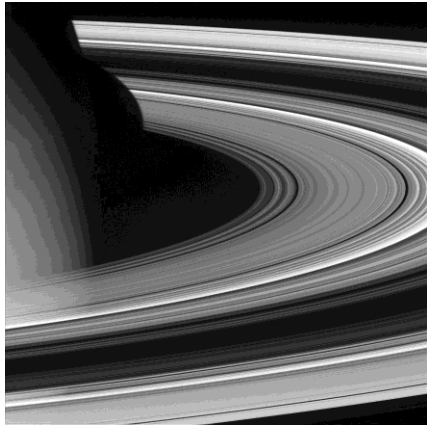


Paris Physics Master

Welcome !

Université Paris Cité

SORBONNE UNIVERSITÉ

Historical Background…

~ 1200 : Université de Paris
Faculté des Sciences de Paris
Campus Pierre et Marie Curie

~ 1968 : Université Pierre et Marie Curie — Université Paris Diderot
Campus Pierre et Marie Curie

~ 2007: Université Pierre et Marie Curie — Université Paris Diderot
Campus Pierre et Marie Curie — Campus Diderot

~ 2018: Sorbonne Université
Physics @ Campus Pierre et Marie Curie

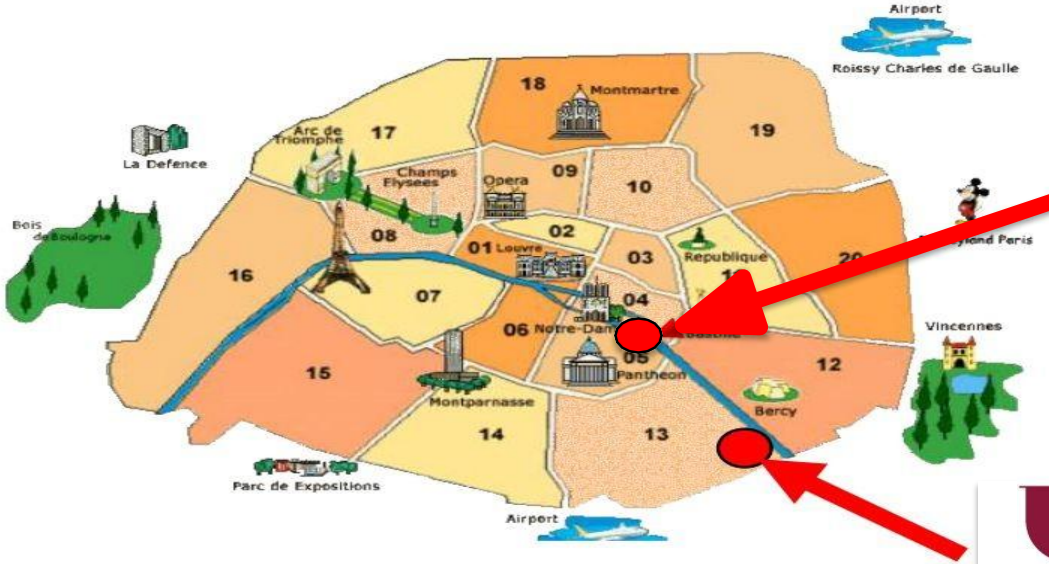
~ 2020: Université de Paris
Physics @ Campus Diderot

~ 2022: Université Paris Cité
Physics @ Campus Grands Moulins

Physics Departments:
a strong interaction…and success

Most of Physics Labs in Paris
are associated to one or both physics departments
of Sorbonne Université and Université Paris Cité

2 Universities, 2 Campuses



SORBONNE UNIVERSITÉ

CAMPUS PIERRE ET MARIE CURIE
4 place Jussieu - 75005 PARIS

Université Paris Cité

CAMPUS GRANDS MOULINS
5 Rue Thomas Mann, 75013 Paris
Several buildings !

Université Paris Cité

~ 61.000 students (Sciences and Engineering, Humanities, and Medical School)

~ 4.500 professors (+ ~2000 researchers) and

~ 3.000 administrative and technical staff

Université Paris Cité

université PARIS DIDEROT PARIS 7

UNIVERSITÉ PARIS DESCARTES

IPGP INSTITUT DE PHYSIQUE DU GLOBE DE PARIS

Sorbonne Université

~ 56.000 students (Sciences and Engineering, Humanities, and Medical School)
~ 6.400 professors and researchers
~ 2.400 administrative and technical staff

