Department of Physics

物理系

香港中文大學理學院
FACULTY OF SCIENCE
THE CHINESE UNIVERSITY OF HONG KONG



JS 4601 Science (Major in Physics)

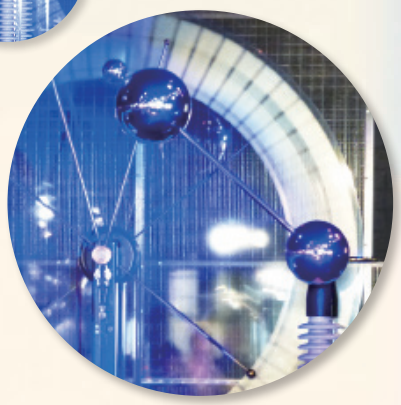
JS 4690 Enrichment Stream in Theoretical Physics

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For 2027 Entry

Physics at CUHK





CUHK Physics has a good and long-standing reputation in training solid physics students. As one of the oldest departments in CUHK, we have been nurturing over 3000 physics students and more than 50% of our graduates in recent years continue to pursue higher degrees in Physics or related subjects. Many of them are professors, scientists, educators, engineers, executives, and entrepreneurs in Hong Kong and around the world.

Our students and alumni

- Awarded prestigious local and oversea scholarships and fellowships every year. Placed as the top-notch students in Hong Kong.
- Awarded many University, College, and Faculty scholarships every year.
- Admitted to the top-tier PhD programs around the world with full financial support. Many of them went to the best schools in the United States, the United Kingdom, Canada, and other European countries.
- Participated in large-scale international research projects in high energy physics, astrophysics, condensed matter physics, etc, which include gravitational wave, black hole, dark matter and energy, and quantum phenomena.
- Published research papers in high-impact journals.
- Won many local and oversea competitions in data and computation science, robotics, etc.

Physics Programmes



Physics [Declare Physics as major programme after admission into CUHK Science]

- A solid grasp of fundamental concepts, supplemented with analytic, computational, and experimental skills as well as research experience.
- A balanced mix of lectures, tutorials, problem-solving sessions, seminars, group discussions, projects, and research opportunities.
- Compulsory courses provide an all-round foundation, supplemented by a pool of elective courses.

Enrichment Stream in Theoretical Physics [Direct admission into CUHK Physics via JUPAS]

- For elite students who are talented in physics and mathematics.
- Emphasis on forming a critical mass of students who are interested in solving theoretical physics.
- Tailored small-group discussion classes, supplemented various activities and projects.
- Guaranteed research opportunities starting at early stage for building up the necessary research skills and experience. Exposure to frontier theoretical research in Hong Kong and oversea.
- Mentorship with a theoretical physicist as the academic advisor on study and research. Help to explore students' research potential and bridge the gap from undergraduate physics to postgraduate studies.

Physics Curriculum



We offer a rigorous curriculum in physics education. The curriculum is divided as the Core and Streams.

The Core is compulsory, and it includes

- Classical mechanics
- Quantum mechanics
- Electromagnetic theory
- Thermal and statistical physics
- Mathematical skills
- Experimental skills
- Computational skills

for building a strong and comprehensive foundation.

Other than the Core, the Streams are optional, and they are:

- Astrophysics and particle physics
- Artificial intelligence and computational physics
- Quantum science and technology
- Enrichment stream in theoretical physics (JS4690)

Students select Streams in their elective courses to attain a certain depth in concepts and skills in several areas, which are useful in future studies and workplace.

