



PRESS RELEASE – OCTOBER 2, 2018

Gérard Mourou wins the 2018 Nobel Prize in Physics

Gérard Mourou, professor and member of the *Haut-collège* of École Polytechnique, has been awarded the 2018 Nobel Prize in Physics. He shares this award with Donna Strickland (Canadian) for having jointly developed a method for generating high-intensity, ultra-short optical pulses. The third winner, Arthur Ashkin (American), also received the award for the invention of optical tweezers and their application to biological systems. The Swedish Academy particularly highlighted the use of these two techniques in the medical field.



After receiving the prestigious French Legion of Honour award in 2012, the Frederic Ives medal in 2016 from the Optical Society of America, and the Arthur L. Schawlow award in Laser Science from the American Physical Society, Gérard Mourou received today the

2018 Nobel Prize in Physics, the crowning achievement of a career entirely dedicated to laser physics and their applications. He shares this award with Donna Strickland (Canadian), for having jointly developed a method for generating high-intensity, ultra-short optical pulses. Arthur Ashkin (American) also receives the Prize for the invention of optical tweezers and their application to biological systems.

Gérard Mourou is the co-inventor, joint work with Donna Strickland, of the Chirped Pulse Amplification (CPA) technique (thirty years ago). This technique rendered possible the amplification of short laser pulses (a few dozen femtoseconds; $1\text{fs} = 10^{-15}\text{ s}$) to extremely high peak power, equal to a petawatt ($1\text{PW} = 10^{15}\text{W}$) or of very high speed (kHz). The principle: temporarily spread an ultra-short pulse by means of an optical network in order to reduce its actual intensity before magnifying it. The pulse is then recompressed to reach intensities a conventional amplification would not make it possible to reach.

The CPA technique revolutionized the laser science field and found new applications in different branches of Physics, including nuclear and particle physics. Adapted to the medical field, it has led to new advances in refractive eye surgery and the treatment of cataracts.

Gérard Mourou spent a great deal of his career in the United States, in particular at the University of Michigan. Upon his return in France in 2005, he was in charge of the Applied Optics Laboratory (LOA – a joint laboratory between ENSTA ParisTech, the CNRS, and École Polytechnique) until 2008. He initiated three major projects in the realm of high-powered lasers: the launch of the XCAN project at École Polytechnique, the Apollon laser in France, located in the Saclay region (the French scientific and industrial cluster) and the large, European infrastructure ELI (Extreme Light Infrastructure) that will host the world's largest lasers in Hungary, Romania, and Czech Republic. He is also director of the International Center for Zetta-Exawatt Science and Technology (IZEST), affiliated with more than 27 laboratories around the world who work together in order to best anticipate the future of high-powered lasers.

Eric Labaye, President of École Polytechnique, stated: *“We are overjoyed to see one of the highest scientific honors in the world be awarded to Gérard Mourou. This award demonstrates once again the quality and excellence of the research developments that take place at École Polytechnique. Gérard Mourou is an innovator in laser research development worldwide and undoubtedly deserves this remarkable recognition for his work as a whole.”*



PRESS CONTACTS

Clémence Naizet	Raphaël de Rasilly
+ 33 1 69 33 38 74 / + 33 6 65 43 60 90	+ 33 1 69 33 38 97 / + 33 6 69 14 51 56
clemence.naizet@polytechnique.edu	raphael.de-rasilly@polytechnique.edu

Sara Tricarico
+ 33 1 69 33 38 70 / + 33 6 66 53 56 10
sara.tricarico@polytechnique.edu



ABOUT ÉCOLE POLYTECHNIQUE / École Polytechnique, also known as L'X, is the leading French institution combining top-level research, academics, and innovation at the cutting-edge of science and technology. Its various undergraduate and graduate-level programs – Bachelor of Science, *Ingénieur Polytechnicien* (Master's level program), Master's, and PhD – are highly selective and promote a culture of excellence with a strong emphasis on science, anchored in humanist traditions. As a widely internationalized university, École Polytechnique offers a variety of international programs and attracts a growing number of foreign students and researchers from around the globe (currently 36% of students and 39% of faculty members).

École Polytechnique offers an exceptional education to prepare bright men and women to excel in top-level key positions and lead complex and innovative projects which meet the challenges of 21st century society, all while maintaining a keen sense of their civil and social responsibilities. With its 22 laboratories, 21 of which are joint research units with the French National Center for Scientific Research (CNRS), the École Polytechnique Research Center explores the frontiers of interdisciplinary knowledge to provide major contributions to science, technology, and society. École Polytechnique is also a pioneer and leading institution of the major scientific and economic cluster, Paris-Saclay, bringing together top French higher education and research institutions, as well as R&D centers of prominent international companies.

www.polytechnique.edu

ABOUT THE CNRS / The French National Center for Scientific Research (CNRS) is Europe's largest public research institution. It produces knowledge for the benefit of society. With 31,612 employees, a budget exceeding 3.5 billion euros in 2017 (including a self-generated income of 787 million euros), the CNRS is present in all scientific fields through its 1100 laboratories in France and around the world. The organization has international visibility thanks to eight offices abroad, which could become hubs for French research. It has developed international cooperation tools with its foreign partners, including 183 International Associated Laboratories (LIA) and 36 International Joint Units (UMI), which are real joint laboratories. Moreover, the CNRS is a partner of the French Ministry of Foreign and European Affairs in 26 joint units with a French research institute abroad (UMIFRE).

With 21 Nobel laureates and 12 Fields Medal winners, the organization has a long tradition of excellence. It carries out research in mathematics, physics, information sciences and technologies, nuclear and particle physics, Earth sciences and astronomy, chemistry, biological sciences, the humanities and social sciences, engineering and the environment.

www.cnrs.fr

ABOUT ENSTA PARISTECH / ENSTA ParisTech is a French "Grande École" (Graduate School of Engineering) under the supervision of the Ministry of Defense, providing high-level scientific education leading to several degrees ("Diplôme d'ingénieur", Master's Degree, Ph.D.) and conducting high-level applied research in close collaboration with industrial partners. ENSTA ParisTech is acknowledged as a leading institution in the fields of transport, energy and complex systems engineering. ENSTA ParisTech is deeply involved in the development and visibility of French higher education, at international, national and local levels - it is one of the founding members of ParisTech and of the ENSTA Group.

www.ensta-paristech.fr