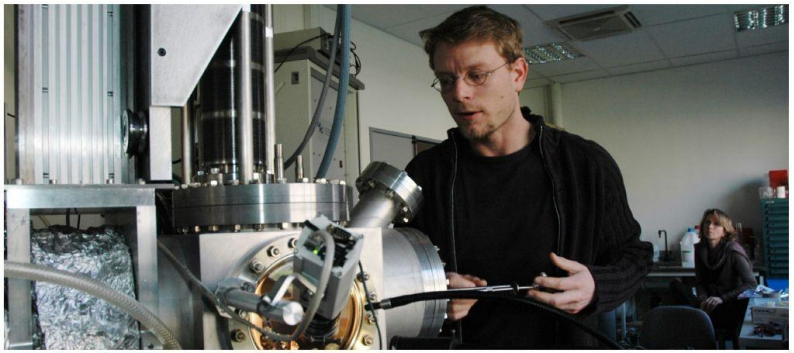
Université Paris Cité: Physics Department

Director: Atef Asnacios

15 laboratories
~ 400 researchers
50 tech. and adm. staff
250 PhD students
650 B/M students

Sorbonne Université: physics department

Director: Edouard Kierlyk



~ 2.500 students
~ 700 professors and researchers
~ 450 administrative and technical staff
22 laboratories

Research domains in physics at Université Paris Cité

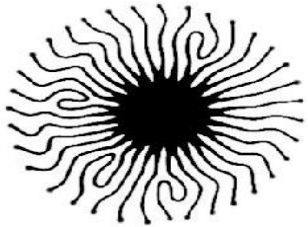
Covers all the main domains of physics, from universe to particle scale, from quantum physics to macroscopic physics.

3 + 1 main research axes

- « Two infinites » : cosmology, astrophysics, particle physics
- Quantum physics and nanophysics : nano-electronics and photonics, new quantum materials
- Macroscopic physics and biophysics : soft matter, non-linear physics, physics of biological systems
- Energetic transition, new energy sources

Université Paris Cité: physics department, laboratories

AstroParticle and Cosmology (APC)



Complex Matter and Systems (MSC)

Quantum Materials and Phenomena (MPQ)

LIED

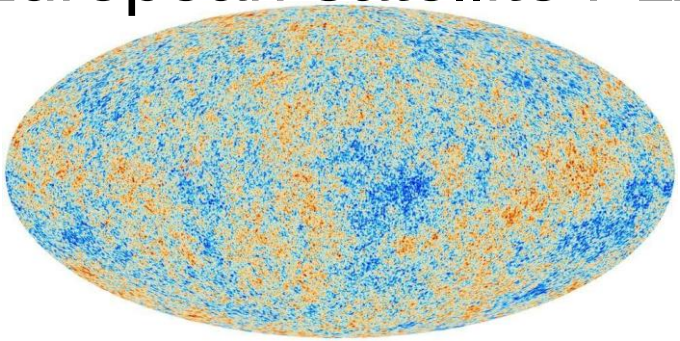
LDAR Education Research in Physics

+ 10 other laboratories in the best institutions around Paris are supported by the Physics department

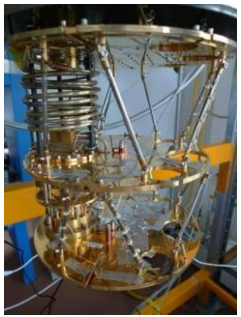
AstroParticle and Cosmology (APC)

https://apc.u-paris.fr/

European satellite PLANCK :



Map of the Cosmological Microwave Background



Superconducting bolometer arrays with SQUIDs readout

Study of the early Universe
Instrumentation on microwaves detection

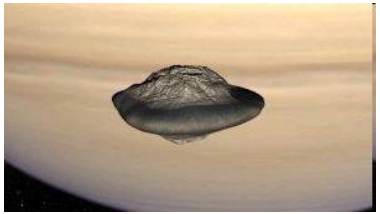
Paris Centre for Cosmological Physics :

George Smoot, 2006 Nobel Prize in Physics, professor at Université Paris Cité

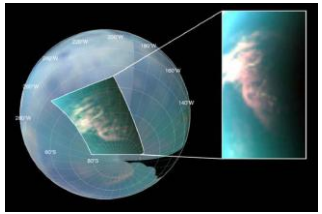
Astrophysics, Instrumentation and Modelization (AIM)

Astrophysics and Planetology

Saturne



Small satellite



Titan

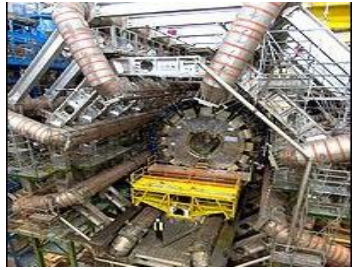
Support to other groups at Observatoire de Paris : LESIA, LUTh, GEPI

