



## Master of engineering in

# Physics and Nanoscience

### PRESENTATION

Many of the groundbreaking technological innovations were born from basic research in physics: the transistor, the LASER, giant magnetoresistance,... The Physics and Nanoscience (PNS) 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) and Engineering along with a vast panel of hands-on practicals (clean-room microfabrication, RF characterization, AFM, NMR and many more), computational and laboratory projects, as well as internships. Final year specializations include "Optics and Microelectronics", "Condensed Matter Physics", "Nanophysics" (in English). Engineers with a PNS degree combine in-depth physical understanding with fine experimental and instrumental capabilities.



### INDUSTRIAL SECTORS

After graduating about 80% of the students in the Physics and Nanoscience branch choose to pursue a PhD in either Applied Physics or Basic Physics research, while the remaining 20% mostly choose directly a career in industry. A vast majority of former PNS students join high-tech companies as R&D engineers, mainly in the semiconductor industry, optoelectronics and aeronautics. Our main industrial partners include ST Microelectronics, Thales, Sofradir, SOITEC as well as several start-up companies. Alternatively, a significant fraction of PNS students choose a research-oriented career in national research laboratories at CEA, CNRS and Universities. A yet smaller fraction of students find work as consultants and programmers.

## PROJECTS

Grenoble hosts the highest density of condensed matter and microelectronics research laboratories in France. Professors and students in PNS are in close touch with the numerous high level public research laboratories. Research topics range from industry connected (microelectronics at CEA labs) to applied physics (material science, microelectronics) and basic research in condensed matter as well as high-energy physics. PNS students perform 2 internships (3 & 5 months respectively) in either research or industry, as well as a year-long project connected to one of the partnering laboratories.

## ASSETS

PNS 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 PNS, particular emphasis is given to hands-on activities and practical/experimental skills. PNS students are trained in clean room microfabrication along with numerous advanced techniques including Atomic Force Microscopy, Nuclear Magnetic Resonance, liquid helium, analog and digital electronics, etc. In the second year of PNS, a wide range of specialties can be chosen. The "Optics and Microelectronics" specialty is strongly linked to a national network of companies and research centers. Other specialties include the Master courses in physics managed by Grenoble University. They naturally lead to a PhD in fundamental physics.



## CONTACT

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<http://phelma.grenoble-inp.fr>

Grenoble INP - Phelma is the school for scientific diversity. It offers its students courses in various fields with a promising future: **micro and nano-technologies** (micro / nano-electronics, nano-sciences, materials, health, building, etc.), **energy** (nuclear energy, renewable energies, accumulators, etc.), **innovative materials** (for aeronautics, automobiles, sport & leisures, health, microelectronics, energy, etc.), **information technology** (digital technologies, image and signal processing, telecommunications, computer science & networks, embedded softwares, etc.), **biomedical engineering** (medical imagery and therapy, implantable devices, etc.) and the **environment** (eco-processes, energy management, natural signal analysis, etc.).

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.

**Key figures:** more than 1,200 students, plus 300 engineering graduates a year, 150 permanent research lecturers from the school's thirteen partner laboratories, 200 speakers from industry and the world of research, plus 25% of engineering students studying for doctorates.

## PRESS RANKINGS



Grenoble INP, leader in 2 lists from QS World University Rankings Engineering & Technology 2014



Grenoble INP ranked 2nd by L'Usine Nouvelle among the 100 best french engineering schools in 2014



Grenoble INP ranked 1st by « Industrie et Technologies » in 2013



Grenoble, ranked 5th World's most inventive city by Forbes in 2013

