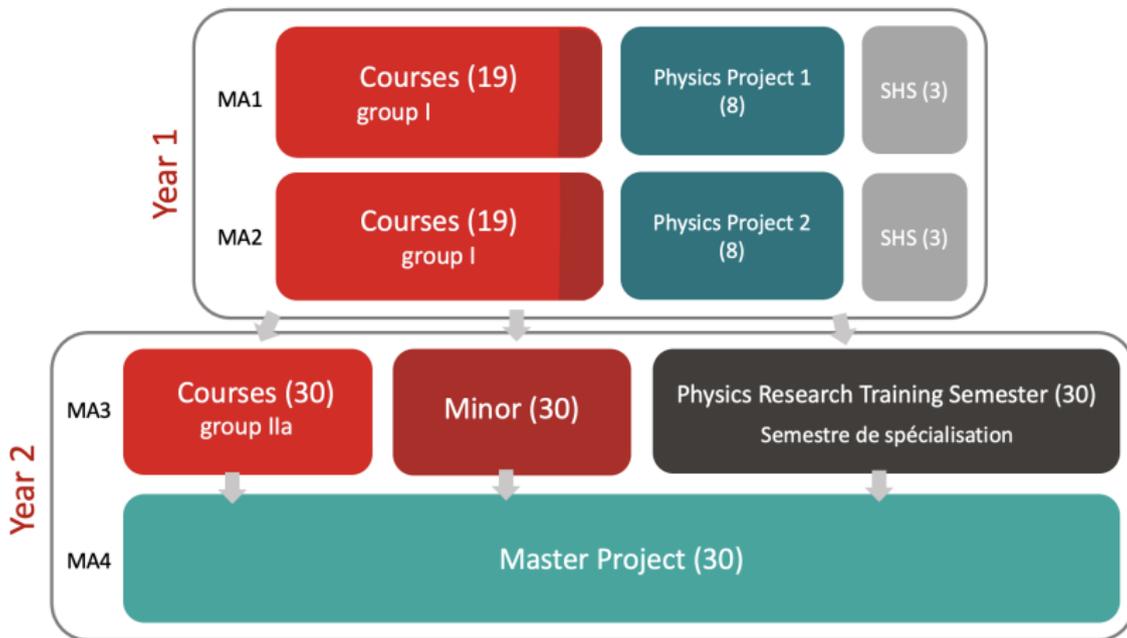


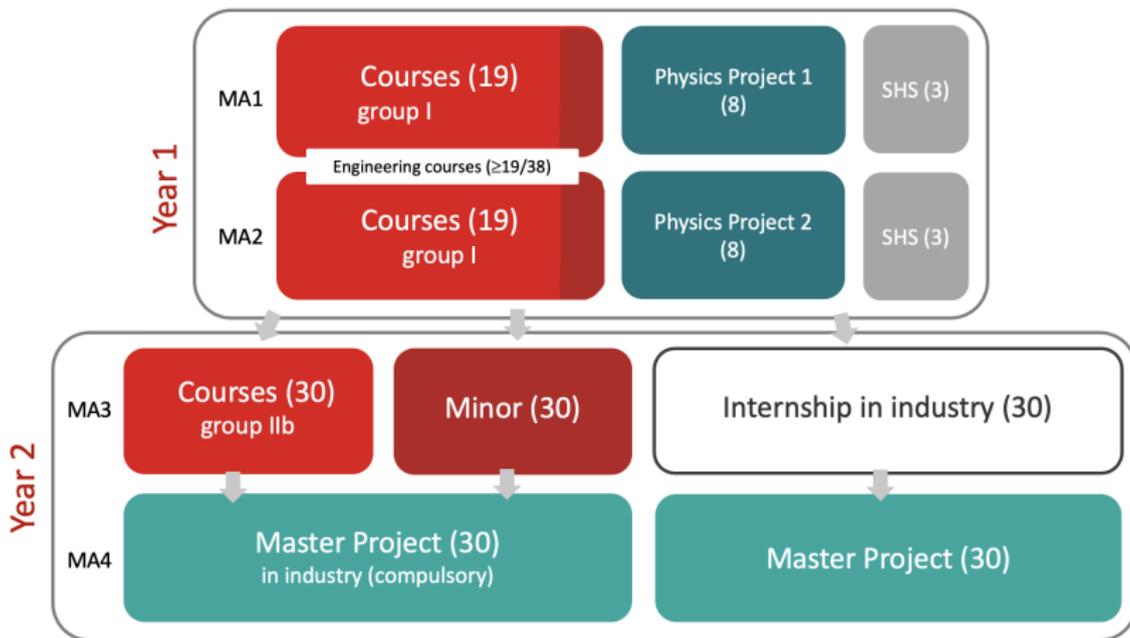
Masters in Physics and Applied Physics

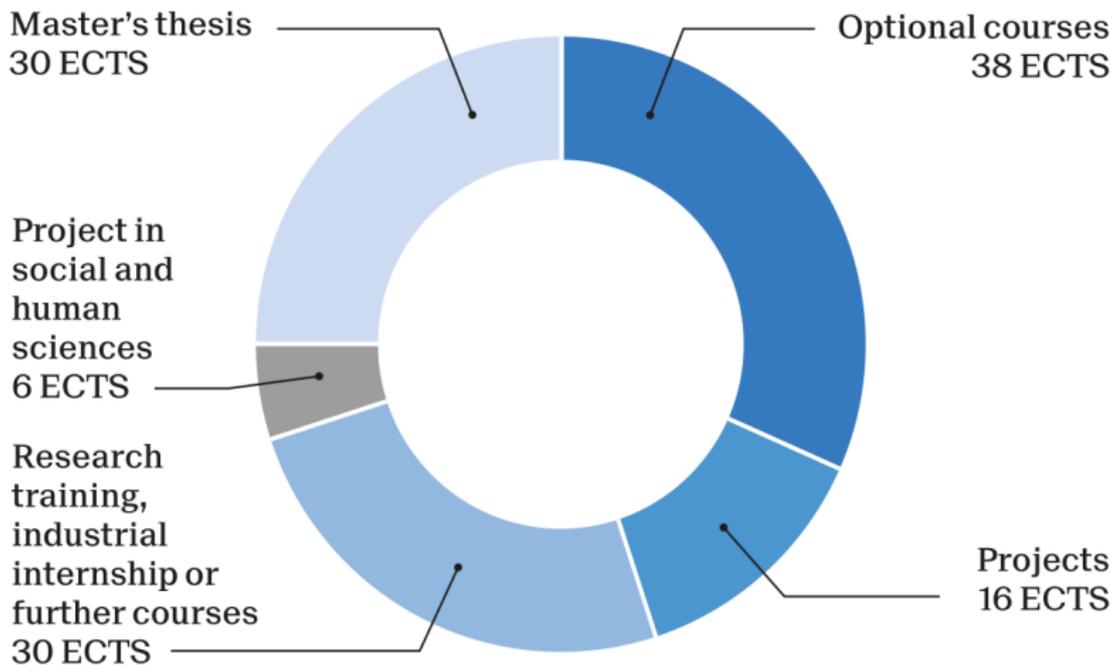
2025-2026

Physics Welcome Day - September 5, 2025

The EPFL logo is displayed in a bold, red, sans-serif font. The letters 'E', 'P', 'F', and 'L' are connected at the top, while the 'P' and 'F' have a unique, stylized design.







- **1 year : MA1 and MA2 : compulsory**
 - ① **Optional courses** : 38 credits
 - ② **Physics projects** : 16 credits
 - ③ **SHS projects** : 6 credits
- **2 year - fall semester : MA3 : options**
 - ① **3rd study semester** : (further courses) 30 credits
 - ② **Minor** : 30 credits
 - ③ **Research training** : 30 credits (Physics)
 - ④ **Internship in industry** : 30 credits (Applied Physics)
- **2 year - spring semester : MA4 : compulsory**
 - ① **Master project at EPFL** : 30 credits at EPFL (Physics and Applied Physics)
 - ② **Master project in industry** : 30 credits (Applied Physics)