Particles, Nuclei and High Energy Lab (LPNHE)

High energy particles physics (CERN) :

Discovery of the Higgs boson

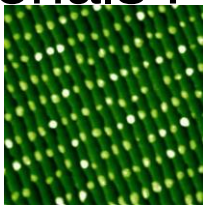
ATLAS detector



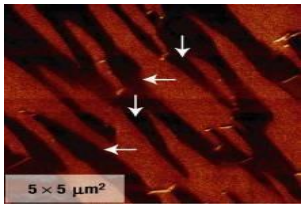
Quantum Materials and Phenomena (MPQ)

https://mpq.u-paris.fr/

Magnetic nanoparticles and materials :

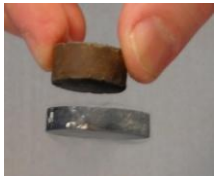


Self-organized Co nanoparticles

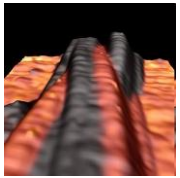


Multiferroic

Quantum materials :

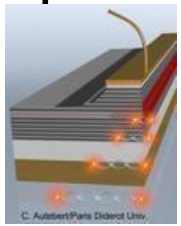


High Tc superconductor

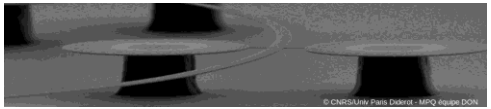


Carbon nanotubes

Photonic quantum devices :



Quantum optics with semiconductors



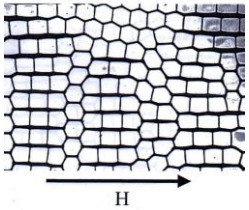
Optomechanics, nonlinear optics

Ions micro-traps

Complex Matter and Systems (MSC)

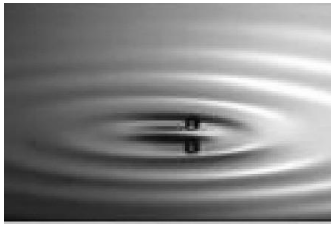
http://www.msc.univ-paris-diderot.fr/?lang=en

Soft matter, hydrodynamics:



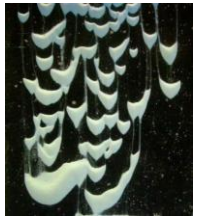
Magnetic foam

Meandering instability



Walking droplet

Morphogenesis :

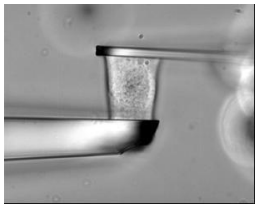


Sand dunes

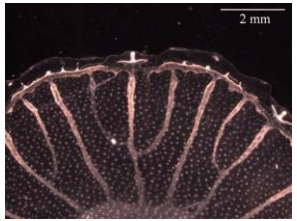
Sunflower

Birds flying

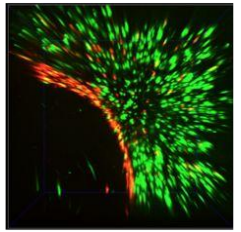
Biophysics and bioengineering :



Single cell mechanics



Angiogenesis in jellyfish



Tissue engineering

Interdisciplinary Laboratory for New Energies (LIED)

- Development of low-carbon energy sources
- Energy efficiency
- Interdisciplinary methodology
- Forecasting, social and economic analysis, and public policy studies

LIED PIERI

Other research groups in condensed matter physics :

At ESPCI : - Institut Langevin (acoustics, imaging for material science and biomedicine),

- **PMMH** (fluid mechanics, non-linear physics)

At Ecole Normale Supérieure : - LPA (quantum physics)

- LPS (statistical physics)

At Paris-Sud Campus : - IMNC (Institut de Modélisation en Neurobiologie et Cancérologie)

- C2N (Center for Nanosciences and Nanotechnologies)

Sorbonne Université: physics department, laboratories

Condensed matter, nanosciences:

Institut de minéralogie, de physique des matériaux et de cosmochimie (IMPMC)

Institut des nanosciences de Paris (INSP)

Laboratoire de Physique de l’ENS (LPENS)

Laboratoire de physique et d’ étude des matériaux (LPEM)

Sorbonne Université: physics department, laboratories

Macroscopic physics, biophysics:

Laboratoire Jean Perrin (LJP)

