction, Electron Microscopy 6 ECTS

Professional Skils

English Scientific Writing 6 ECTS	Lab internship 6 ECTS

Offers for internships 2024-2025

LOA

- Aerosol Measurement Over Oceans

PhLAM

- Characterization of Gas-Phase Atmospheric Organic Compounds and their Weakly Bonded Complexes via Rotational Spectroscopy
- Complexation of trivalent actinides by phosphate species
- Linking core spectra features of actinide complexes to their local environment
- Studying Reactivity of Atmospherically Relevant Radicals using Chirped Pulse Fourier Transform Millimeter wave spectroscopy
- Theoretical Investigation of the Surface Activity of Organosulfates on water droplets

Subjects for internships

- Can be outside Lille
- change from year to year, depending on students, labs, etc.
- Not so many from LOA this year. Could be different next year

UMET

- High PT experiments for modeling the Earth's inner core
- Machine-learning approaches for nanoparticle simulations
- Modeling of dislocations in perovskite oxides ABO3
- Phase-field modelling of radiation induced segregation application to nickel based alloys
- TEM analysis of a possible natural deep Earth sample

IEMN

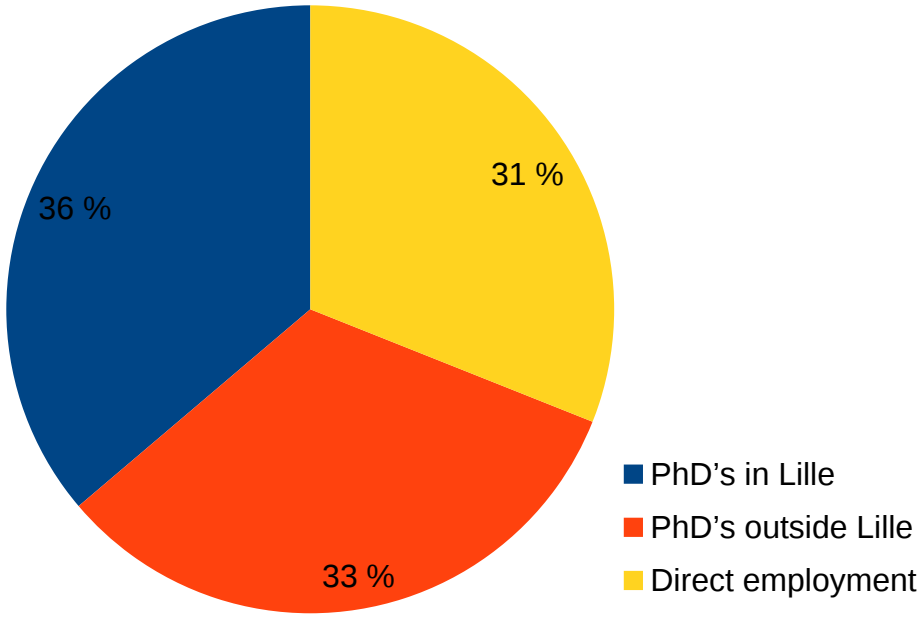
- Using strong coupling to detect gas traces in the THz range
- Exploring Proteins quantum dynamics by using strong coupling in the Terahertz range
- Developing Novel THz Spectroscopy Techniques for Biological Sample sensing
- THz-Photonics in Biomolecular Research

