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; 1fs = 10⁻¹⁵ s) to extremely high peak power, equal to a petawatt (1PW = 10¹⁵W) 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 ParsiTech, 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  
+ 33 1 69 33 38 74 / + 33 6 65 43 60 90  
clemence.naizet@polytechnique.edu

Raphaël de Rasilly  
+ 33 1 69 33 38 97 / + 33 6 69 14 51 56  
raphael.de-rasilly@polytechnique.edu

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

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