Physico-chimie Curie (PC-Curie)

Physique et mécanique des milieux hétérogènes (PMMH)

Sorbonne Université: physics department, laboratories

Theoritical and statistical physics, particle physics:

Laboratoire de physique nucléaire et hautes énergies (LPNHE)

Laboratoire de physique théorique et hautes énergies (LPTHE)

Laboratoire de Physique de l’ENS (LPENS)

Laboratoire de physique théorique de la matière condensée (LPTMC)

Sorbonne Université: physics department, laboratories

Waves, quantum optics, atomic and molecular physics:

Institut Langevin ondes et images

Laboratoire Kastler-Brossel

Sorbonne Université: physics department, laboratories

Astronomy, astrophysics and plasma physics:

Institut d'astrophysique de Paris (IAP)

Institut de Mécanique Céleste et Calcul des Ephémérides (IMCCE)

Laboratoire d'études du rayonnement et de la matière en astrophysique et atmosphères (LERMA)

Laboratoire d'études spatiales et instrumentation en astrophysique (LESIA)

Laboratoire de physique des plasmas (LPP)

Laboratoire pour l'utilisation des lasers intenses

Systèmes de référence temps-espace (SYRTE)

PPM…

1st Semester

Semester 1	
Courses:	**Professors:**
Advanced Quantum Mechanics	SU : Michael Joyce UPCité : Edouard Boulat
Statistical Physics	SU : Fabio Pietrucci UPCité : Jihad Mourad
Numerical methods	SU : Roch Smets/Andrea Ciardi UPCité : Sébastien Charnoz
Complex Systems	SU : Maria Barbi UPCité : Florence Elias

+

Laboratories

+

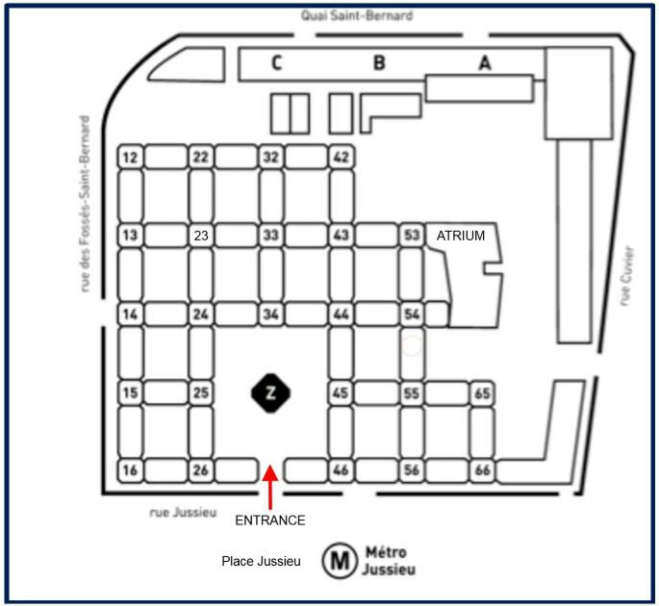
French foreign language

or

International Physicists Tournament

Lecture rooms at Sorbonne Université

Pierre et Marie Curie Campus:
Main entrance: 4 place Jussieu, 75005 PARIS
Metro Station : Jussieu, metro lines 7 and 10



