

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)

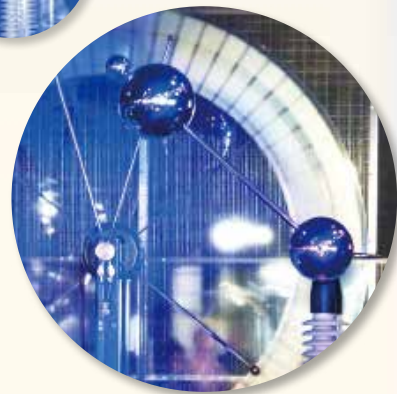
JS 4690 ENRICHMENT STREAM IN THEORETICAL PHYSICS

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For 2026 Entry



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 overseas 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 overseas 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 overseas.
- ◆ 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
- ♦ Computational and data 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.



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 overseas 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 overseas 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.



SURE (Summer Undergraduate Research Exchange Program)

This summer I worked in the SNO+ group at the University of Oxford, supervised by Professor Jeff Tseng. SNO+ is a neutrino detector located 2 km underground in Canada. My project focused on finding and fixing issues in the developing pre-supernova online system - software designed to detect neutrinos emitted just before a supernova. Being part of this international collaboration was a wonderful experience. I exchanged ideas in several regular group meetings, and whenever I encountered a challenge there was always someone with the right expertise to help. I also gained real confidence in computational work - from using scientific data analysis tools (e.g.: ROOT and RAT) and writing C++ processors to Python automation and batch jobs - this experience has made me much more prepared for future research in physics and data analysis.



– CUI Hao Fei
2025 SURE: University of Oxford



This summer, I had the pleasure of working on a project with Prof. Johan Chang from University of Zurich. I was able to utilize my expertise on large dataset processing and optimization algorithms to perform a structure refinement of $\text{PrBa}_2\text{Cu}_3\text{O}_7$, an anonymous counterpart to $\text{YBa}_2\text{Cu}_3\text{O}_7$, a well-known superconductor. This experience has solidified my passion in studying how electronic, magnetic, and structural properties of quantum materials, and I have gained invaluable experience on how to extract physical phenomena from data. Other than working on my project, I had the opportunity to travel around Switzerland and enjoy the beautiful scenery the country has to offer. Finally, I would like to thank the department of Physics at CUHK and University of Zurich for their financial support.

– DAI Shi Yang Alris
2025 SURE: University of Zurich

I visited the Wako campus of RIKEN this summer, and I am invited to join the SAMURAI experiment, which involves testing the detectors and collecting data from particle beams. Besides this large collaboration, I also built a pre-amplifier and tested the drift chamber which is used to track ionizing particles. I have learned a lot from these experiences, including experimental nuclear physics and how to work with a large research group. My experience in RIKEN was very fruitful and enjoyable.

– FENG Wenguang
2025 SURE: Institute of Physical and Chemical Research (RIKEN)



Summer Study Tour

This summer, I joined the study tour organized by the Department of Physics and want to preserve the memory of every enjoyable moment and the impressive facilities we encountered during the trip. One highlight was the Kitt Peak telescope's involvement in the EHT project and the breathtaking night sky we observed there. Another unforgettable experience was spending a night observing celestial objects through the 100-inch and 60-inch telescopes at Mount Wilson. This felt like stepping back in time to when Hubble and other pioneering astronomers were making groundbreaking observations. Beyond the famous facilities, we engaged in insightful conversations with people at these institutions. I recall a welcoming reception on our first day at the University of Arizona, where I met numerous researchers and educators from the Tucson area and learnt a lot from the experts.

Finally, I want to express my sincere gratitude to the four staffs from our department for organizing this enriching study tour. They generously dedicated their time to planning the trip and managing the administrative details. I am also deeply grateful to Prof. Chan from the University of Arizona for facilitating our visit to their institution. Furthermore, I would like to thank Dr. Lau, Howard Hui, and the tour guides from various institutes for expertly guiding us through the different locations.