Optional courses	A	B	C	38
Advanced superconducting magnet technologies	A	B		4
Astrophysics II: interaction of radiation with matter	A		C	4
Astrophysics III: galaxy formation and evolution	A		C	4
Astrophysics IV: stellar and galactic dynamics	A		C	4
Astrophysics V: observational cosmology	A		C	4
Attosecond radiation sources	A	B		4
Biophysics: physics of biological systems	A		C	4
Computational quantum physics	A	B		6
Computer simulation of physical systems	A	B		4
Electron microscopy: advanced methods	A	B		3
Frontiers in nanosciences	A	B		4
Fundamentals of biomedical imaging	A	B		4
Interacting quantum matter	A		C	4
Introduction to astroparticle physics	A		C	4
Introduction to particle accelerators	A	B		4
Machine learning for physicists	A	B		6
Magnetism in materials	A		C	4
Mathematical aspects of quantum physics	A		C	4
Microwave engineering in physics	A	B		4
Modeling and design of experiments	A	B		4
Modern approaches to quantum gravity	A		C	8
MRI practicals on CIBM preclinical imaging systems	A	B		4
Neutron and X-ray scattering of quantum materials	A		C	4
Nonlinear dynamics, chaos and complex systems	A	B		6
Nonlinear optics for quantum technologies	A	B		4
Nuclear fusion and plasma physics	A	B		4
Nuclear interaction: from reactors to stars	A	B		4
Particle detection	A	B		4
Particle physics: the flavour frontiers	A		C	4
Particle physics I	A		C	4
Particle physics II	A		C	4

Physics of life	A	B		4
Physics of low-dimensional materials	A	B		4
Physics of materials	A	B		4
Physics of photonic semiconductor devices	A	B		4
Plasma I	A		C	6
Plasma II	A	B		6
Quantum computing	A		C	6
Quantum electrodynamics and quantum optics	A		C	6
Quantum field theory I	A		C	6
Quantum field theory II	A		C	6
Quantum field theory III	A		C	8
Quantum information theory	A		C	4
Quantum optics and quantum information	A	B		6
Quantum physics III	A		C	6
Quantum physics IV	A		C	6
Quantum transport in mesoscopic systems	A	B		4
Radiation biology, protection and applications	A	B		4
Radiation detection	A	B		4
Relativity and cosmology I	A		C	6
Relativity and cosmology II	A		C	6
Selected topics in nuclear and particle physics	A	B		4
Semiconductor physics and light-matter interaction	A	B		4
Solid state physics III	A		C	6
Solid state physics IV	A		C	4
Solid state systems for quantum information	A	B		4
Spintronics: basics and applications	A	B		4
Statistical physics III	A		C	6
Statistical physics IV	A		C	6
Statistical physics of biomacromolecules	A		C	4
Statistical physics of computation	A		C	4
Statistical physics : theory of phase transitions	A		C	4
The standard model	A		C	8
Topics in biophysics and physical biology	A	B		3

- 1 **SPH courses** : study plans : **physics** and **applied physics**
 - 2 **SB faculty courses** : mathematics (SMA) and chemistry (SCGC)
 - 3 **EPFL courses outside of SB faculty** : approved by SPH
- **Master in Physics** : 38 credits
 - **Minimum 20 credits** : list A courses (all SPH courses)
 - **Master in Applied Physics** : 38 credits
 - **Minimum 19 credits** : list B courses (SPH - engineering)
 - **Remaining credits** : list C courses (SPH - applied physics) or other courses approved by SPH
 - **Masters in Physics and Applied Physics** :
 - **Maximum 18 credits** : other courses approved by SPH (within or outside of SB faculty)
 - **Maximum 6 credits** : optional bachelor SPH courses
 - **Maximum 6 credits** : optional master courses outside of SB faculty (submitted to SPH for approval)

THE 3RD STUDY SEMESTER IS AIMED AT STUDENTS WHO WOULD LIKE TO TAKE ADDITIONAL OPTIONAL COURSES

- **Physics** : 30 credits
 - **Courses of physics section** : list A courses
 - **Master courses of engineering section** : approved by SPH
 - **Courses of doctoral school** : maximum 2 courses
 - **Maximum 18 credits** : master courses of engineering section and doctoral courses

- **Applied Physics** : 30 credits
 - **Courses of physics section** : lists B and C courses
 - **Courses of engineering section** : approved by SPH (maximum 18 credits)

THE MINOR IS AIMED AT STUDENTS WHO WOULD LIKE TO FURTHER THEIR STUDIES IN A GIVEN FIELD OR DEVELOP INTERFACES WITH OTHER PROGRAMS AT EPFL

- **Physics and Applied Physics : 30 credits**

- ① **Interdisciplinary minor** : focused on courses from several programs
- ② **Disciplinary minor** : focused on a single program, different from that of the main Master's program
 - **Starting date** : first year : registration end of 1st semester (compulsory)
 - **Examples** : minors related to physics or entirely different
- ① **Engineering for sustainability**
- ② **Photonics**
- ③ **Physics of living systems**
- ④ **Quantum science and engineering**
- ⑤ **Space technologies**
- ⑥ **Management of technology & entrepreneurship**
- ⑦ **Financial engineering**