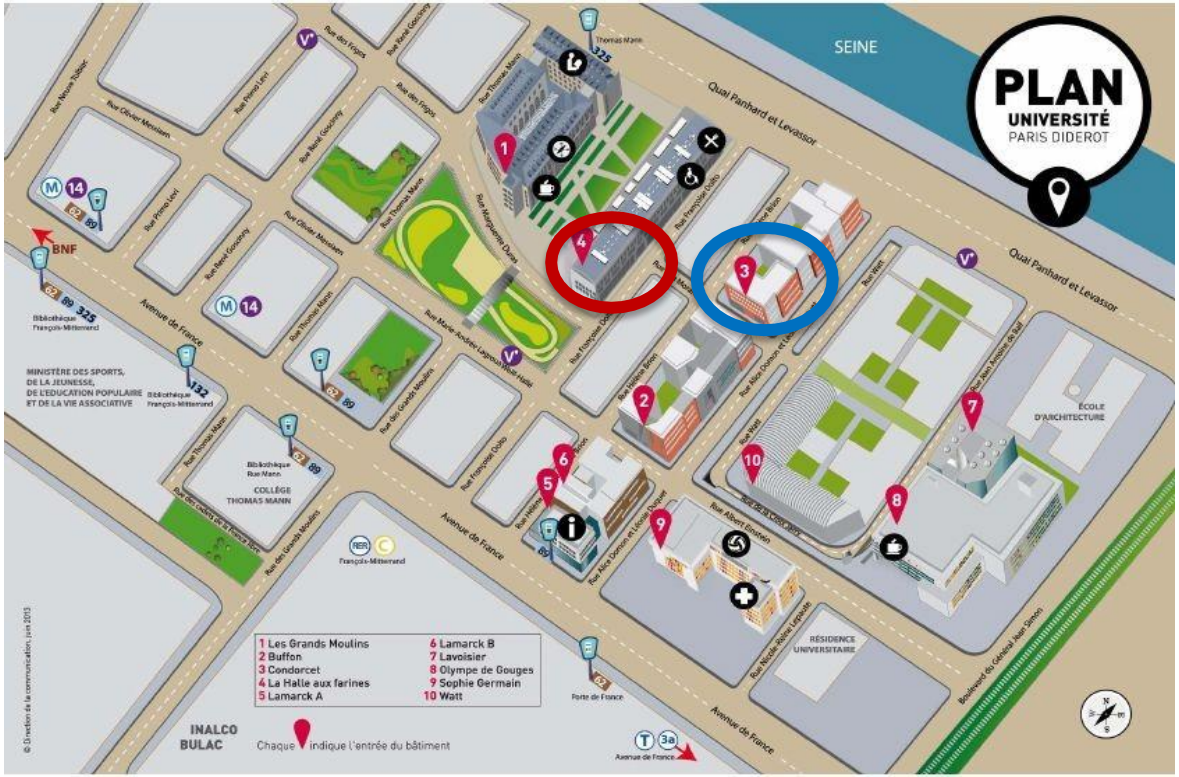
Example:
Room 23-33, 202

- Go to tower 23 or 33
- 202 means go to 2d floor
- Enter the 23-33 corridor

Université Paris Cité:
Paris Diderot/Grands Moulins campus

234C Halle aux farines building

356A Condorcet building



2nd Semester

Choose 3 among the 4 courses:

- Atomic and Molecular Physics
- Condensed Matter: from fundamentals to nanosciences
- Astrophysics and Cosmology
- Nuclear and Particle Physics

Choose 1 among the 3 courses:
Statistical Physics of Complex systems / Plasma Physics / Advanced Quantum Mechanics 2

+ Internship (>7 weeks)

SEMESTER 2	
COURSES:	**Professors:**
Atomic and molecular physics	SU: Jean Hugues Fillion UPCité: Luca Guidoni/Julien Serreau
Condensed matter	SU: Nathalie Jedrecy UPCité: Yann Gallais
Nuclear and particle physics	SU: Eli Ben Haim UPCité: José Ocariz
Astrophysics and cosmology	SU: Irina Dvorkin UPCité: Sylvain Chaty
Plasma Physics	SU: Andrea Ciardi
Advanced Quantum Mechanics 2	UPCité: Philippe Lafarge
Statistical Physics of Complex Systems	SU: Maria Barbi/Fabio Pietrucci/Marie-Anne Herve du Penhoat/Nicolas Rodriguez
Internship	SU: Nicolas Rodriguez/Andrea Ciardi UPCité: Florent Baboux

For Sorbonne University students : **The IPIASMUS Program**

The possibility to make your **M1 internship**
in a foreign country with a grant
of the Initiative Physique des Infinis

- ✓ For internships in the fields of : ***Plasma, Fusion***, ***Astrophysics***, ***Cosmology***, ***Particle Physics…***
- ✓ 5 to 10 grants opened for the spring 2022
- ✓ Amount : between 2000 and 4000 € for transport, housing and meals
- ✓ Applications : before December 2024
- ✓ More information on :
  https://ipi-sorbonne-universite.fr/ipiasmus/
- ✓ Contact : **Sophie Trincaz-Duvoid (trincaz@lpnhe.in2p3.fr)**

Université Paris Cité: the master department

Director (of all M1+M2 programs): Francesco Nitti
French Master 1 coordinator: Francesca Carosella Paris
Physics master UP coordinator: Florent Baboux
Administrative secretary: Stessy Mondongue
(Grands Moulins campus, Condorcet building, room 320A)

Contact: firstname.surname@u-paris.fr

(Or firstname.surname@univ-paris-diderot.fr if you encounter any problem with the previous address)

Université Paris Cité

Sorbonne Université : the master in physics department

Director: Frédéric DECREMPS
Vice director: Sophie TRINCAZ
Master 1 director: Pauline IZOMBARD
Pedagogical and administrative head: Odette COMBRISSON
(office : PM Curie campus, 33-23 2d floor)
Paris Physics master SU coordinator: Nicolas RODRIGUEZ

