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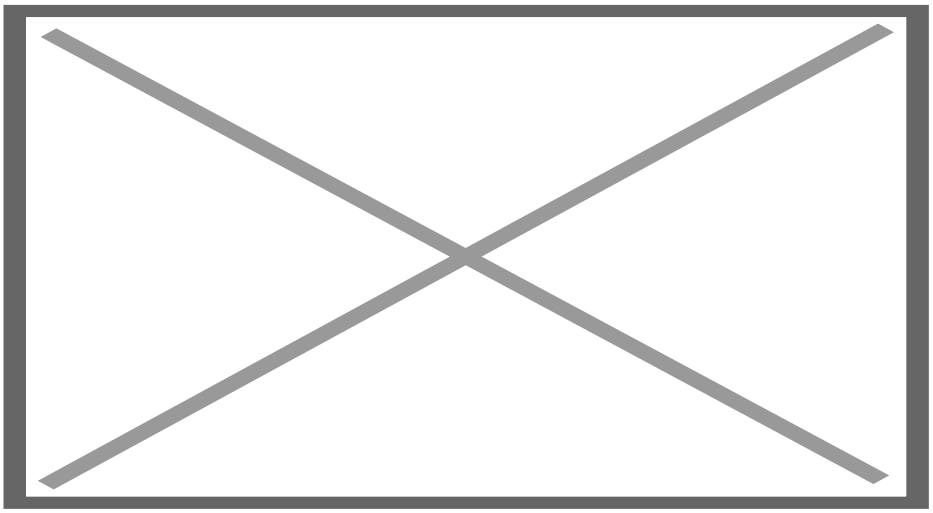
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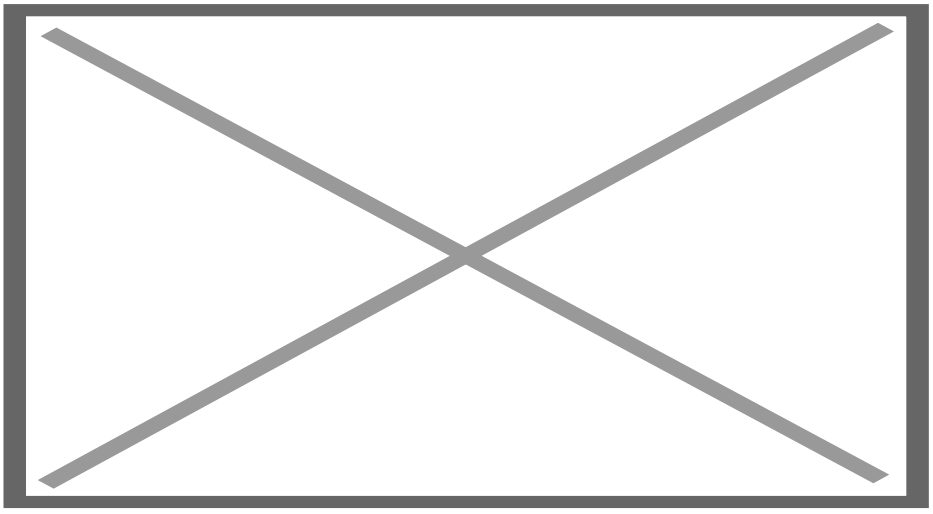
M2 Physics of Plasmas and Fusion

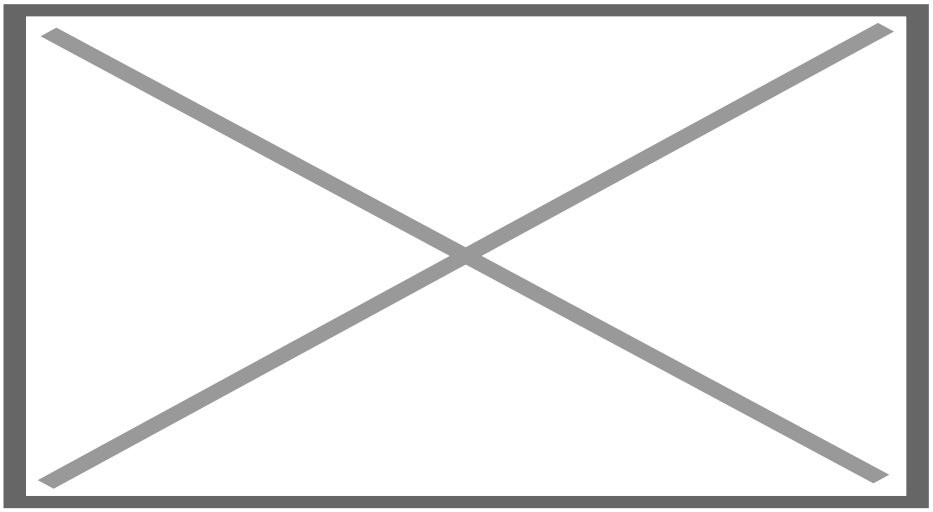
Master's degree
Specialisation Physique fondamentale et applications
Enrolment type
Formation initiale
Formation continue
Language(s) of instruction
English