THE RESEARCH TRAINING SEMESTER, OR SPECIALIZATION SEMESTER, IS AIMED AT STUDENTS WHO WOULD LIKE TO DEVELOP A PHYSICS-RELATED RESEARCH PROJECT THAT ALLOWS THEM TO GAIN NEW KNOWLEDGE AND PRACTICAL EXPERIENCE IN A SPECIFIC FIELD

- **Physics** : 30 credits (no grade - pass or fail)
 - **Supervision** : Professor or Senior Scientist (MER) of the SPH section
 - **Location** : inside EPFL (physics laboratory) or outside (laboratory or research institute like PSI, CERN, etc...)
 - **Courses** : the Professor responsible for such work can require you to take some courses relevant for the specialisation

THE INTERNSHIP IN INDUSTRY IS AIMED AT STUDENTS WHO WOULD LIKE TO PUT THEIR SKILLS INTO PRACTICE ON A CONCRETE PROBLEM IN AN INDUSTRIAL ENVIRONNEMENT REQUIRING THE TYPICAL ENGINEERING APPROACH : PROBLEM ANALYSIS, STUDY OF POSSIBLE SOLUTIONS, AND FINAL IMPLEMENTATION

- **Applied Physics** : 30 credits (no grade - pass or fail)
 - **Location** : company not a research institute
 - **Supervision** : company supervisor (full responsibility)
 - **Duration** : 4 to 6 months
 - **Companies** : wide database of subjects proposed by companies will be available on **IS Academia** (Internship menu > 100 choices!)
 - **Other internship** : must be approved by the Physics Section
 - **Evaluation** : written report and oral presentation in front of the Physics section supervisor and the company supervisor who will evaluate the internship

THE MASTER'S PROJECT GIVES THE OPPORTUNITY TO CARRY OUT THEORETICAL AND/OR PRACTICAL WORK CONDUCTING RESEARCH IN A SPECIFIC AREA OF PHYSICS.

- **Physics and Applied Physics** : 30 credits
 - **Supervision** : Professor or Senior Scientist (MER) of the SPH section
 - **Duration** : 17 weeks at EPFL and 25 weeks outside EPFL
 - **Registration** : [IS Academia](#)
 - **Evaluation** : written report and oral presentation, which will be evaluated and graded by a jury

- **Physics and Applied Physics** : 16 credits
 - **General case** : physics projects I and II are performed in a **laboratory** of the Physics Section (**short presentations**)
 - **Exceptionnal case** : physics projects I and II can exceptionnally be performed in an other section of EPFL upon the approval of Physics Section.
 - **Registration** : **IS Academia**

Two projects in the following fields:	16
Astrophysics, particles, high energy physics	
Condensed matter physics	
Physics of biological and complex systems	
Plasma physics and energy	
Quantum science and technology	

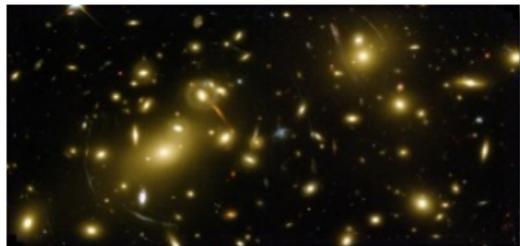
PARTICLE PHYSICS

- Prof. Frédéric Blanc
- Prof. Laurent Dufour
- Prof. Viktor Gorbenko
- Prof. Radoslav Marchevski
- Prof. Joao Penedones
- Prof. Chiara Perrina
- Prof. Riccardo Rattazzi
- Prof. Olivier Schneider
- Prof. Mike Seidel
- Prof. Lesya Shchutska



ASTROPHYSICS

- Prof. Richard Anderson
- Prof. Michaela Hirschmann
- Prof. Pascale Jablonka
- Prof. Jean-Paul Kneib
- Prof. Emma Tolley
- Dr. Yves Revaz

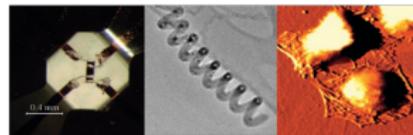
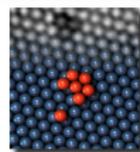