Contact: firstname.surname@sorbonne-universite.fr

SORBONNE UNIVERSITÉ

Quantum Devices

(https://www.ip-paris.fr/master-2-quantum-devices/)

2nd year track

Master 2
Quantum Devices

APPLY ›

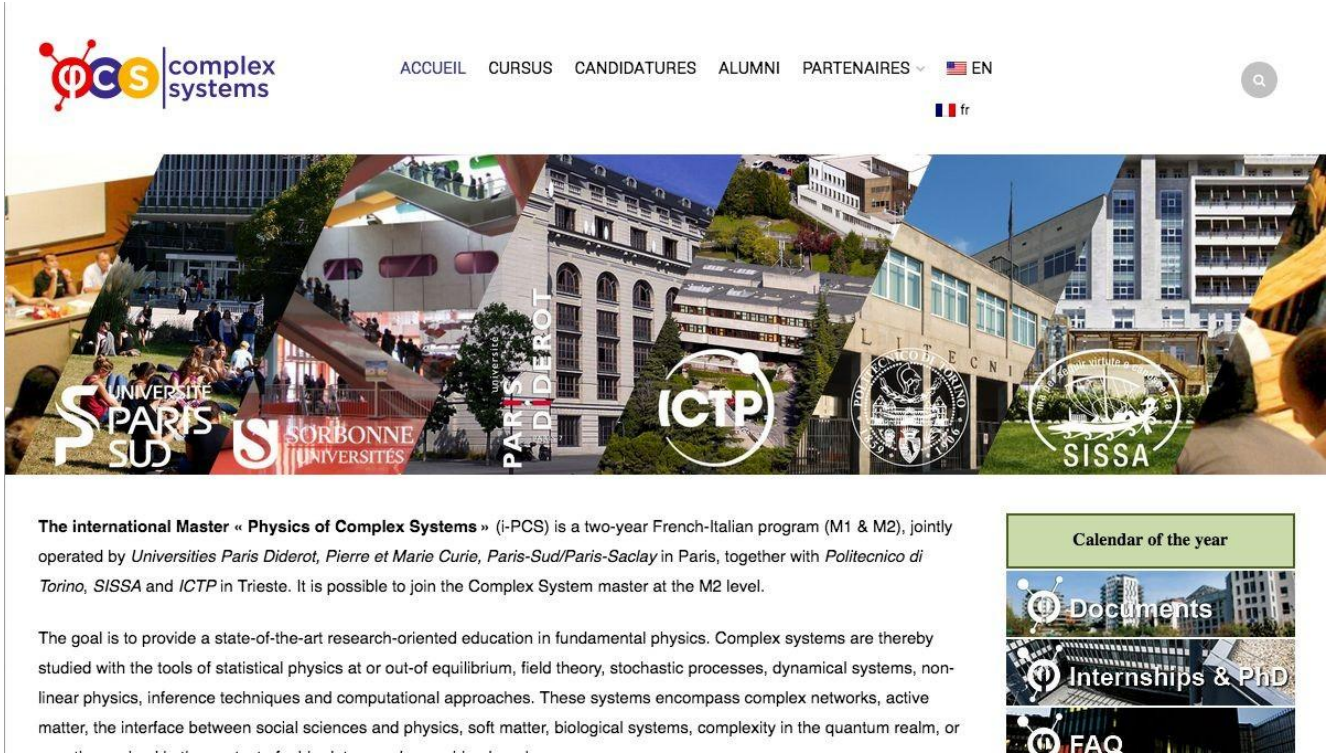
Overview

The 'Quantum Devices' program provides its students with a high level theoretical and experimental training on different kinds of quantum phenomena with particular emphasis on quantum devices and nanotechnologies. Students receive state of the art training in nanofabrication and nanocharacterizing, with access to cleanroom facilities and a dedicated nanoscience teaching platform.
The training courses are given by high-level scientists from Ile de France laboratories working in the domain of quantum devices. Thanks to this well established network, students find many opportunities after graduation both in academics as well as in the industrial sector.

