

Master of engineering in Physical engineering for photonics and microelectronics



PRESENTATION

Many of the ground-breaking technological innovations were born from interactions between fundamental and applied research in physics: transistor, LASER, giant magnetoresistance... The "Engineering Physics (IPhy)" branch at Phelma trains research engineers and researchers in Physics and its technological applications. The curriculum combines advanced courses in Modern Physics (Solid State Physics, Quantum Physics, Electromagnetism, Semiconductor devices, Nanophysics, Photonics) and Engineering (Numerical methods, Optics, Instrumentation) along with a vast panel of hands-on practicals (clean-room microfabrication, RF characterization, AFM, NMR and many more), computational and experimental projects, as well as internships. Final year specializations include "Photonics and Semiconductors", "Quantum Matter" and "Quantum Information and Quantum Engineering" (in English). Engineers with an IPHY degree combine in-depth physical understanding with fine experimental and instrumental capabilities.

INDUSTRIAL SECTORS

After graduating, about 70% of the students in the Engineering Physics branch choose to pursue an academic or industrial PhD in either Applied or Fundamental Physics research, while the remaining 30% mostly choose directly a career in the industry. A vast majority of former IPHY students join high-tech companies as R&D engineers, either after graduating or after their PhD thesis. The main recruiters are the semiconductor, optoelectronics and aeronautics industries. Our main industrial partners include STMicroelectronics, Thales, Lynred, SOITEC, as well as several start-up companies. Alternatively, a small fraction of IPHY students choose a research-oriented career in laboratories in France or abroad. Others find work as consultants and programmers.

RESEARCH

Grenoble hosts the highest density of condensed matter and microelectronics research laboratories in France. Professors and students in Iphy are in close touch with numerous high level public research laboratories. Research topics range from industry connected to applied and fundamental research in condensed matter, as well as high-energy physics. Iphy students perform 2 internships (3 & 5 months respectively) in either research or industry and an 18 months transversal project linked to the main fields of the branch.

ASSETS

Iphy students combine the skills of a physicist and an engineer. While a strong theoretical basis in general physics is acquired throughout the first year of Iphy, particular emphasis is given to hands-on activities and practical/experimental skills. As a result, IPhy engineers are not only highly valued in fundamental, applied or industrial research, but also highly employable upon graduation. Whether for the "Quantum" or "Optics and Microelectronics" specialisation, IPhy is closely linked to national networks of companies or research centres. This results in regular interaction with external experts during the course of studies, as well as numerous opportunities for internships and academic or industrial PhDs.

Of particular note are the opportunities for incoming scholarships on quantum topics in connection with the graduate school for students who would like to join Phelma for the two years of the master's degree (excluding Erasmus).



PRESS RANKINGS



Shanghai

Since 2020, Grenoble INP - UGA has contributed to the international ranking of the University of Grenoble Alpes

Shanghai Global 2022

Grenoble Alpes University ranked among the 150 best universities in the world and in the top 5 of French universities.



QS 2023 ranking by theme: Grenoble INP - UGA makes good progress in the field of engineering and technology

Grenoble INP - UGA has made good progress in the overall field of "engineering and technology", moving up 74 places to 93rd position worldwide and 5th position in France, making it the leading institution outside the Paris region.

The institute has made eight appearances in this ranking.



REUTERS

Grenoble INP - UGA leader in 2 lists from Reuters Ranking 2019

Most innovative universities in Europe

- 2nd of the French Engineerings Schools
- 13th in France

Grenoble INP - Phelma, UGA is the school for scientific diversity. It offers its students courses in various fields with a promising future:

- **Microelectronics and nano-technologies** (electronics, nanosciences, materials, health),
- **Decarbonated energy** (nuclear energy, photovoltaic, electrochemical storage),
- **Information technology** (digital communication, image and signal processing, telecommunications, computing and networks, Internet of Things, artificial intelligence),
- **Innovative materials** (for aeronautics, automobiles, sport & leisures, health, microelectronics, energy),
- **Biotechnology and biomedical engineering** (medical imagery and therapy, implantable devices),
- **Sustainable development** (decarbonated energies, eco-processes, recycling, material durability, energy management, natural signal analysis).

Based in Grenoble in the heart of the French Rhône Alpes region, Phelma boasts a rich academic and industrial infrastructure. As the only teaching institute on the Minatec innovation campus, Phelma benefits from an exceptional Training / Research / Industry synergy.



1,400 students
380 + Engineering graduates a year
+ More than 25% of engineering go on to complete a thesis

110 permanent teacher-researchers from
11 laboratories associated with the school
Approximately 370 stakeholders from industry and research

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