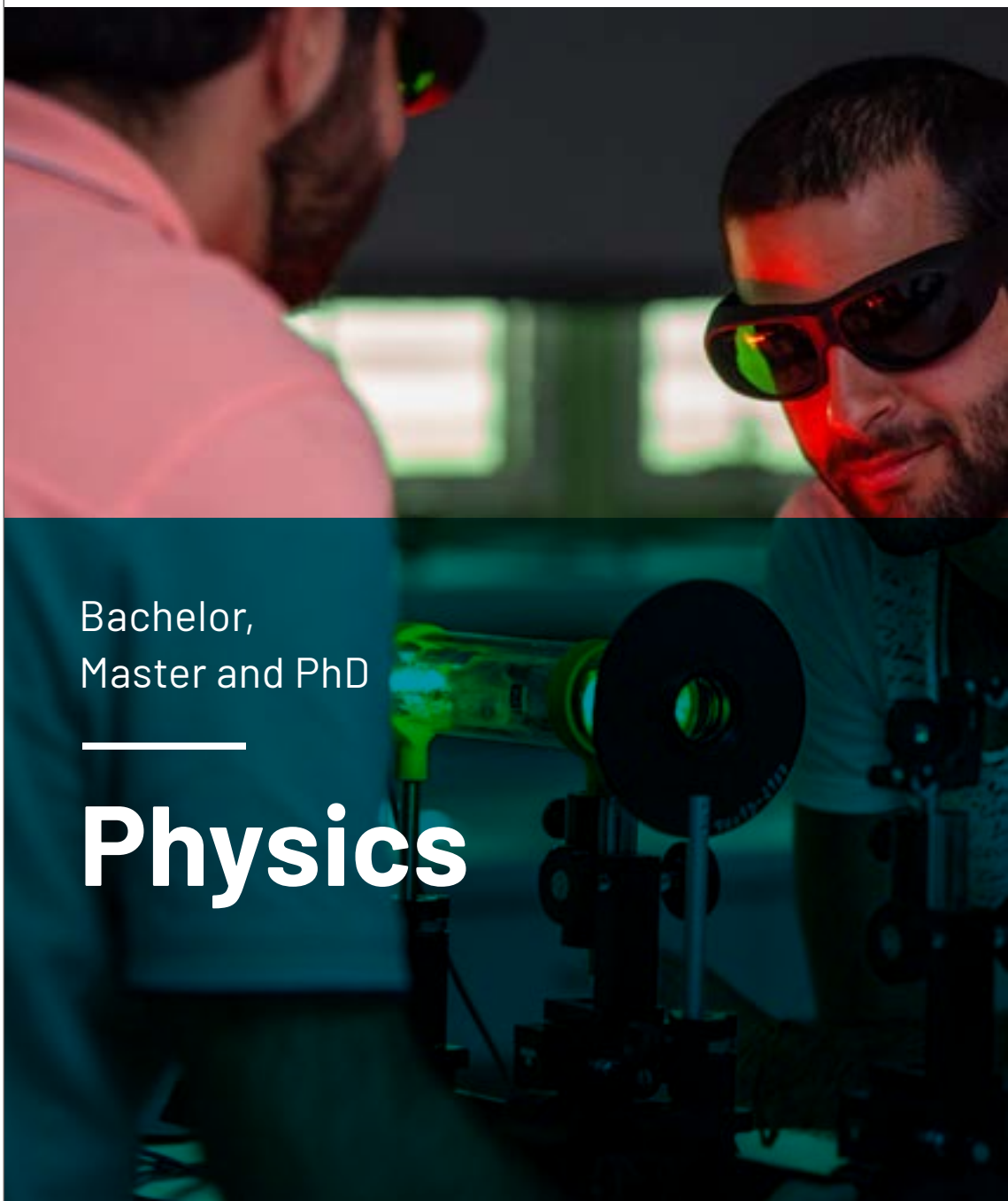
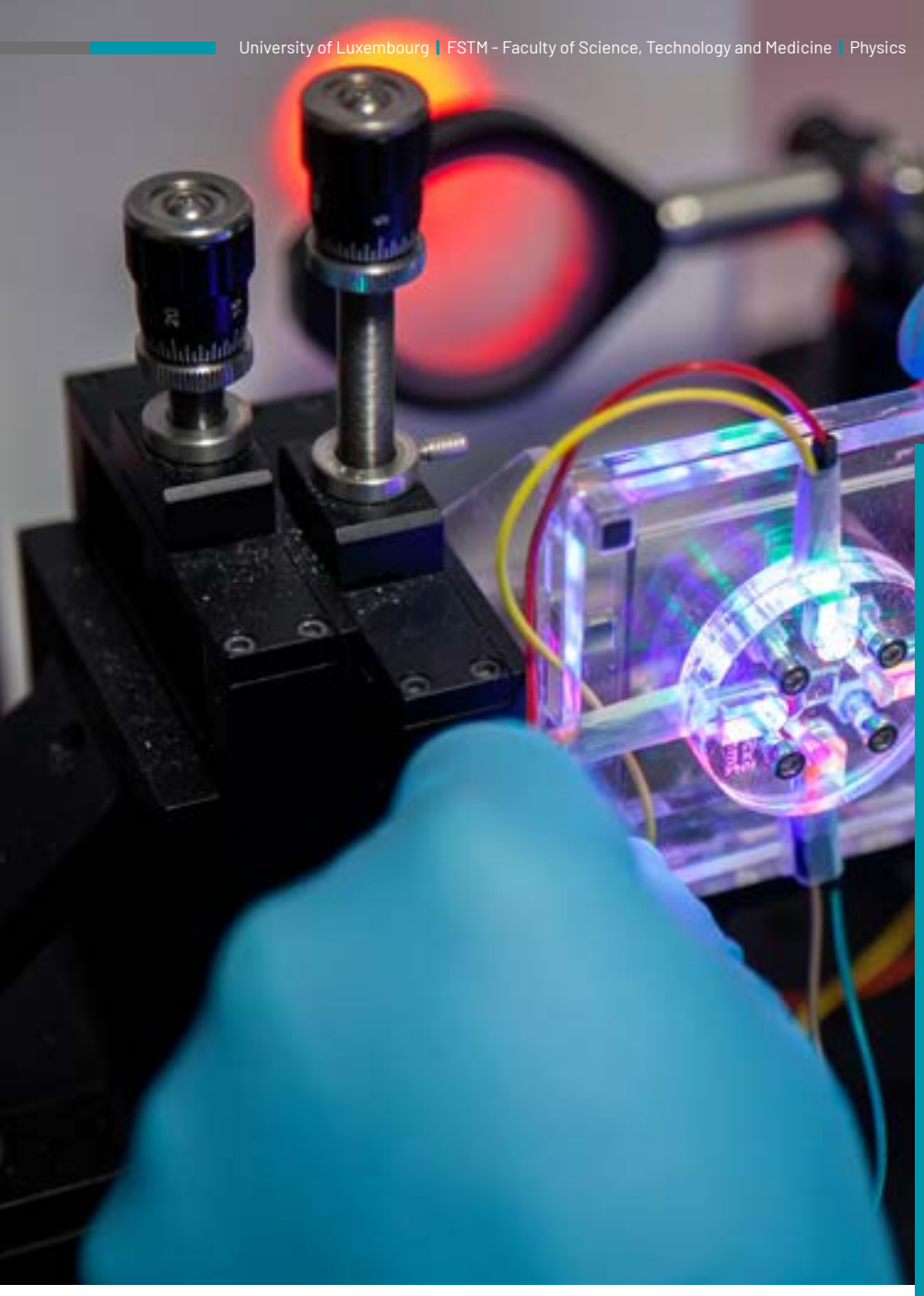
FACULTY OF SCIENCE,
TECHNOLOGY AND
MEDICINE



