

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 2021 Entry

# Physics Curriculum



- **Physics [Declare Physics as major programme after admission into CUHK Science]**
  - ◆ A solid grasp of fundamental concepts, analytic, numerical, computational, and research skills, as well as basic experimental skills
  - ◆ A balanced mix of lectures, tutorials, problem-solving sessions, seminars, group discussions, projects and undergraduate research opportunities
  - ◆ Compulsory courses provide an all-round foundation, supplemented by a pool of elective courses
  - ◆ Students may focus on the following Streams: (i) Astrophysics and Particle Physics, (ii) Computational and Data Physics, and (iii) Quantum Science and Technology
  - ◆ A number of special academic and extracurricular experiential learning programmes.
  
- **Enrichment Stream in Theoretical Physics**
  - ◆ For students who have a good foundation in secondary school physics and mathematics
  - ◆ Emphasis on early small-group discussion classes with an academic advisor and on research component
  - ◆ Better opportunities to engage in research at an earlier stage and build up research capabilities
  - ◆ Help students explore their research potential and bridge the gap from undergraduate physics to postgraduate studies
  - ◆ Students may opt for an additional Stream by completing stream-specific electives from: (i) Astrophysics and Particle Physics, (ii) Computational and Data Physics, or (iii) Quantum Science and Technology
  - ◆ A number of special academic and extracurricular experiential learning programmes



# S treams of Study



- Department of Physics offers the following Streams:
  - ◆ *Astrophysics and Particle Physics Stream*
  - ◆ *Computational and Data Physics Stream*
  - ◆ *Quantum Science and Technology Stream*
  - ◆ *Enrichment Stream in Theoretical Physics (JS4690)*
- Streams guide students to use 12-15 elective units on focused sets of electives for attaining a certain depth in concepts and skills for which students will find useful in research in future studies and valuable in the workplace.
- Students who
  - ◆ *have developed an interest in the theme of a Stream by the time they do electives;*
  - ◆ *plan to pursue research opportunities in the theme of a Stream in postgraduate studies;*
  - ◆ *want to acquire the skill set in a Stream for future employment;*will find the Stream a useful guidance in their electives selection.
- A student could do up to two Streams. Students should consider their all-round training as an undergraduate besides their major subject before deciding. Stream selection will be shown in the transcript.
- It is useful to think and plan earlier, and also useful to discuss with your academic advisor. If there is a Stream that fits you, start taking Stream-specific required courses.



# D

## ouble Majors



- The newly introduced **Physics-X Streamlined Path** provides a way for students to pursue a double major in Physics and a second discipline in either Mathematics or Earth System Science within the nominal period of study while maintaining academic rigor.
- The **Physics-X Streamlined Path** maintains academic rigor through careful merging of major requirements and partial removal of courses which are common to both majors.
- The **Physics-X Streamlined Path** prepares students to carry out cutting edge research at the interface of two closely related disciplines.
- **Physics-X Streamlined Path** is especially suitable for academically-strong students who want to have an intellectually stimulating and rewarding undergraduate experience.
- **Highlights of the Physics-X Streamlined Path**
  - ◆ *Rigorous foundation in physics and one more scientific discipline*
  - ◆ *Opportunity to engage in knowledge transfer through interdisciplinary research projects*
  - ◆ *Flexibility in future research directions*



# Experiential Learning Opportunities

CUHK Physics Department has 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:

	Cumulative number of participating students
● Summer Undergraduate Research Exchange (SURE)	134 (since 2000)
● Summer Teacher AppRenticeship (STAR)	137 (since 2002)
● Overseas Program for Undergraduate students (OPUS)	62 (since 2006)
● Internship Program with Hong Kong Observatory	50 (since 2005)
● Summer Study Tour	55 (since 2017)
● Summer Internship Program	143 (since 2016)

These efforts, together with the final year research projects, of involving undergraduates into research activities have led to publications of research papers in international journals with undergraduates as co-authors. The Department also supports students to report their research results in local and international conferences.

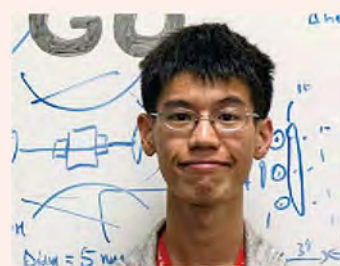


# What Our Students Say

There is no doubt that the professors at CUHK Physics impressed me a lot. Most of them pay much effort in teaching physics to students, from well prepared notes, problem sets, to lengthy post-class discussions with students who have questions. With the interactive and interesting style of instructing. I have learnt a lot of physics, as well as presentation skills and other knowledge from them.

Another thing that cannot be missed is the annual Physics Study Tour. They are organized to let students visit scientific research organizations and perform astronomical observations. For instance, in 2017, students were able to observe the total solar eclipse in the US with telescopes. It was an eye opening experience for every one of us. We were also given the opportunity to visit well-known research institutes like Caltech and the LIGO laboratory there.

Various opportunities have also been given to students to develop their presentation skills, research skills and creative skills. The annual Physics Student Conference has been organized since 2017, where students are provided a platform to present their research work to the others in a real-conference-like scenario. We were able to sharpen our presentation skills and communication skills through participation. I am also very grateful that I was given the precious opportunity to develop my ebook on special relativity, which was then uploaded to the CUHK physics general education website. CUHK Physics really provides as many opportunities as possible for students to pursue goals and dreams.



– LI Ka Yue Alvin, graduated in 2019

In these 5 years, there are two experiences which impressed me deeply. The first one is the experience of working as a full-time student intern in the Hong Kong Observatory (HKO) for one year. This is an invaluable experience to work full-time as a student. I have many opportunities to learn more about the works of HKO. Secondly, I joined a research programme held by the CU Physics department. I went to University of Twente in Netherlands during a summer, and worked with the physicists there. This was very exciting since I could conduct experimental research there by using advanced apparatus and technology. The exchange experience has really broadened my horizon and expanded my knowledge.



– TAI Ngan Cheung, graduated in 2019

I did not choose this programme at first; I was a mathematics major. I learnt about the double major curriculum and intended to do the Math/Phys double major programme. But later I discovered my greater interest in physics and would like to enjoy more freedom in selecting my elective courses, so I switched to become a physics major and have mathematics as my minor.

I confirmed my inclination towards physics from the study tour that I joined in summer 2018. State-of-the-art research facilities, such as CERN and Virgo, were introduced to me and the fact that I might have the opportunities to participate in those collaborations in the future.

I also like how the programme curriculum is structured in terms of streams. The enrichment stream requires me to complete a year-long research-like work (senior project) to better prepare for graduate school studies; the computational stream motivates me to take on more advanced courses or courses from other departments. The programme curriculum is totally up to the students in choosing what they want to learn about.



– YIP Hoi Tung, graduated in 2020