

PRESS RELEASE - DECEMBER 6TH, 2023

## Inauguration of the Chair "Physics of high energy densities and inertial fusion"



**FRANCE - École Polytechnique and the Military Applications Division of CEA are launching the "Physics of High Energy Densities and Inertial Fusion" Chair to help train students in the physics of high energy densities, and to facilitate the emergence of research collaborations on topics such as fusion for energy by inertial confinement or the physics of magnetised plasmas.**

École Polytechnique, a leading French Institution that combines top-level research, academics, and innovation, and the Military Applications Division of CEA are launching a **teaching and research chair** in "Physics of High Energy Densities and Inertial Fusion". This sponsorship was inaugurated on December 4<sup>th</sup>, 2023 in the presence of Laura Chaubard, Acting President and Director General of École Polytechnique, and Vincenzo Salvetti, Director of Military Applications at the CEA.

The Chair headed by Sébastien Le Pape, researcher and director of the Laboratoire pour l'Utilisation des Lasers Intenses (Intense Lasers Laboratory LULI\*), aims to meet a **high-level strategic and academic challenge for France's defence and energy policy.**

On the one hand, École Polytechnique is now **one of the world's leading players** in the field of high-energy-density physics, both in terms of its staff and its laboratories, including the LULI. On the other hand, the physics of high energy densities and thermonuclear fusion is a strategic field for the Military Applications Division of CEA, which aims to have **world-class models and calculation codes** to describe this physics.

The goal of this Chair is to crystallise the expertise of École Polytechnique and the CEA, to build a **research centre** with even greater international influence. It aims to facilitate the **emergence of new collaborations** on promising themes, such as magnetised plasmas, through short stays by visiting researchers and a series of seminars. It will also help to increase the number and quality of **high-level students trained in high-energy density physics** in France, who are likely to continue their training and professional careers in this scientific field.

More specifically, the Chair plans to set up a new introductory course in the physics of high energy densities, offered to 3rd year Polytechnique engineering students. Designed with a view to **developing the attractiveness of the professions** to the student community, the course will be based on collaborative projects in which students will have access to cutting-edge equipment. The Chair's research axis aims to develop an **academic centre of excellence** in the field of hot plasma physics, by supporting original experimental projects, funding a research team, research visits and seminars to initiate international collaborations and deepen knowledge of atomic physics in plasmas, laser-matter interaction, and radiative hydrodynamics.

These concepts are useful in laboratory astrophysics, a discipline that involves studying **astrophysical phenomena** using scientific installations in the laboratory, identifying the similarities between the experiment and what actually happens in space. Another application is **fusion by (magnetic or inertial) confinement**, a process that creates the conditions needed for nuclear fusion, the same reaction that produces energy at the heart of stars and that could one day be used to produce electricity.

*"This Chair is being launched at a time of great excitement in the field of high-energy-density physics, particularly following the reach of Ignition in the United States in 2022. It will give us the resources to train the scientists of tomorrow in close collaboration with specialists in the field at the Military Applications Division of CEA. By funding research initiatives, it will also enable LULI and École Polytechnique to consolidate their position as academic leaders,"* says Sébastien Le Pape, Scientific Director of the new Chair.

*\*LULI: a joint research unit of CEA, CNRS, Sorbonne University, École Polytechnique, Institut Polytechnique de Paris, 91120 Palaiseau, France.*



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**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 41% of students and 40% 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 23 laboratories, 22 of which are joint research units with the French National Center for Scientific Research (CNRS), École Polytechnique Research Center explores the frontiers of interdisciplinary knowledge to provide major contributions to science, technology, and society. École Polytechnique is a founding member of Institut Polytechnique de Paris.

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