NANOSTRUCTURES WITH WELL DEFINED SIZE, SHAPE AND COMPOSITION

- **Prof. Harald Brune** (nanostructures)
- **Prof. Hugo Dil**
- **Prof. Cécile Hébert** (electron microscopy)
- **Dr. Stefano Rusponi**

NOVEL MATERIALS INCLUDING SUPERCONDUCTORS, SOFT MATTER AND HIGH-PRESSURE PHASES

- **Prof. Daniele Mari**
- **Prof. Henrik Ronnow**
- **Dr. Arnaud Magrez**

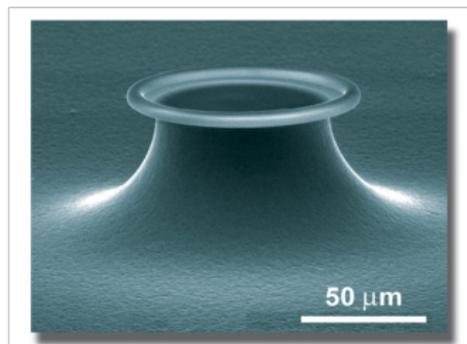


QUANTUM DEVICES AND QUANTUM PHOTONICS

- Prof. Mitali Banerjee
- Prof. Fabrizio Carbone
- Prof. Tobias Kippenberg

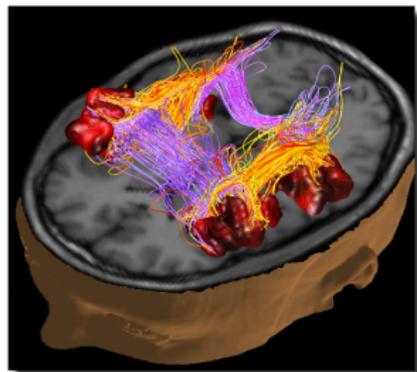
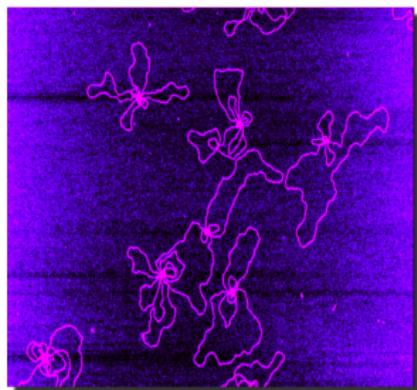
THEORY AND SIMULATION

- Prof. Giuseppe Carleo
- Prof. Andreas Läuchli
- Prof. Frédéric Mila
- Prof. Alfredo Pasquarello
- Prof. Manuel Guizar Sicaïros
- Prof. Christian Wäckerlin
- Prof. Oleg Yazyev
- Dr. Sylvain Bréchet



FUNCTION, STRUCTURE AND
PROPERTIES OF BIOLOGICAL SYSTEMS

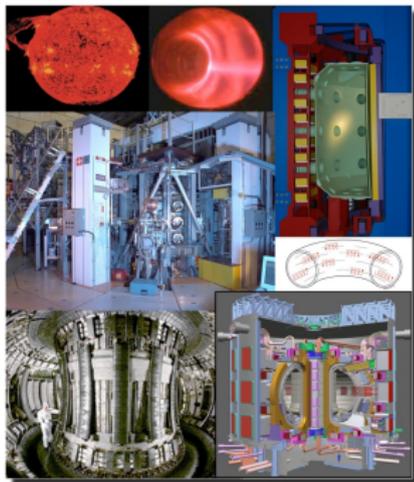
- Prof. Paolo De Los Rios
- Prof. Rolf Gruetter : LIFMET
- Prof. Dimitrios Karampinos
- Prof. Florent Krzakala
- Prof. Sulfiana Manley
- Prof. Sahand Rahi
- Prof. Guillermina Ramirez-San-Juan
- Prof. Hennig Stahlberg
- Prof. Mathieu Wyart
- Prof. Lijing Xin
- Prof. Lenka Zdeborová
- Dr. Cristina Cudalbu
- Dr. Georges Wagnières



- Prof. Ambrogio Fasoli
- Prof. Ivo Furno
- Prof. Andreas Pautz
- Prof. Paolo Ricci
- Prof. Christian Theiler
- Prof. Laurent Villard
- Dr. Stefano Alberti
- Dr. Stephan Brunner
- Dr. Stefano Coda
- Dr. Jonathan Graves
- Dr. Jean Philippe Hogge
- Dr. Mathieu Hursin
- Dr. Benoît Labit
- Dr. Joaquim Loizu
- Dr. Holger Reimerdes

