

2026-2027 MASTER EN PHYSIQUE - Options

Cycle Master

validé par la Présidence le 8 juin 2026

CODE	MATIERES	ENSEIGNANTS sous réserve de modification	SEMESTRES						CREDITS ECTS	FORME
			MA1/MA3			MA2/MA4				
			cours	exercices	course- project	cours	exercices	course- project		EXA
Groupe I "Options"									38	
Groupe Ia - Options SPH						dont min. 20				
PHYS-476	Advanced superconducting magnet technologies	Riccioli				2	2		4	oral
PHYS-472	Astrophysics II : interactions radiation-matter	Jablonka	2	2					4	écrit
PHYS-465	Astrophysics III : galaxy formation and evolution	Hirschmann	2	2					4	oral
PHYS-401	Astrophysics IV : stellar and galactic dynamics	Revaz				2	2		4	oral
PHYS-402	Astrophysics V : observational cosmology	Kneib				2	2		4	oral
PHYS-761	Attosecond radiation sources	Carbone/Puppini	2	2					4	oral
PHYS-463	Computational quantum physics	Carleo				2	2		6	oral
PHYS-403	Computer simulation of physical systems I	Pasquarello	2	2					4	oral
MSE-450	Electron microscopy: advanced methods	Alexander				2	2		4	oral
PHYS-407	Frontiers in nanosciences	Pivetta	2	2					4	oral
PHYS-477	Fundamentals of crystallography and diffraction	Alexander	2	1					3	écrit
PHYS-438	Introduction to biomedical imaging	Xin	2	2					4	écrit
PHYS-502	Interacting quantum matter (pas donné en 26-27)	vacat.	3	1					4	oral
PHYS-439	Introduction to astroparticle physics	vacat.				2	2		4	oral
PHYS-448	Introduction to particle accelerators	Pieloni	2	2					4	écrit
PHYS-467	Machine learning for physicists	Zdeborová	2	2	1				6	écrit
PHYS-491	Magnetism in materials	Zivkovic				2	2		4	oral
PHYS-469	Mathematical aspects of quantum physics	Bossoney	2	2					4	oral
QUANT-410	Microwave engineering in physics	Manucharyan				2	1	1	4	oral
PHYS-442	Modeling and design of experiments	Fuerbringer	2	1	1				4	oral
PHYS-473	MRI Practicals on CIBM preclinical imaging systems	Cudalbu/Lanz/Lê	2		2				4	sem A
PHYS-640	Neutron and X-ray Scattering of Quantum Materials	Rønnow/Schmitt+Lacmann	2	2					4	oral
PHYS-460	Nonlinear dynamics, chaos and complex systems	Février				3	2		6	oral
PHYS-470	Nonlinear optics for quantum technologies	Galland				2	2		4	écrit
PHYS-445	Nuclear fusion and plasma physics	Fasoli	2	2					4	oral
PHYS-440	Particle detection	Haefeli	2	2					4	sem A
PHYS-415	Particle physics I	Dufour	2	2					4	oral
PHYS-416	Particle physics II	Shchutska				2	2		4	oral
PHYS-471	Particle physics: the flavour frontiers	Marchevski				2	2		4	oral
PHYS-468	Physics of life	Stahlberg				2	2		4	écrit
PHYS-474	Physics of low dimensional materials	Wäckerlin				2	2		4	oral
PHYS-478	Physics of magnetic resonance imaging	Karampinos				2	2		4	écrit
PHYS-307	Physics of materials	La Grange	2	2					4	oral
PHYS-434	Physics of photonic semiconductor devices	Grandjean				2	2		4	oral
PHYS-423	Plasma I	Theiler	2	3					6	oral
PHYS-424	Plasma II	Ball				2	2		6	oral
PHYS-541	Quantum computing	Savona	3	2					6	oral
PHYS-453	Quantum electrodynamics and quantum optics	Kippenberg	2	2					6	écrit

PHYS-431	Quantum field theory I	Penedones	3	2					6	écrit
PHYS-432	Quantum field theory II	Rattazzi				3	2		6	oral
PHYS-550	Quantum information theory	Holmes	2	2					4	écrit
PHYS-454	Quantum optics and quantum information	Brantut				2	2		6	écrit
PHYS-425	Quantum physics III	Yazyev	2	3					6	oral
PHYS-426	Quantum physics IV	Carleo/Rossi				2	2		6	écrit
PHYS-462	Quantum transport in mesoscopic systems	Banerjee				2	2		4	oral
PHYS-450	Radiation biology, protection and applications	Damet/Grilj/Pakari	2	1					4	écrit
PHYS-452	Radiation detection	Lamirand	2	1					4	oral
PHYS-427	Relativity and cosmology I	Rattazzi	3	2					6	écrit
PHYS-428	Relativity and cosmology II	Gorbenko				2	2		6	écrit
PHYS-400	Selected topics in nuclear and particle physics	Blanc F.				2	2		4	oral
PHYS-433	Semiconductor physics and light-matter interaction	Butté	2	2					4	écrit
PHYS-419	Solid state physics III	Herviou	3	2					6	oral
PHYS-420	Solid state physics IV	Carbone				2	2		4	oral
PHYS-464	Solid state systems for quantum information	Scarlino				2	2		4	oral
PHYS-510	Spintronics : basics and applications	Pivetta/Rusponi				2	2		4	oral
PHYS-475	Statistical Physics : Theory of Phase Transitions	De Los Rios	2	2					4	écrit
PHYS-441	Statistical physics of biomacromolecules	De Los Rios	2	2					4	oral
PHYS-512	Statistical physics of computation	Defilippis/Krzakala/Zdeborov	2	2					4	écrit
PHYS-436	Stochastic methods in classical & quantum physics	Kippenberg				2	2		6	écrit
PHYS-466	Topics in biophysics and physical biology	Manley				2	1		3	sem P
Options : cours faculté FSB, Liste des cours agréés par SPH et cours autres facultés :									max. 18	
--- cours de cycle bachelor 3e année et cycle master des sections SCGC et SMA										
--- liste des cours agréés par SPH (Section de Physique)										
---cours à option de 3ème année de SPH pour autant qu'ils n'aient pas été suivis au bachelor et pour un maximum de 6 crédits										
--- cours de 3e année et du cycle master des sections d'ingénierie EPFL, sous réserve de l'approbation de la direction de la section (max. 6 crédits)										