Curriculum

Study Plan

Experiential Learning Opportunities

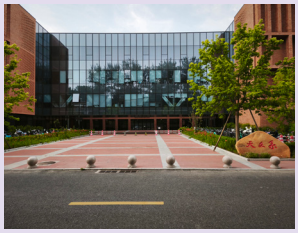
We put much effort in developing effective experiential learning activities, which form an integral part of a high-quality education. Many of these activities are unique among physics programs in Hong Kong. Examples of such extra-curricular learning opportunities include:

- Summer Undergraduate Research Exchange (SURE), which provides opportunities to students to conduct in-depth research in an oversea institution with financial support.
- Summer Teacher AppRenticeship (STAR), which provides opportunities to students to teach in a local secondary school with financial support.
- Overseas Program for Undergraduate students (OPUS), which provides opportunities to students a 6-month period to study and conduct research in University of California, Berkeley, or Fudan University with financial support.
- Internship Programs with Hong Kong Observatory, Science Museum, Space Museum, science publishers, financial sectors, and engineering firms for students to gain experience in various industries.
- Summer Study Tour, which provides opportunities for students to work in small groups to conduct a physics related field work or experiment in an overseas site.
- Summer Undergraduate Research Internship Program (SURIP), which provides opportunities for students to participate in in-house research programs.
- Co-op program, which provides opportunities to students to spend 6 to 8 months in a local company as a regular employee.
- Many University and College exchange programs for students to study in oversea universities.

These efforts, together with the final year research projects, involve students into academic research activities that can lead to publication of research papers in international journals. We also support students to report their research results in local and international conferences.

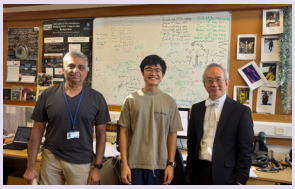
Extra-curriculum Opportunities

SURE (Summer Undergraduate Research Exchange Program)



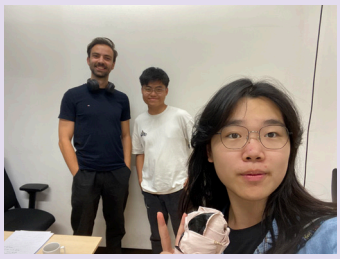
My project at TsingHua University is to build a Python pipeline to search for and analyse HINSA (HI Narrow Self-Absorption) signatures in the Smith Cloud.
HINSA is a narrow dip in the emission spectrum where cold, dense HI within molecular clouds absorb the radiation from the background warm, diffuse atomic hydrogen (HI). The narrow feature and its association with molecular line emission (e.g. OH) help trace the cold HI gas deep in the core rather than hydrogen in the interstellar medium. From the depth and width of the dip, we can estimate the column density of this cold component, offering a way to study early-stage molecular cloud formation directly through the atomic gas — including the mass of cold gas and the stage of star formation.
In the project, I analysed HI radio data of the Smith Cloud obtained from FAST to build moment maps of the cloud's velocity structure. Using a contour-based detection method, I identified dense clumps and filaments within the cloud, which serve as candidate sites for cold, self-absorbing gas. I then extracted absorption spectra from these candidate regions and fit them to measure the depth and width of the HINSA feature. From these measurements, I set a threshold to quantify the fraction of gas in the Smith Cloud that is cold and self-absorbing, which provides a way to characterise the cloud's progress toward molecular cloud formation.

– LEE Ming Hin
2026 SURE: Tsinghua University



This summer, I conducted a 2.5-month research term at the University of Oxford under the supervision of Prof. Jeff Tseng and Prof. Farrukh Azfar, focusing on the SuperNova Early Warning System (SNEWS). My work involved implementing and enhancing the original Poisson-likelihood light-curve matching algorithm to pinpoint supernova locations via neutrinos. By significantly improving the speed and accuracy of calculating neutrino arrival time differences across detectors, this invaluable journey helped me grow into a more independent researcher and deeply fueled my enthusiasm for my upcoming studies.