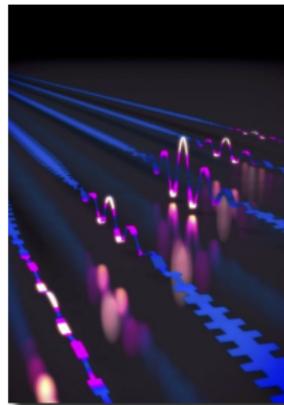
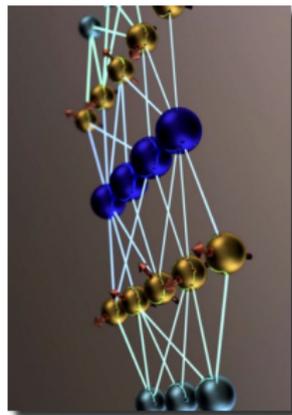
FUSION AND FISSION,
TOKAMAK

Swiss Plasma Center



PHOTONICS, QUANTUM COMPUTING,
QUANTUM MATTER

- Prof. Mitali Banerjee
- Prof. Jean Philippe Brantut
- Prof. Fabrizio Carbone
- Prof. Giuseppe Carleo
- Prof. Nicolas Grandjean
- Prof. Zoe Holmes
- Prof. Tobias Kippenberg
- Prof. Vladimir Manucharyan
- Prof. Yihui Quek
- Prof. Vincenzo Savona
- Prof. Pasquale Scarlino
- Dr. Raphael Butté
- Dr. Christophe Galland





WHY ? WHAT FOR ?

- Engineering projects involve humans and society
- Transverse social skills are required
- In our information age, projects to acquire social competences are key : probably more than ever before !

WHAT KIND OF COMPETENCES AND SKILLS ARE DEVELOPED BY SHS PROJECTS ?

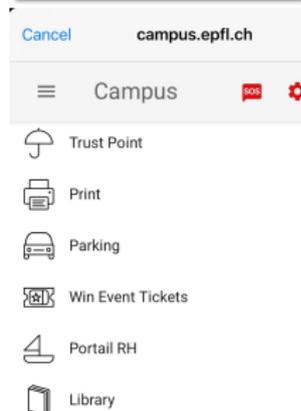
- **Practical** : **understanding** practices, norms, values and history of social environments
- **Cultural** : **knowing** the rules and habits of the working environment
- **Intellectual** : **learning** other ways of reasoning and different thinking schemes
- **Emotional** : **developing** the ability to perceive and express emotions

GROUP WORK BASED ON COURSES AND PROJECTS

- **Physics and Applied Physics** : 6 credits (first year : MA1 and MA2)
- **Language** : French or English
- **Evaluation** : according to study plan (report, oral presentation, etc...)
- **Registration** : **IS Academia**
- **Collège des humanités website** : www.epfl.ch/schools/cdh
- **Office** : **CM 2 267**
- **Email** : scienceshumaines@epfl.ch

EPFL IS A COMMUNITY OF AROUND 20000 PERSONS

- **Community** : we all enrich EPFL every day with our background, skills and identities
- **Respect** : EPFL is committed to uphold the values of respect, well-being and trust
- **Trust and Support Network** : to live up to these values EPFL has created this network
- **Trust Point** : accessible through EPFL Campus mobile app



EVERYONE HAS A ROLE TO PLAY! WE ARE ALL CONCERNED!

- **Health days : sport activities and health village EPFL - UNIL**
- **Moodle : EPFL Promoting Respect**
- **Trust and Support Network (TSN) : Speak up and seek support**
- **Respect Compliance Office (RCO) : Internal entity to file formal complaints**





- **Information** : primary resource
 - **Physics section** : www.epfl.ch/schools/sb/sph/en
 - **EPFL Masters** : www.epfl.ch/education/master
 - **Physics master program** :
edu.epfl.ch/studyplan/en/master/physics-master-program
 - **Applied Physics master** :
edu.epfl.ch/studyplan/en/master/applied-physics
- **Contacts** : secondary resource
 - daniele.mari@epfl.ch
 - sylvain.brechet@epfl.ch
 - valerie.schaererbusinger@epfl.ch