– LEUNG Chi Suen
2025 Summer Study Tour

S TAR (Summer Teacher AppRenticeship)

This Summer, I applied the Star program and served as a student teacher at Immaculate Heart of Mary College for three months. During these days, I have learnt a wide range of skills, such as teaching methodologies, word processing, organizational and managerial abilities. Moreover, I deeply felt a sense of satisfaction and accomplishment when I successfully imparted knowledge to the students in different lessons. Furthermore, all the teachers and staff there were amiable as they were always proactive and willing to offer guidance and advice. Therefore, it has been an unforgettable and fruitful experience for me. The most impressive task was being a teacher-in-charge for 「全港學界天文問答比賽」. It was my first time leading a group of students to participate in outdoor activities which included a telescope training session and competition in CUHK.



– CHAN Man Chung
2025 STAR: Immaculate Heart of Mary College

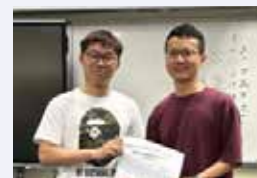
This summer, I had the chance to step into the classroom at C & MA Sun Kei Secondary School, teaching students ranging from junior to senior levels. Apart from preparing notes and exercises under the DSE curriculum, I also engaged in extracurricular activities such as supervising exams and teaching the International Junior Science Olympiad. Beyond academic instruction, I gained valuable insights into classroom management and the importance of flexibility in teaching. This experience has truly been an eye-opening journey, allowing me to discover the impact a teacher can have on students' growth and motivation. I am grateful for this opportunity and look forward to applying these skills as I continue to explore the future in education and science.



– HO Yu Hin
2025 STAR: Christian & Missionary Alliance Sun Kei Secondary School

S URIP (Summer Undergraduate Research Internship Program)

This summer research internship has been an unforgettable journey of growth and challenges. Under the guidance of Professor Wang and the patient mentorship of Dr. Chen Yilin, I learned a lot of knowledge about spin hall effect and experimental skills. What began as pipetting and observation evolved into independent experiments and chiral nanoparticle synthesis. I am deeply grateful to Prof. Wang and Dr. Chen for their unwavering support—whether explaining spin-orbit coupling, troubleshooting failed experiments, or refining my poster design. Their belief in me pushed me to strive for precision, even when the FIB machine or silver plates resisted.



This experience taught me resilience: from chaotic lab days (glove shortages, FIB struggling) to breakthroughs (lighting up nano-slits, synthesis of good chiral nanoparticles). Most importantly, I learned that research isn't just about results—it's about problem-solving, collaboration, and owning every failure as a step forward. This internship didn't just teach me physics—it showed me the grit and creativity behind real science. I leave not just with a certificate, but with skills, confidence, and a hunger for the next challenge.

– LEUNG King Yin Henry
1 Place Winner, 2025 Summer Undergraduate Research Internship Programme

I am incredibly grateful to have participated in the Summer Undergraduate Research Internship Program (SURIP). Before joining, I had limited exposure to hands-on research, but this program transformed my understanding of what it means to conduct research in condensed matter physics. One of the most rewarding aspects was learning to face the challenges in research—how to improve programming techniques, interpreting complex data, or adapting to unexpected results. These experiences strengthened my problem-solving skills and taught me the importance of persistence and critical thinking in scientific inquiry.



What made SURIP truly exceptional was the supportive environment. My research group was not only knowledgeable but also patient and encouraging. They guided me through challenges, explained complex concepts and learning new software that made the experience both productive and enjoyable. I also improved my ability to communicate research findings clearly, both in discussions with my mentors and during presentations. Collaborating with a supportive team of researchers further enriched my perspective on how scientific discovery unfolds in a collaborative environment.

I am deeply grateful to my supervisors and colleagues for their guidance and encouragement. This internship not only solidified my passion for physics research but also equipped me with valuable skills and confidence for my future academic and professional journey. I am also very grateful to the department for providing such a meaningful opportunity for me and all physics students.