Bachelor,
Master and PhD

Physics



We develop **talents**

FSTM has a key mission: attract and train the talents that Luxembourg and the world will need in the STEM fields (Science, Technology, Engineering and Mathematics) as well as in Medicine.

Table of Contents

The Faculty of Science, Technology and Medicine (FSTM) **at a glance**

The Faculty of Science, Technology and Medicine (FSTM) contributes multidisciplinary expertise in the fields of Mathematics, Physics, Engineering, Computer Science, Life Sciences and Medicine. Through its dual mission of teaching and research, the FSTM seeks to generate and disseminate knowledge and train new generations of responsible citizens, in order to better understand, explain and advance society and environment we live in.

1
Faculty

5
Departments

3
Campus sites

5
Disciplines

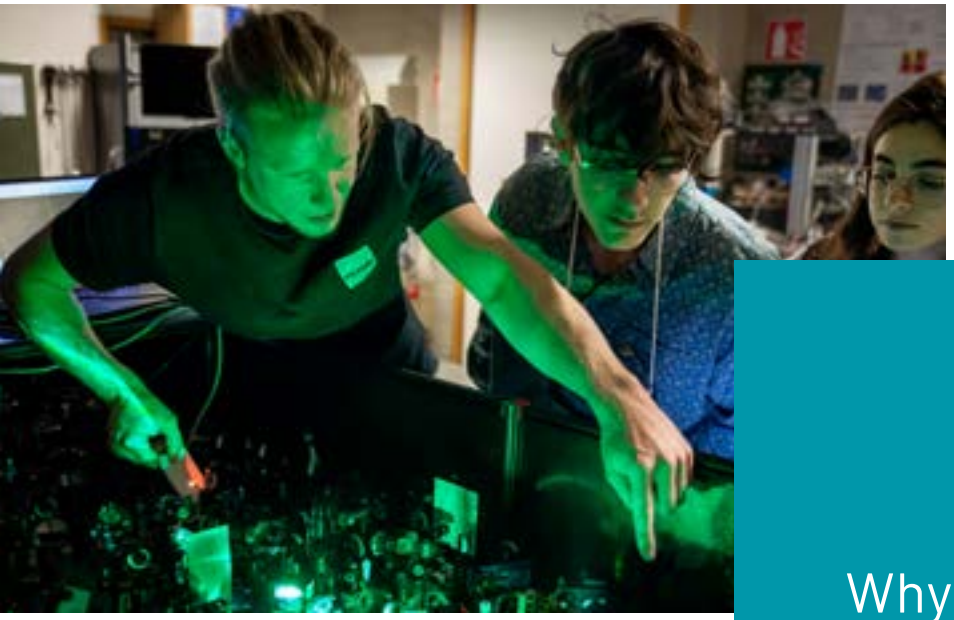
39
Study programmes

3
Official languages

2 000
Students

130
Countries

56 %
International students



Why study **Physics?**

Luxembourg needs physicists

PHYSICS IS EVERYWHERE

Physics helps you to better understand how the universe and the world around you work. Physics leads to breakthrough technologies like smartphones and to great discoveries such as black holes.

Studying physics enables you to develop analytical and problem solving skills. These skills are in high demand in scientific research and in other popular sectors such as finance and banking, consultancy and industry.

Moreover, in Luxembourg, physics graduates have excellent opportunities to become science teachers in an unusually well-resourced education system.

COMPLETE TRAINING OFFER

The Department of Physics and Materials Science (DPhyMS) at the University of Luxembourg offers study programmes in physics at all levels. You can pursue a Bachelor, a Master, or a doctoral degree with many possible specialisations.

The uniqueness of our Bachelor and Master programmes is that students are able to focus on research. In particular, the sixth semester of the Bachelor programme and the second year of the Master programme are entirely dedicated to your thesis, which allows you to engage in-depth with modern research.

Excellent opportunities **Join our University!**

By joining us, you will benefit from many advantages:

INDIVIDUAL MENTORING

As a Bachelor or Master student here, you attend inspiring lectures in small classes and perform captivating experiments in small groups. An excellent professor-to-student ratio in physics allows you to have close contact with our internationally renowned professors.

STRONG LINKS WITH INDUSTRY

Thanks to strong links with industry, you have great opportunities to get involved in projects directly sponsored by companies. Recent participating companies include Google, Jansen Pharma, Boehringer Ingelheim, Avancis, Ceratizit.

TRINATIONAL DEGREES

If you speak English and German or French, you can choose to participate in a joint-degree programme with our partner universities in Germany (Saarland University) or France (Université de Lorraine or Université Grenoble Alpes). You will be awarded a joint Bachelor or Master degree from the participating universities. Even if you are not enrolled in a joint-degree Bachelor programme, you will go for a mobility semester, spending half of an academic year almost anywhere in the world.

OUTSTANDING ENVIRONMENT

During your studies, you are surrounded by professors, researchers, and students from many different countries, who are willing to discuss your new ideas. For your research activities, we provide you with world-class facilities. Furthermore, our research groups are carrying out world-leading research in a wide range of fields. You will enjoy a pleasant and multicultural study experience here!

Our study programmes
overview

BACHELORS

3 YEARS

Bachelor in Physics

180 ECTS

German-French-Luxembourgish Bachelor in Physics

180 ECTS

MASTERS

2 YEARS

Master in Physics

120 ECTS

German-French-Luxembourgish Master in Physics

120 ECTS

DOCTORAL EDUCATION

Doctoral Programme in Physics and Materials Science

RESEARCH
+ 20 ECTS

Bachelor in Physics

180 ECTS

This Bachelor allows students to gain knowledge about the main areas of physics. It familiarises them with the necessary mathematical tools and allows for specialisation via a wide range of elective courses. This is an excellent passport to an enthralling future.

STRENGTHS

- Combination of lectures and current research
- A range of contemporary courses in offer: quantum science and technology, physics of living systems, sustainable materials and energy and machine learning
- Courses are taught and trained by globally recognised pioneers in the field of physics and materials science
- Broad range of elective courses (computer science, didactics, astronomy geophysics, etc.)
- Studies abroad in semester 3, 4 or 5 are possible

ADMISSION REQUIREMENTS (30 PLACES)

- Degree: secondary school diploma
- Languages: B2 in English and B1 in French

STUDY OPPORTUNITIES

- Master in Physics or related field

EXAMPLES OF ALUMNI CAREERS

- Financial analyst, Banque de Luxembourg
- Regional sales manager, Saint-Gobain
- Project manager, Zeiss
- Research scientist, Flatiron Institute

Programme at a glance

- Duration: 3 year full-time programme/ 6 semesters (180 ECTS)
- Languages: English (75%), French (25%)
- Registration fees: 400€/semester (1 & 2) + 200€/semester (3 to 6)
- Available places: 30
- Application period:
  > For EU students: February-August
  > For non-EU students: February-April