– SIN Ka Lok
2026 SURE: University of Oxford



During the summer, I went to the Institute for Gravitational and Subatomic Physics at the Utrecht University, joining Prof. Chris Van Den Broeck's group. I took charge of a project focused on developing an extended null-stream framework with strongly lensed images for Non-General-Relativity polarization searches. This hands-on experience significantly enhanced my computational skills, my ability to apply AI, and my understanding of spacetime. Furthermore, this project granted me the opportunity to join the LIGO Scientific Collaboration and attend a conference at Heidelberg University, where I presented a poster and engaged with experts. Overall, this full-time research journey immersed me in Europe's academic atmosphere, broadened my horizons, and provided invaluable insights for my future graduate school applications.

– WANG Yucheng
2026 SURE: Utrecht University

Internship & Placement Programs



During the internship at the HK Space Museum, I helped with public workshops and activities, which have taught me a lot in crowd control and schedule planning. The main project I have worked on involved designing a workshop centered on Citizen Science. While designing the workshop and researching the Citizen science project, I have learnt a lot about science communication and museum standards, specifically how to convey comprehensive science to the public and prevent knowledge gaps. It is truly fascinating to experience firsthand the high standard of accuracy and attention to detail required to communicate science clearly without introducing misleading or unnecessary concepts. This project showed me that clear communication is just as important as the research itself, and I believe there is so much more to learn and improve.

– KOK Sin Chai
2026 Summer Internship in Hong Kong Space Museum

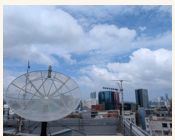
The ten weeks of working experience are fascinating, interesting, and meaningful. It is not just a chance to know more about how museums work in Hong Kong but also a great opportunity to explore science and science education, such as participating in education workshops for teachers and doing research on the internal solar data. If you are interested, don't hesitate and join next time!

– SIN Siu Ting
2026 Summer Internship in Hong Kong Space Museum

During my summer internship in the senior secondary ICT (Information and Communication Technology) department at UPEP, I developed engaging textbook resources—such as educational games, animations, and simulations—by leveraging company-supported AI tools to maximize my efficiency. Through a collaborative peer-review process, I learned to refine my work step-by-step and translate complex, technical knowledge into accessible content by designing from a student's perspective. Ultimately, this experience helped me build highly transferable skills in collaboration, modern tool integration, and effective communication that will be invaluable to my future career, especially in education.



– LAU Nok Sum
2026 Summer Internship at United Prime Educational Publishing (UPEP)



天文台實習這幾個月，主要都是和電腦打交道。要計算海洋與大氣的流動，「掠曲」（Code）自然就是日常。對着螢幕上的吐露港寫程式、跑模型、看數據，就又是一日。既要懂氣象背後的物理，也要顧計算它們的技術，兩頭都不能少。預報工作講求速度與穩定，和學術上慢慢推敲邏輯的節奏不一樣，交流和協作也更緊密。工作需要物理、統計、地理、網頁開發、Linux，十八般武藝輪番上陣，自感樣樣都是半路出家。話雖如此，寫論文、做一點點學術的機會還是有的。

– CHO Chi Chit
2026 One Year Placement in Hong Kong Observatory



在香港天文台實習的這一年裡，我十分感恩能在 R3 部門學習與成長。這個部門主要負責儀器的改善與維護，讓我有許多戶外外勤的機會，我也才發現原來天文台的氣象站早已遍佈香港各區。無論是自動氣象站、輻射監察，還是我主要負責的微氣候監測站，共同構成了實時監控香港天氣變化的龐大網絡。在室內工作方面，我主要進行資料分析，探討如輻射冷卻和暑熱指數等氣候現象。此外，我也學習組裝微氣候監測裝置，從 Arduino 開發板與 3D 列印等硬體應用，到程式編寫與 LoRa 通訊設置等軟體整合，全都是我實習前從未接觸過的領域。非常感謝同事們的熱心指導，讓我如遊戲中點亮了技能樹的新分支般，拓寬了物理專業以外的視野，這一年過得無比充實。

– WONG Hoi Chit
2026 One Year Placement in Hong Kong Observatory

As a student intern at the Hong Kong Observatory, I spent a fruitful year developing a Physics-Informed Machine Learning model for severe weather nowcasting to predict short-term rainfall. By embedding physical constraints into deep learning architectures, I ensured that the model's predictions strictly adhered to natural laws, successfully correcting the unphysical errors common in pure data-driven approaches. Navigating the chaotic complexity of atmospheric data allowed me to seamlessly bridge the gap between theoretical physics and AI, turning advanced science into a rewarding, real-world application dedicated to public service.