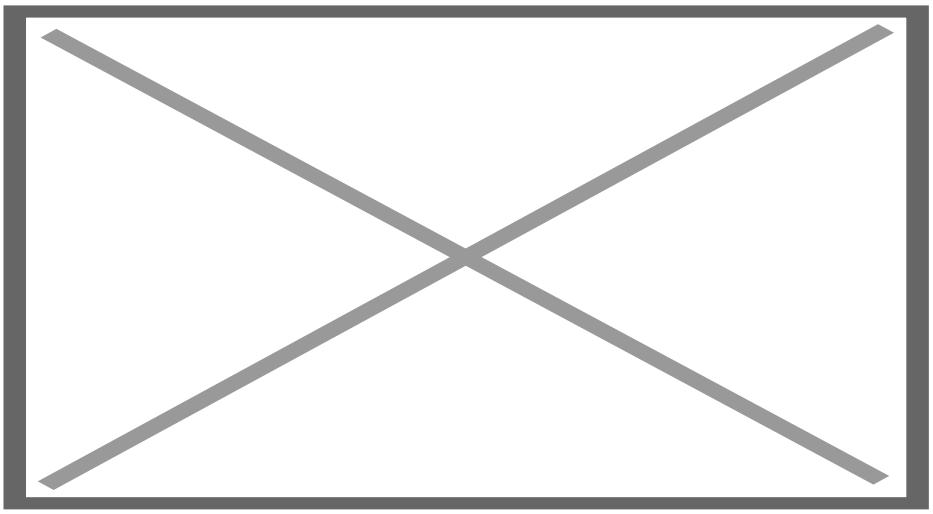
General training in plasma physics, with applications ranging from space to the laboratory

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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

Master and apply specialized knowledge of physics with the necessary scientific rigor.

Objectives

The Master “Physics of Plasmas and Fusion” (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). The academic year is structured in different parts. After fundamental lectures given to all students to introduce the plasma physics' basic notions (common core), optional courses dealing with the different themes of the discipline are offered to them: natural plasmas' physics (Space Plasmas and Astrophysics), process plasmas (so-called "industrial" plasmas), thermonuclear plasmas (magnetic or inertial fusion plasmas) or plasmas from laser-matter interactions, a more detailed description of which is given below. All of these courses are introduced both theoretically and fundamentally, but also from the point of view of experimentation, numerical simulation and modeling. They allow students to acquire expertise in different multidisciplinary fields (plasma/health, plasma/environment, plasma/energy, plasma/space, …), but also to be introduced to the most current innovative technologies and major international and national projects such as the Tokamak ITER, the MegaJoule, Apollon or Petal lasers, or even present and future space missions (Parker Solar Probe / NASA, Solar Orbiter ESA / NASA, …). These optional thematic lectures are followed by so-called "specialization" courses, which allow students to deepen their knowledge in a more specific way and in the perspective of their research internship of 4-5 months. This internship can be carried out in a research laboratory in France or abroad, in the academic environment or with an industrial partner. It completes the Master, which then opens onto a PhD (for the majority of students) or directly onto a job in the industry.

Débouchés

Further Study Opportunities

PhD thesis

Calendar

Start of programme (indicative date)
02/09/2025
End of programme (indicative date)
28/08/2026
Admission

Capacity

Available Places

28

Target Audience and Entry Requirements

M1 in Physics or engineer school diploma

Période(s) de candidature

Inception Platform

From 15/03/2026 to 15/07/2026

Supporting documents

Compulsory supporting documents

Copy of identity document.

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Curriculum Vitae.

Detailed description and hourly volume of courses taken since the beginning of the university program.

Additional supporting documents

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Document indicating the list of local M2 choices available here : https://urlz.fr/i3Lo.

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class

Instrumentations, diagnostics and plasmas analysis	3	Semester 1	18			24		
Charger le détail								
Numerical methods and simulations	3	Semester 1	20			24		
Charger le détail								
Kinetic theory	3	Semester 1	30					
Charger le détail								
Atomic, molecular and radiation physics	3	Semester 1	30					
Charger le détail								
Tools for plasmas and fusion	3	Semester 1	18	3				
Charger le détail								
Waves and instabilities	3	Semester 1	32					
Charger le détail								
Magneto-hydrodynamics	3	Semester 1	30					
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
Astrophysical plasmas with high energy density	3	Semester 1	21						
Charger le détail									
Cold plasmas at high pressure	3	Semester 1	15	6					
Charger le détail									
Relativistic laser-plasma interaction	3	Semester 1	18	8					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
Charger le détail									
Laser-plasma interaction and inertial confinement fusion	3	Semester 1	15	6					
Charger le détail									
Turbulence, transport, heating and containment	3	Semester 1	30						
Charger le détail									
Physics and diagnostics in Tokamaks	3	Semester 1	24						
Charger le détail									
Space plasmas	3	Semester 1	21						
Charger le détail									
Cold plasmas at low pressure	3	Semester 1	21						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learn cour
Internship	24	Semester 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dis lea c
Dilute astrophysical plasmas	3	Semester 2	30						
Charger le détail									
Relativistic plasma astrophysics	3	Semester 2	12		9				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dis lea co

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
High power lasers	3	Semester 2	12	8	14			

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Hydrodynamics of inertial fusion	3	Semester 2	12	8	14			

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dist lear cou
Physics of Magnetized Fusion Plasmas	3	Semester 2			40				

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Advanced physics for Tokamaks	3	Semester 2	10	10	20			

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dis lea co
Plasmas for materials, environment and biomedicine	3	Semester 2	27	5					

Charger le détail

Subjects	ECTS	Semester	Lecture
Plasmas for energy and aerospace	3	Semester 2	30

Charger le détail

Teaching Location(s)

ORSAY

PARIS 05
PALAISEAU

Contact

- **Pierre MOREL**
- **Sebastien GALTIER**

http://www.universite-paris-saclay.fr/formation/master/physique-fondamentale-et-applications/m2-physique-des-plasmas-et-de-la-fusion