Groupe IIadv "advanced courses"										
PHYS-504	Modern approaches to quantum gravity (MA3 only)	Henriksson/Tourkine/Vecchi + Penedones	2	2					8	oral
PHYS-503	Quantum field theory III (MA3 only)	Karateev	3	1					8	oral
PHYS-505	The standard model (MA3 only)	Riembau	3	1					8	oral

Translation :

Options: Courses FSB Faculty, List of courses approved by SPH, and courses from other faculties: max. 18 credits

- 3rd-year Bachelor and Master-level courses from the SCGC and SMA sections
- List of courses approved by the Physics Section (SPH)
- 3rd-year elective courses from SPH, provided they were not taken during the Bachelor and up to a maximum of 6 credits
- 3rd-year and Master-level courses from EPFL engineering sections, subject to approval by the section (max. 6 credits)

Remarque :

sans retrait = no withdrawal = not possible to withdraw from this course after the registration deadline

CODE	MATIERES	ENSEIGNANTS sous réserve de modification	SEMESTRES						CREDITS ECTS	EXA
			MA1/MA3			MA2/4				FORME
			cours	course based	ind. proj.	course based	ind. proj.			
Bloc "Projets et SHS"									22	
PHYS-421	Projet de Physique I	Divers enseignants / sans retrait			8			8		sem A
PHYS-422	Projet de Physique II	Divers enseignants / sans retrait					8	8		sem P
Domaine des projets de Physique										
	- Astrophysics, particles, high energy physics	Dufour, Gorbenko, Hirschmann, Kneib, Marchevski, Penedones, Perrina, Rattazzi, Seidel, Shchutska, Tolley								
	- Condensed matter physics	Aidukas, Banerjee, Brune, Carbone, Carleo, Grandjean, Guizar-Sicairos, Hébert, Läuchli, Mila, Pasquarello, Rønnow, Yazyev, Wäckerlin								
	- Physics of biological and complex systems	De Los Rios, Gruetter, Karampinos, Krzakala, Manley, Rahi, Ramirez, Ricci, Stahlberg, Wyart, Xin, Zdeborova								
	- Plasma physics and energy	Fasoli, Pautz, Ricci, Seidel, Theiler								
	- Quantum science and technology	Banerjee, Brantut, Carbone, Carleo, Grandjean, Holmes, Kippenberg, Manucharyan, Quek, Savona, Scarlino								
HUM-nnn	SHS : introduction au projet	Divers enseignants	2	1				3		sem A
HUM-nnn	SHS : projet	Divers enseignants / sans retrait				3		3		sem P
Groupe I "Options"									38	
	--- voir liste									
Groupe II "MA3" - 3 options à choix: 3 options to choose from :									30	
	-- Cours à options:								30	
	--- Groupe IIa "options" et/ou									
	--- Groupe IIadv "advanced courses"									
	-- Mineur								30	
PHYS-597	-- Travail de spécialisation pour master en physique				680h	680h		30		sem A/P
Total des crédits du cycle master en Physique									90	
PHYS-599(b)	Projet de master en physique	(17 ou 25 semaines)			900h	900h		30		oral
Total des crédits du master en Physique									120	

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Group IIa :

Optional courses:

List of "Group Ia courses" + master courses from other sections and/or a doctoral Programme (up to 18 credits, including maximum 2 courses of doctoral programme) with the agreement of the Section

--- Groupe IIadv :

List of "advanced courses" (on the Options list)

Minors :

The master curriculum may be complemented with a Minor offered at EPFL, with one exception : the Minor in " Physics" may not be chosen by physics students. The selection of courses making up a minor is done with the approval of the person in charge of the minor. The minor courses can be taken from MA1 onwards.

Physics Research Training semester (Travail de spécialisation) :

Students have the opportunity to develop their knowledge through a project that will help them specialise in a specific area of physics. This project can take place in an EPFL laboratory or in an external research institute and must be supervised by a professor or MER (maître d'enseignement et de recherche).