– LAU Ka Kiu
2026 One Year Placement in Hong Kong Observatory

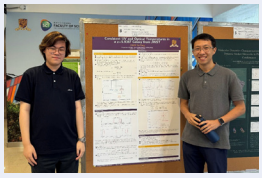
STAR (Summer Teacher AppRenticeship)

From May to August, I completed STAR programme at Christ College. During the programme, I produced video solutions for DSE and school examination questions, assisted with examination revision classes, taught summer lessons and supported several school activities. These experiences allowed me to apply my knowledge in real classroom settings and develop my communication, lesson-planning and presentation skills. I also learned how to respond to different learning needs, practice bilingual teaching and use digital tools in teaching. This internship gave me a deeper understanding of teaching and school operations. I can also be mentally prepared with heavy workload of a teacher. STAR programme provide me a valuable experience for my career planning and future work.

– HUI Pak Hei
2026 STAR: Chris College

SURIP (Summer Undergraduate Research Internship Program)

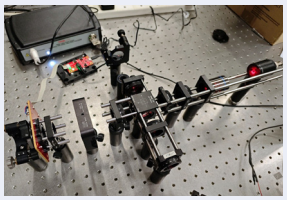
This program provided me with my first in-depth experience in observational astrophysics, and the journey was both challenging and immensely rewarding. As an undergraduate with limited prior exposure to astronomical data analysis, I initially felt overwhelmed by the complexity of JWST data reduction and the physical principles behind the temperature diagnostics. However, working through each stage of the project taught me the importance of patience, persistence, and intellectual curiosity. I learned that research is rarely linear; setbacks and uncertainties are not failures but opportunities to refine one's understanding. The experience has fundamentally shaped how I approach scientific problems and deepened my appreciation for the rigor required in astrophysical research.



I am especially grateful for the guidance and encouragement of my supervisor, Professor Yuguang Chen, whose expertise and patience were instrumental throughout this program. He provided invaluable feedback on my methodology, helped me navigate the complexities of the data, and always made time for my questions. His mentorship not only improved the quality of this work but also inspired me to pursue further research with confidence.

Beyond the scientific content, this program taught me the value of effective communication and intellectual honesty—skills that will serve me well in any future endeavour. I leave this summer with a clearer sense of my research interests and a stronger commitment to contributing meaningfully to the field of astrophysics.

– CHAN Yat Fung
2026 Summer Undergraduate Research Internship Programme



Participating in SURIP has been a deeply fulfilling experience of my undergraduate journey. I worked on the geometric phase of polarized light. This was a project worth working on because it gives a lot of insight into geometric phase, which appears in numerous fields of physics such as classical dynamics and quantum mechanics.
Besides, it was an experimental project in which I had hands-on experience building the setup and learning to control measurement devices and mechanical stages that I used to measure my results. I encountered a lot of trial, error and refinement. Unexpected data kept surfacing, but those moments taught the most lasting lessons. Seeking guidance from graduate lab mates taught me the importance of collaboration and reminded me that science does not come from isolation, but from generous exchange.
The poster presentation also challenged me to put my ideas into clear communication, a skill that is essential in a wide range of jobs. Seeing posters made by other teams was equally enjoyable, topics spanning from gravitational waves to crystal lattices and organic solar cells, and topics that I did not think I could learn before graduate or master's level study. This has been a powerful reminder that nothing is too hard to learn if we invest the time and sustain our passion.