Additional information

CONTACT
bphy@uni.lu

CAMPUS
Limpertsberg and Belval

bphy.uni.lu

Programme

COURS	ECTS
Semester 1	
Analysis	5
Experimental physics: mechanics, oscillations and waves	5
Experimental physics: thermodynamics	3
Lab classes	4
Linear algebra	5
Mathematical methods	6
Electives (astronomie et géodésie, programming)	2
Total required	**30**
Semester 2	
Analyse et applications	6
Experimental physics: electromagnetism	5
Experimental physics: optics	3
Linear algebra	4
Mathematical methods	4
Theoretical physics: mechanics	6
Electives (geophysics, logiciels mathématiques)	2
Total required	**30**
Semester 3	
Chemistry	2
Experimental physics: modern physics	6
Mathematical methods	4
Lab classes	4
Theoretical physics: electrodynamics and relativity	6
Electives (analyses, astronomie, didactics, programming, topologie, etc.)	8
Total required	**30**
Semester 4	
Chemistry	2
Advanced lab course	8
Introduction to biological physics	4
Theoretical physics: quantum mechanics	6
Electives (analyses, data science, didactics, geophysics, logiciels mathématiques, écrire et présenter contexte académique, probabilités et statistiques, etc.)	10
Total required	**30**
Semester 5	
Condensed matter physics	6
Continuum mechanics	4
Literature seminar	5
Particle physics	4
Theoretical physics: statistical physics	8
Electives (défis mathématiques, astronomie, didactics)	3
Total required	**30**
Semester 6	
Bachelor thesis	27
Bachelor seminar	3
Total	**30**

German-French-Luxembourgish Bachelor in Physics

180 ECTS

This Bachelor is jointly offered by the Universities of Luxembourg, Lorraine and Saarland. It provides a solid knowledge in experimental and theoretical physics in a multicultural and multilingual context.

STRENGTHS

- Trinational diploma (first year in Nancy, second year in Luxembourg and third year in Saarbrücken)
- Financial support from the Franco-German University (DFH/UFA)
- Language courses are part of the programme

ADMISSION REQUIREMENTS (20 PLACES)

- Degree: secondary school diploma
- Languages: B2 in French and German

STUDY OPPORTUNITIES

- German-French-Luxembourgish Master in Physics or other Master

In collaboration with:

Université de Lorraine

Universität des Saarlandes

Université franco-allemande / Deutsch-Französische Hochschule

Programme at a glance

- Duration: 3 year full-time programme/ 6 semesters (180 ECTS)
- Languages: French (40%), English (30%), German (30%)
- Registration fees: according to each university
- Available places: 20
- Application period:
  > For EU students: February-August
  > For non-EU students: February-April

Additional information

CONTACT
bphy@uni.lu

CAMPUS
Nancy, Luxembourg and Saarbrücken

Programme

COURS	ECTS
Semester 1: Université de Lorraine	
Chimie	6
German/French	3
Mathématiques	6
Physique	9
Physique théorique	6
Total	**30**

Semester 2: Université de Lorraine	
Calcul scientifique	3
Chimie	4
Electromagnétisme	6
German/French	3
Mathématiques	6
Physique	8
Total	**30**

Semester 3: University of Luxembourg	
Experimental physics: modern physics	6
Mathematical methods	4
Lab classes	4
Probabilité et statistiques	5
Theoretical physics: electrodynamics and relativity	6
Electives (analyses, astronomie, didactics, programming, topologie, etc.)	5
Total required	**30**

Semester 4: University of Luxembourg	
Chemistry	2
Advanced lab course	8
Introduction to biological physics	4
Theoretical physics: quantum mechanics	6
Electives (analyses, data science, didactics, geophysics, logiciels mathématiques, écrire et présenter contexte académique, probabilités et statistiques, etc.)	10
Total required	**30**

Semester 5: Universität des Saarlandes	
Fertkörperphysik	4
Lab course	9
Quantenphysik und Statistische Physik	8
Internship	5
Electives	6
Total required	**30**

Semester 6: Universität des Saarlandes	
Kern- und Elementarteilchenphysik	4
Bachelor thesis	12
Seminar	6
Electives	6
Total	**30**

Master in Physics

120 ECTS

This Master enables students to acquire a solid and broad education in physics with emphasis on the research areas explored at the university of Luxembourg: quantum science and technology, photovoltaics, spectroscopy and functional materials, soft and living matter, statistical physics and machine learning.