Language of instruction: English
ECTS: 60
Oriented: academic research or industrial sector
Duration: 1 year
Courses Location: Université Paris-Diderot, Ecole Polytechnique

Physics of Complex Systems

(https://physics-complex-systems.fr/en/)



Nuclei, Particles, Astroparticles, Cosmology

(https://npac.lal.in2p3.fr/m2-presentation/)

CONTACTS LABORATORIES AFTER NPAC SIP POSTER COVID-19

M2 PRESENTATION

All the lectures are given in English

The NPAC Master's degree (or "M2"*) is designed to provide training for students wishing to enter research in nuclear physics, particle physics, astroparticles and cosmology. More specifically it prepares students for either an experimental or a theoretical PhD in these fields in laboratories attached to the universities or other major research institutions (CNRS, CEA).

(*)In the French system, the master program is divided into two years: M1 (first-year of Master) and M2 (second-year of Master).

The content of the program has a dual objective. On the one hand, it provides an introduction to the physics of the "infinitely small" – the physics of the fundamental particles and interactions in Nature, and the physics of nuclei built from these elementary building blocks. On the other hand, it introduces the physics of the "infinitely large" – modern cosmological theory and its description of the geometry and contents of the Universe (including notably dark matter and dark energy). The students are also taught about astroparticle physics, which concerns another important class of "cosmic messengers" which open windows on many unanswered questions.

CONNECTIONS ZOOM (DISTANCE EDUCATION)

All the courses will be available via zoom (until October 22 for the moment) for those will not be able to be present in the classrooms due to the COVID-19 (if you are not yet in France, in quarantine or having an health problem which makes you very sensitive to COVID-19).

Morning courses (9:00-12:00):

Participate to the ZOOM courses:
https://ijclab.zoom.us/j/94989833665?pwd=a3FzTkxld3pZWUpLVW5mVDJsN2grQT09

ID de réunion : 949 8983 3665
Code secret : .....

Afternoon courses (14:00-17:00):

Participate to the ZOOM courses:

SMNO-Nanomat

https://master.physique.sorbonne-universite.fr/fr/m2/smno/smno.html)

Material sciences and nano-objects-nanomat

French version here.

SMNO-nanomat is a research-type M2 program (*M2: Master 2nd year*) that offers a complete high-level training on the structural and electronic properties of condensed matter and nanostructures. The objective is two-fold: (i) to acquire the theoretical bases allowing a thorough understanding of the materials properties, (ii) to be trained in advanced experimental and numerical investigation methods. The program includes numerous tutorials, laboratories and numerical projects in relation with current scientific topics that can answer to societal challenges (renewable energies, ecology, health, heritage, ...). The addressed topics concern optics, electronics, spintronics, superconductivity, correlated systems, physical chemistry of solids and high-density liquids, exploration of planetary interiors, interaction with the environment, etc. They cover a large variety of materials and their applications, such as nanostructured materials, 2D materials, thin films, materials for energy, materials under extreme conditions, glasses, minerals and cultural heritage materials, with a systematic focus on the microscopic phenomena at the origin of their macroscopic properties.

SMNO-nanomat welcomes students enrolled at Sorbonne University, with the support of l'École Polytechnique (l'X), ESPCI and Chimie Paris-Tech. Strong international ties are maintained by the collaboration "Nanomat international master" with the Universities of Uppsala, Antwerp, Bologna and Khatam, allowing the awarding of double diplomas.

A research-type master's degree in physics covering light-matter interaction and quantum processes from both theoretical and experimental perspectives

https://masterquom.fr/

Physics of plasmas and fusion

(http://www.master-plasmas-fusion.fr/ppf-en/?lang=en)

Master's programme Physics of Plasmas and Fusion (PPF)

Home » Master's programme Physics of Plasmas and Fusion (PPF)