– YU Tsz Yeung
2026 Summer Undergraduate REsearch Internship Programme

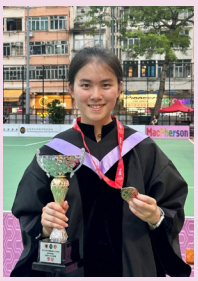


The summer research program on kagome superconductors offered me a window into the forefront of materials science. I gained extensive hands-on experience with experimental techniques such as performing crystal growth and energy-dispersive X-ray spectroscopy (EDX). More importantly, I learned how to design an experiment starting from a literature review, guided by a senior researcher. This experience has given me a much clearer direction for my future studies. I sincerely thank Prof. Goh for this invaluable opportunity and Wai for his patient guidance.

– ZHENG Hao
2026 Summer Undergraduate Research Internship Programme

What Our Students Say

Alumni Sharing



I loved physics when I entered CUHK but did not yet know what kind of physicist I wanted to become. These 4 years made me realize that the most valuable part of my undergraduate journey was not the knowledge I gained, but the ability to think independently and explore possibilities beyond the classroom.

The CUHK Physics program provided me with a strong foundation in physics and encouraged me to develop my own curiosity. Through coursework and research experiences, I gradually discovered my passion for theoretical physics and learned that meaningful questions often require the courage to explore unfamiliar directions.

With this foundation, I began to seek opportunities beyond CUHK. During my exchange at ETH Zurich, I challenged myself through graduate-level physics courses in a new academic environment. I also applied for and joined the PSI START Intern as one of the ten students worldwide, where I continued exploring research at a world-leading institute. Experiences such as representing Hong Kong and CUHK at the PLANCKS International Final twice further strengthened my confidence as a young physicist.

Looking back, CUHK Physics did not define what kind of physicist I should become. Instead, it gave me the foundation, independence, and confidence to pursue my own path. I hope future students will discover the same freedom to explore, question, and grow into the physicist they aspire to be.

– HE Qirui

2024 & 2025 United College Scholarship in Physics
2024 & 2025 United College Head's List
2024 C.N. Yang Scholarship
2023, 2024 & 2026 Science Faculty Dean's List

ESTP & STARS graduated in 2026
2026 The Joseph Needham Merit Scholarship
2024 & 2026 Winner of PLANCKS Hong Kong Preliminary
2025 Joseph Wang Ngai Cheung Undergraduate Research Excellence Award
2025 & 2026 Prof. Dennis YK Lo Physics Award



Albert Einstein once said: "The eternal mystery of the world is its comprehensibility … The fact that it is comprehensible is a miracle." I couldn't agree more. Tiny ants could not understand how a human city works. In the face of the vast cosmos, we are no difference from ants. Yet, we humans are given the chance to comprehend the workings of everything in the universe. For me, as a human being, this is an opportunity not to be missed, and that is why physics became my unequivocal choice.

The physics programme at CUHK has provided me with invaluable support in understanding the world better: lecturers across various subjects teach with enthusiasm and guidance, breaking down the abstruse theories in textbooks and feeding them to you like well-prepared bread; abundant summer internships and exchange opportunities offer a broad platform for you to apply what you have learned at the frontiers of physics. In the summer of 2025, through the Summer Undergraduate Research Exchange programme organised by the physics department, I was given the chance to intern at CERN. This was an experience I had valued for since secondary school, yet once seemed beyond reach, and the CUHK physics department offered me this extraordinarily precious opportunity, for which I am truly grateful!

If you, like me, are a kid who looks up at the stars and marvels at their beauty, then don't hesitate to join me at CUHK Physics and together let us explore the beauty of the world.

– LI Sze Tung
ESTP graduated in 2026
2026 HSBC Hong Kong Scholarship
2025 Professor Charles K. Kao Research Exchange Scholarship
2025 Reaching Out Award
2024 SURIP 1st Place Winner