STRENGTHS

- Full scope from soft matter to solid-state physics
- Collaboration with industry
- Involvement in research activities (two semesters of research)
- Strong links with the Luxembourg Institute of Science and Technology (LIST)

ADMISSION REQUIREMENTS (20 PLACES)

- Degree: Bachelor in physics or related field
- Language: B2 in English

STUDY & CAREER OPPORTUNITIES

- Engineer, analyst, teacher, consultant, manager, researcher
- PhD in physics

EXAMPLES OF ALUMNI CAREERS

- Physics teacher, Lycée Ermesinde
- Business support analyst, FundsDLT
- Data scientist, US Army
- Senior process engineer, ASM International

Programme at a glance

- Duration: 2 year full-time programme/ 4 semesters (120 ECTS)
- Language: English
- Registration fees: 200€/semester
- Available places: 20
- Application period:
  > For EU students: February-July
  > For non-EU students: February-April

Additional information

CONTACT
mphy@uni.lu

CAMPUS
Belval and Limpertsberg

mphy.uni.lu

Programme

COURSES	ECTS
Semester 1	
Advanced experimental and theoretical laboratory classes	4
Advanced materials characterization techniques	2
Classical and quantum information theory	4
Classical and quantum transport	4
Computational methods	4
Colloids and liquid crystals	4
Laser physics	4
Solid state physics	6
Electives	
Computational fluid dynamics	3
Discrete-time stochastic processes	6
Lernen und schulisches Lernen	4
Partial differential equations	7
Physics didactics	1
Scientific Python	1
Total required	**30**
Semester 2	
Advanced experimental and theoretical laboratory classes	4
Introduction to general relativity	4
Literature seminar	2
Nonequilibrium soft and active matter	4
Physics of living matter	4
Semiconductor and solar sells	4
Electives	
Advanced engineering materials	4
Communicating science	3
Didactics for physics	3
Ferroelectrics and multiferroics	4
Knowledge discovery and data mining	5
Partial differential equations	8
Principles of software development	5
Total required	**30**
Semester 3	
Research project	30
Total	**30**
Semester 4	
Research project	30
Total	**30**

"The Master gave me a chance to deepen my knowledge in condensed matter and materials physics. The study environment here is inspiring, creative and friendly.
I appreciated, in particular, the wide range of research topics and the freedom to participate in any of research projects. In summary, this Master has met all my initial expectations, strongly enriched my perspectives, and helped me in my career."

Sergi Batlle Porro
PhD student, ICFO (Institute of Photonic Sciences)

German-French-Luxembourgish Master in Physics

120 ECTS

This Master is developed in partnership with the Universities of Luxembourg, Lorraine, Saarland and Grenoble Alpes. It enables students to acquire a solid and broad education in physics in a multicultural and multilingual context. Students do their first year of the Master in one of the 4 universities and the second year abroad at one of the other partner universities.

STRENGTHS

- Double diploma from University of Luxembourg and Lorraine, Saarland or Grenoble Alpes
- Focus on condensed matter physics and materials physics at the University of Luxembourg
- Multicultural and multilingual aspects

ADMISSION REQUIREMENTS (20 PLACES)

- Degree: Bachelor in physics or related field
- Languages: B2 in English/French or English/German

STUDY & CAREER OPPORTUNITIES

- Engineer, analyst, teacher, consultant, manager, researcher
- PhD in physics

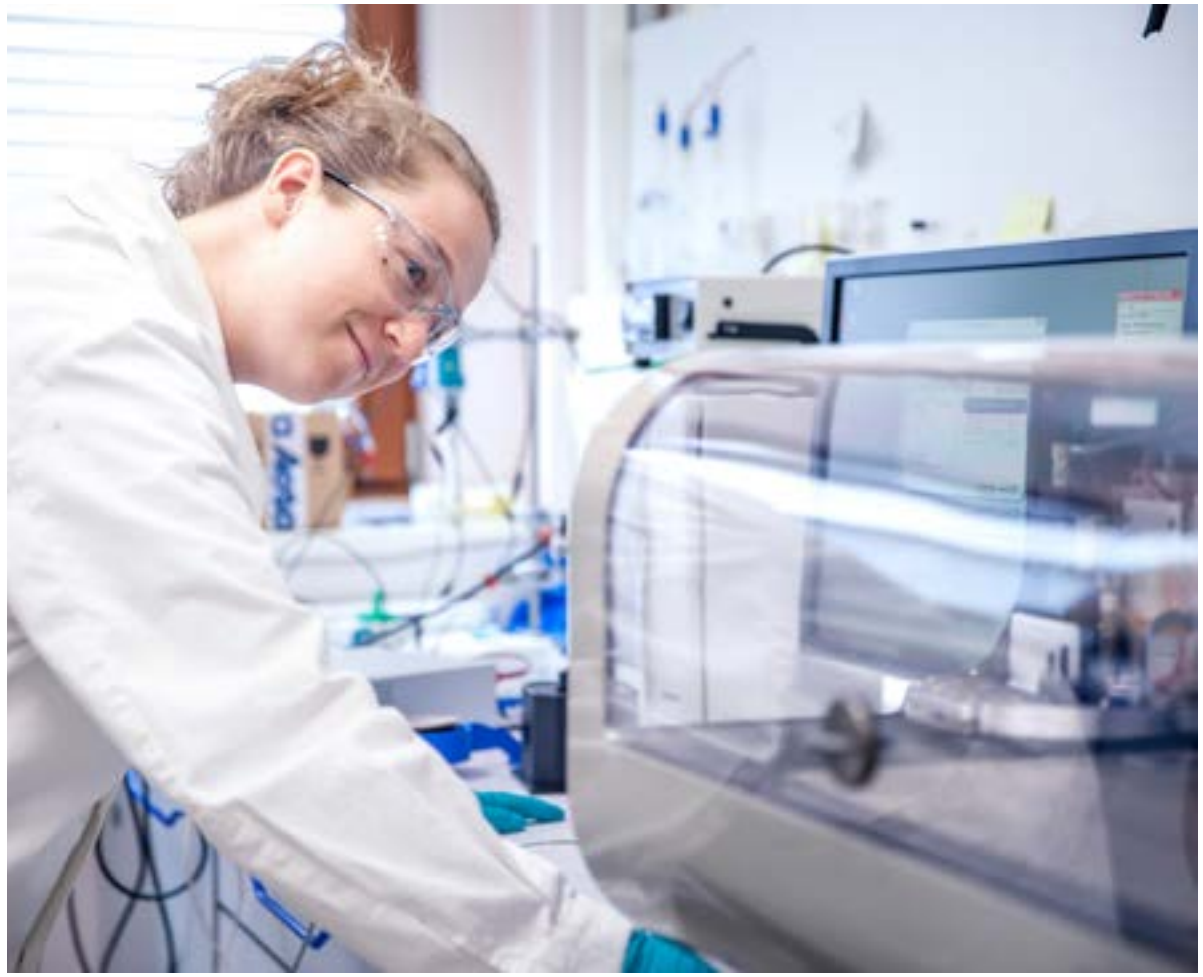
In collaboration with:

Université de Lorraine

Universität des Saarlandes

UGA Université Grenoble Alpes

Université franco-allemande Deutsch-Französische Hochschule



Programme at a glance

- Duration: 2 year full-time programme/ 4 semesters (120 ECTS)
- Languages: English/French or English/ German
- Registration fees: according to each university
- Available places: 20
- Application period:
  > For EU students: February-July
  > For non-EU students: February-April

Additional information

CONTACT
mphy@uni.lu

CAMPUS
Luxembourg, Nancy, Saarbrücken or Grenoble

"Living and learning in a highly international environment allows the students to build up cultural competence and opens many opportunities in our border region.
The programme gives us the possibility to choose a curriculum and university, which fit most with our respective interests. Moreover, highly motivated teaching staff and state of the art labs provide a motivating learning experience up to the current state of research in various fields."

Tobias Fischbach,
PhD student, University of Luxembourg

Doctoral Programme in Physics and Materials Science

This programme offers a research oriented doctorate at an internationally leading level. The aim of the research is to understand the fundamentals and applications of materials physics and science. The training is based on personal supervision and on specialised and transferable skills courses.

STRENGTHS

- Personal supervision by internationally leading scientists
- Immediate integration into research groups and projects
- Broad offer of transferable skills training
- State of the art laboratories and computer equipment

ADMISSION REQUIREMENTS

- Degree: Master in physics, chemistry, materials science or related field
- Language: B2 in English

CAREER OPPORTUNITIES

- Postdoctoral researcher, research scientist, research associate, associate professor
- Engineer, analyst, scientist

In collaboration with:

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST

EXAMPLES OF ALUMNI CAREERS

- Quantum engineer, Kvantify
- Software engineer, Siemens
- Patent examiner in applied physics, European Patent Office
- Research fellow, Trinity College Dublin
- Postdoctoral researcher, Tel Aviv University

Programme at a glance

- Duration: 3 to 4 years
- Language: English
- Registration fees: 200€/semester
- Number of doctoral candidates: 113

Additional information

CONTACT
dppm@uni.lu

CAMPUS
Belval and Limpertsberg

dppm.uni.lu

University of Luxembourg | FSTM - Faculty of Science, Technology and Medicine | Physics

Our department
Physics and Materials Science

DPhyMS at a glance

The Department of Physics and Materials Science (DPhyMS) has an excellent international reputation for its research on a wide range of fundamental and applied topics. The joint efforts of experimental and theoretical physicists have resulted in multiple breakthroughs published in top-level international journals and numerous prestigious grants. Members of DPhyMS are involved in multipronged collaborations at national and international levels and with industry (Goodyear, IEE, Janssen, Google). DPhyMS will also continue to foster interdisciplinary research collaborations with other Departments and Faculties, as well as with industry, on topics related to machine learning, artificial intelligence and big data anlytics.

MEMBERS

- 21 professors
- 56 post-docs and 14 research scientists
- 63 doctoral candidates
- 16 technical and administrative staff

FUNDING AND COLLABORATIONS

- nearly €10 million acquired in new research projects (2023)
- 8 FNR ATTRACT fellows + 8 ERC grants

PUBLICATIONS (2023)

- 150 peer-reviewed articles in scientific journals

Additional information

CONTACT
dphyms@uni.lu

CAMPUS
Limpertsberg and Belval

dphyms.uni.lu

Research areas

The department (DPhyMS) carries out research activities around five thematic axes:

PHOTOVOLTAICS AND SUSTAINABLE ENERGY

Researchers investigate the physics of materials and quantum mechanical systems that are used in the conversion of renewable energy sources like sun and wind. The research stretches from the fundamental understanding to the development of devices. They combine exciting questions in fundamental physics with societal impact.