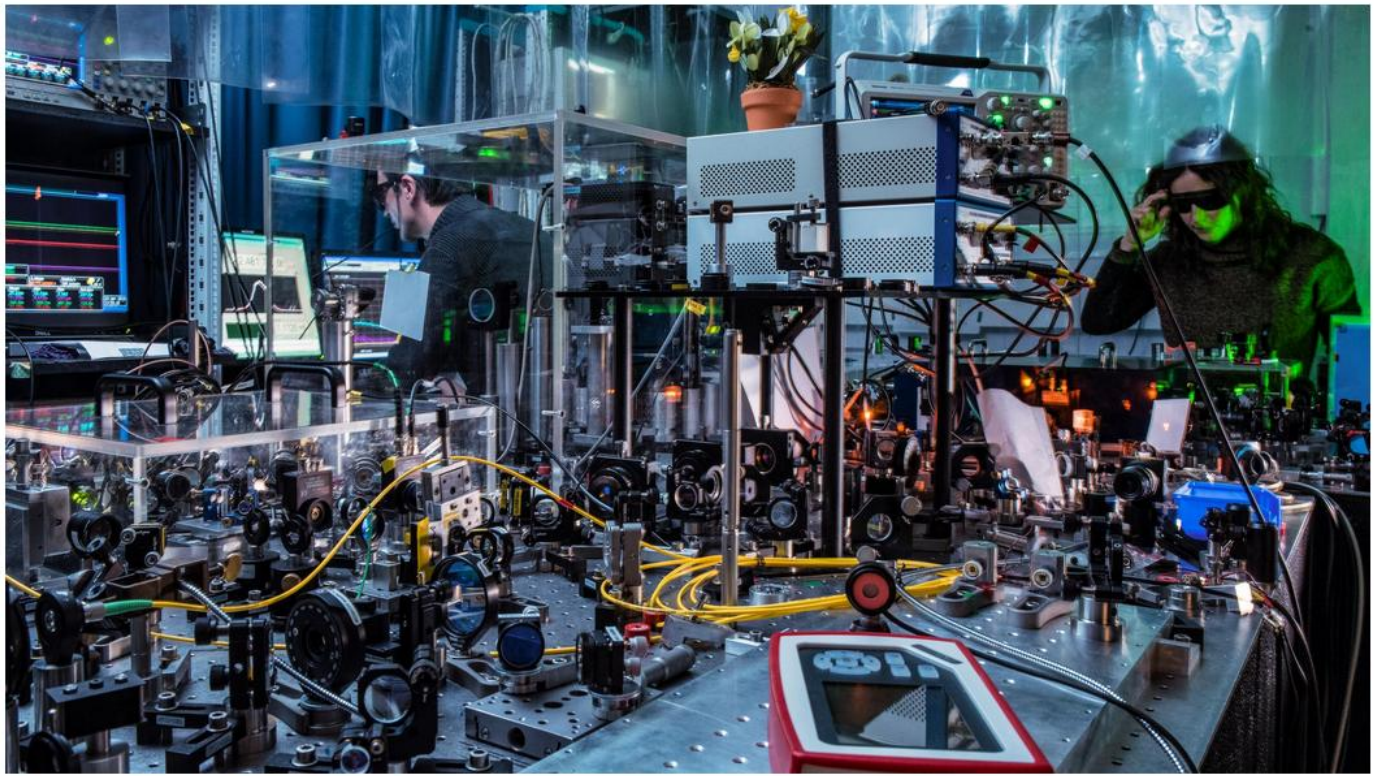
- Description
- Courses
- Application for M2 PPF

The Master "**P**hysics of **P**lasmas and **F**usion" (PPF) is the **only generalist** Master in France which offers fundamental basis in plasma physics and whose objective is to train **high level** scientists and engineers, capable of invest in research programs on plasmas, whether natural or artificial, cold or hot, diluted or dense.
This Master offers students **wide possibilities of choice and orientation** among many themes of plasma physics, allowing them to build step by step their professional project throughout the academic year. It is common to various establishments including the Paris-Saclay University (UPSAy), the University Sorbonne Université (SU) and the Polytechnic Institute of Paris (IPP).

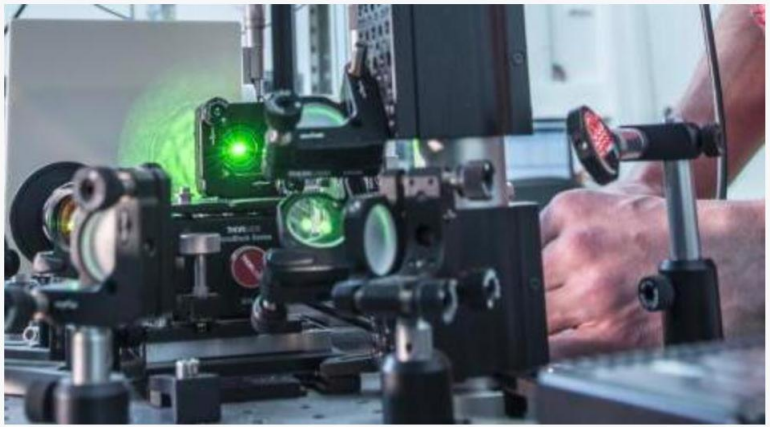
Etablissements partenaires du M2 PPF

Quantum Information

https://qics.sorbonne-universite.fr/second-year-joint-master-program-quantum-information-physics



M2 International Center for Fundamental Physics (ICFP)



Condensed matter physics

Soft matter and biological physics

Quantum physics: From the foundations to quantum technologies

Theoretical physics

https://www.phys.ens.fr/en/formations/m2-icfp