– ZHANG Zihou
2nd Place Winner, 2025 Summer Undergraduate Research Internship Programme

Internship & Placement Programs

My task in HKO is risk assessment of weather and development of probabilistic forecast within Hong Kong International Airport (HKIA) using Machine Learning. I mainly use Extreme Gradient Boost (XGBoost) as the primary tool to forecast the wind speed, wind direction and probability of gust occurrences in HKIA during Tropical Cyclone (TC) period for better preparation of air traffic operation in future TC events. What I currently do is try feeding in different relevant predictors (such as latitudes, longitudes and intensities of the TCs) of previous TC events archived by HKO to XGBoost and see if it could yield accurate results. So far, the model could be said accurate, but it still failed to predict extreme cases, like the very high or very low wind speed resulted from some TCs, and therefore I am still struggling and working on it. In general, my experience here has been incredibly fulfilling, and I have gained a great deal of knowledge in meteorology and computer literacy such as machine learning.



– **SHAW Matthew**
2025 One Year Placement in Hong Kong Observatory

這個暑假，我在香港太空館進行了為期九個禮拜的實習。我被分配的工作主要圍繞內容創作及活動策劃。內容創作方面，除了撰寫文案、修訂教學材料等，我更有機會參與網上直播的籌備工作。香港太空館每逢有特殊的天文現象，便會舉行直播。在我實習期間，太空館正好計劃於七月直播「水星東大距」。我便有幸與同事一同準備直播內容，並深刻體會到撰寫科普內容時，事實核查的嚴謹及重要性。

此外，我還跟隨同事參與了「少年太空人計畫」中為期三日兩夜的訓練營。在訓練營期間，我更受邀在晚間活動中，為學員們講解關於望遠鏡的知識。講解結束後，學員們非常踴躍提問，展現出他們對天文的好奇心。透過同事們的回饋，我也了解到許多能夠提升講解技巧的方法，相信這次的經驗對我未來在不同場合的演說能力將大有助益。總括而言，這次實習不僅讓我深入了解太空館的日常運作，更讓我學習到科學推廣的方法與技巧，是一段十分難忘的體驗。



– **姚雪藍**
2025 Summer Internship at Hong Kong Space Museum

This summer, I had the invaluable opportunity to intern in the physics department of a textbook publisher. The experience fundamentally deepened my understanding of the subject.

My first task involved drafting answers for the 2025 HKDSE Physics examination. This was far more than just finding the correct answers. It taught me that truly knowing a physical law means being able to articulate it with clarity and precision for others. I learned to construct questions that highlighted core principles, such as energy conservation, and to refine my answers to be both succinct and comprehensible. This process revealed that editing is essentially an act of teaching through text.

This internship was more than a job, it was a masterclass in communication, application, and the subtle art of making complex ideas accessible. It was an incredibly rewarding journey that has deepened my passion for physics.



– **KO Yik Fai**
2025 Summer Internship at United Prime Publishing

What Our Students Say

Choosing a university major is a serious decision. If you're looking for an easy major that doesn't require much time, physics is not a good choice. However, if you're seeking a subject that involves "seeking truth and cultivating logic", CUHK Physics can definitely fulfill your need. In addition to the core courses, CUHK Physics allows you to choose from areas such as theory, experiment, and computation based on your personal interests and abilities, helping you find your shining point within the program.

Beyond the coursework, CUHK also offers research and employment-oriented opportunities during the summer. I participated in SURIP, which allowed me to truly engage in scientific research. From designing experiments, measuring and improving, to using previously learned theories to explain the data and finally presenting my findings, each step deepened my understanding of physics and helped me appreciate the rigor of science.

The teachers and classmates in CUHK Physics are also very eager to help. If you have an interest in physics, this harmonic and friendly program would be a great choice.



– **WONG Shek Wang**
(Physics, graduated in 2025)
2023 SURIP 1st Place Winner
2025 Study Improvement Award