QUANTUM SCIENCE AND TECHNOLOGY

This cluster is composed of theory groups and experimental groups that jointly span a range of topics in quantum information science, many-body physics, statistical mechanics and machine learning, quantum chemistry, and light-matter interactions for the advancement of emergent quantum technologies.

SOFT AND LIVING MATTER

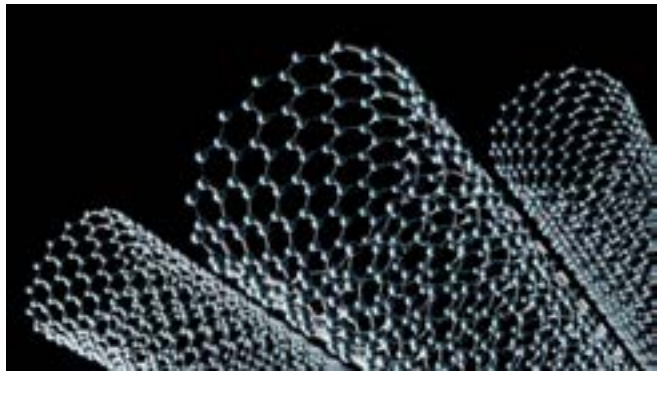
Researchers study the physics of partially ordered and responsive materials, with structures often arising without external assistance, in living systems as well as in inert materials. The research comprises theoretical and experimental approaches, addressing problems that range from curiosity-driven fundamental research into why certain structures and peculiar behaviours arise in soft and living systems, to applied aspects where they explore means to improve society and environment through understanding adaptive, responsive or otherwise smart active materials.