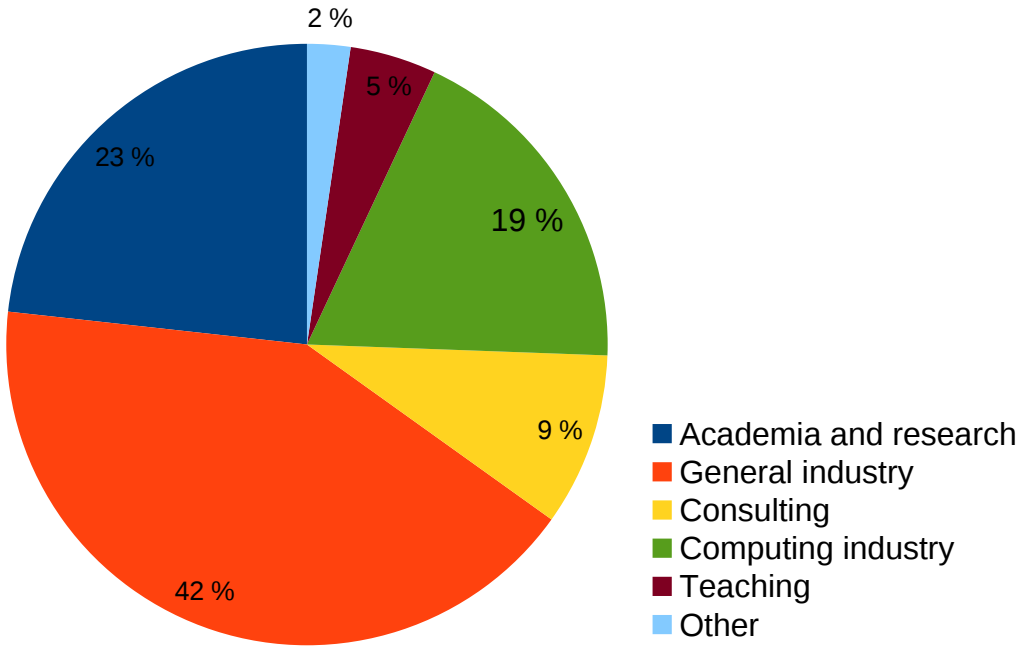
Former students

Former students analysis

Strongly biased towards condensed matter, which has been running for as such for much longer

Statistics on ~60 students 2008-2024





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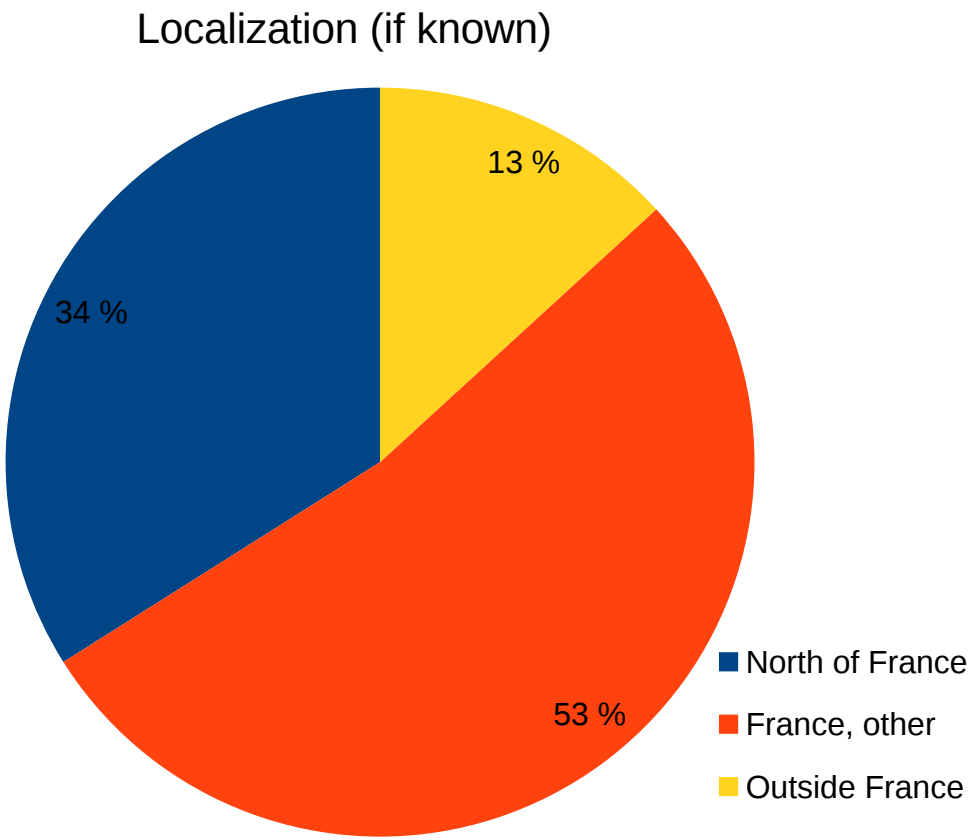

Former students: employers

Academia / Government agencies

- CNRS
- Yale University, US
- Phoenix University, US
- Université Tours
- Univ. Lille
- Universitas 17 Agustus 1945 Surabaya, Indonesia
- Canadian Nuclear Laboratories
- CEA
- Onera
- Grenoble INP
- Université libre de Bruxelles

Private sector (industry)

- Siemens Energy
- Framatome
- EDF
- Decathlon France
- Altsom
- Raclot Industries
- AstraZeneca
- Imerys
- Groupe Institut de Soudure
- ITP Interpipe
- Blue Capsule Technology
- PPG

Consulting / computer industry

- Devoteam G Cloud
- Sopra HR Software
- Sopra Banking Software
- Groupe Luminess
- Axecom
- Calogena
- DEF
- Assystem
- Power Inside Data