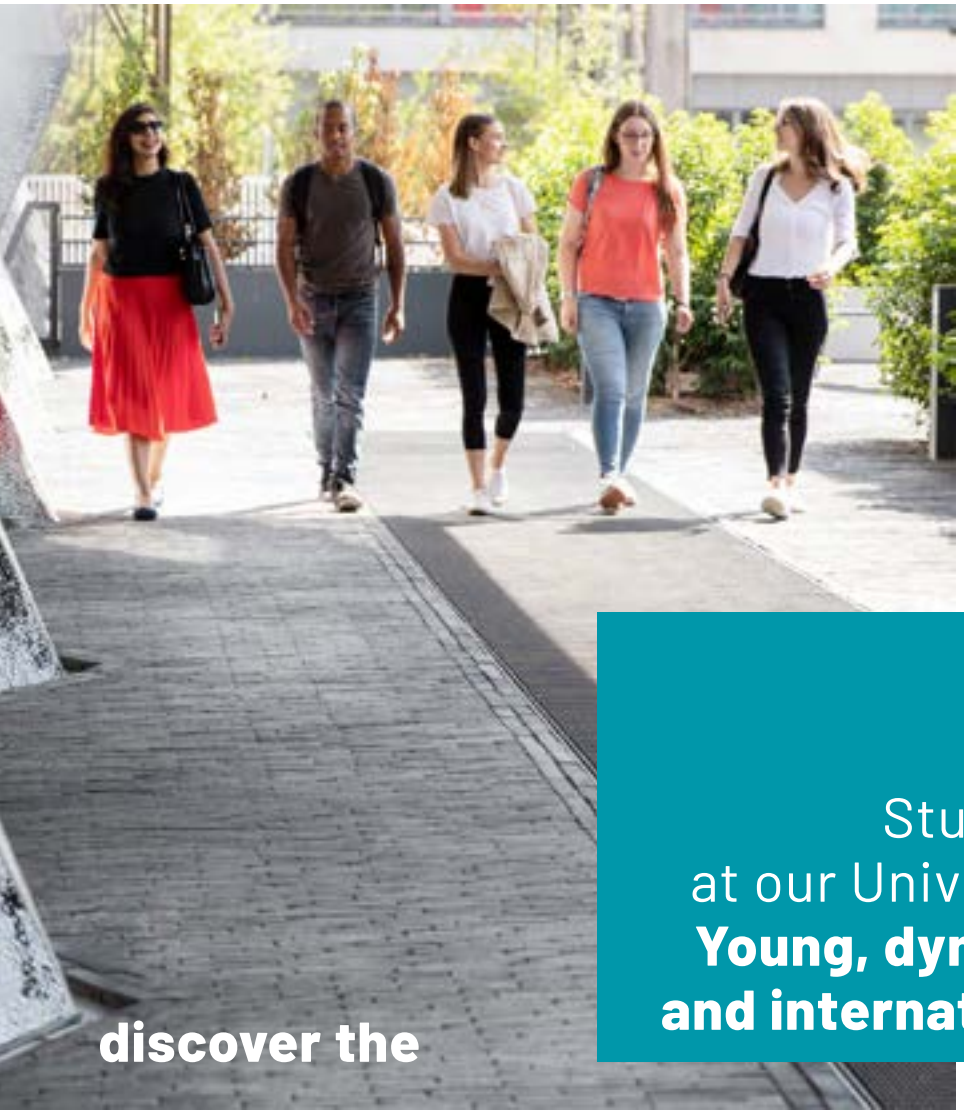
SPECTROSCOPY AND FUNCTIONAL MATERIALS

Physicists investigate novel materials in order to unveil the fundamental processes that govern and determine the properties of matter. The research groups employ a wide range of cutting-edge spectroscopic techniques in order to understand, design and control materials with important applications in future technology. The experimental activity is accompanied by advanced modeling of the fundamental phenomena to obtain a complete picture of the functioning mechanisms of materials and related devices.

STATISTICAL PHYSICS AND MACHINE LEARNING

This cluster uses and develops statistical physics and machine learning to design materials that can undergo dramatic and controllable changes in their properties, develop new methodologies to accurately compute long range intermolecular forces, understand collective behaviors in interacting living systems, design efficient and reliable quantum and classical computing schemes.





discover the

Studying
at our University
Young, dynamic and international

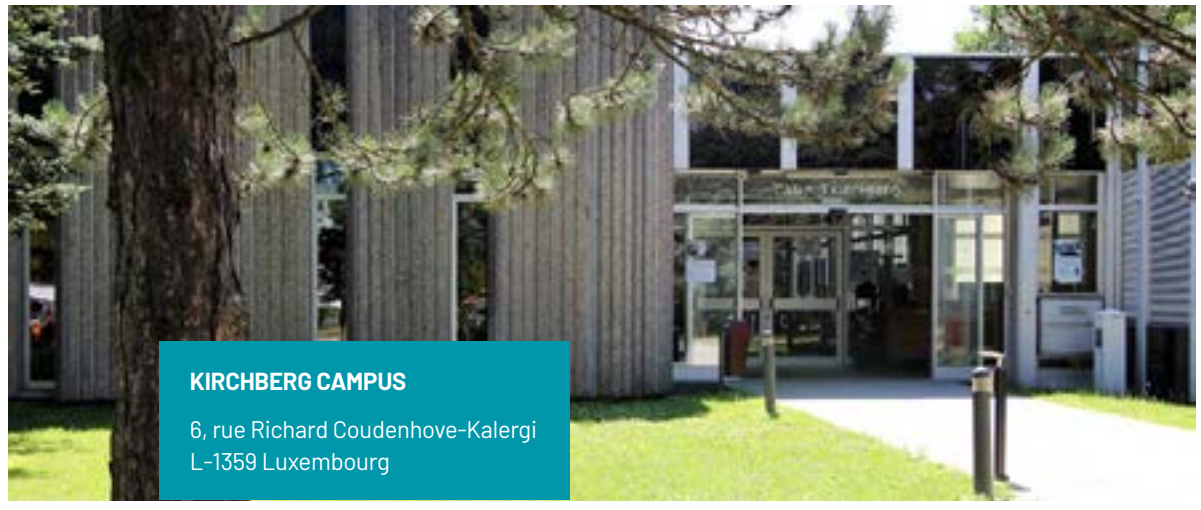
UNIVERSITY OF LUXEMBOURG

With more than 6,780 students from all over the world, the University of Luxembourg has an international and multilingual character that offers its students a higher research-oriented education.

Three campus sites

BELVAL CAMPUS

2, place de l'Université
L-4365 Esch-sur-Alzette



KIRCHBERG CAMPUS

6, rue Richard Coudenhove-Kalergi
L-1359 Luxembourg

LIMPERTSBERG CAMPUS

162 A, avenue de la Faïencerie
L-1511 Luxembourg

University of Luxembourg | FSTM - Faculty of Science, Technology and Medicine | Physics

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Discover Luxembourg **Great place to live and work**

Located in the heart of Europe, the Grand Duchy of Luxembourg boasts a colourful history, stunning landscape, multicultural environment and multilingual population. The thousand year old capital and five regions each have their own unique flavour and discoveries to be made. Experience contemporary and historic culture, explore the country's hiking and cycling trails, and taste world-class cuisine and local wine.

University of Luxembourg | FSTM - Faculty of Science, Technology and Medicine | Physics

Contact

University of Luxembourg
Faculty of Science, Technology
and Medicine (FSTM)
fstm.uni.lu

Campus Belval
2, place de l'Université
L-4365 Esch-sur-Alzette

Campus Kirchberg
6, rue Richard Coudenhove-Kalergi
L-1359 Luxembourg

Campus Limpertsberg
162 A, avenue de la Faïencerie
L-1511 Luxembourg

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FACULTY OF SCIENCE,
TECHNOLOGY AND
MEDICINE