

BSc in Physics (PHYS)



Physics encompasses everything from the tiniest elementary particles to the ultimate fate of the universe, and provides the foundation for all modern science and engineering. The BSc in Physics program gives students depth and breadth in their studies. Students will learn about exciting topics ranging from quantum computing, superconductivity and nanotechnology to quarks and black holes. The program prepares students for science-related careers, or for further studies in physics and related fields.

Since physics students are rigorously trained in generic analytical and problem-solving skills, they are well prepared to take up jobs with diverse natures in both government and the private sector. Students can work in education, research and development, technical sales, forensic science, medical industry, commerce, banking, etc. We offer internship opportunities in local technology companies and secondary schools so that students gain invaluable experience in real working environments. Our best graduates routinely go on to further studies at prestigious universities around the world.



Program Highlights

The BSc in Physics (PHYS) program offers one track and two options:

- **International Research Enrichment Track (IRE Track)** - This is an “elite program” in the School of Science to prepare outstanding students to pursue a career in research. Students in this track are guaranteed a summer research internship opportunity in a foreign university or national laboratory, as well as exchange opportunity in a renowned foreign university.
- **Honors Physics Option** - This option is intended for students planning to enter graduate school after their undergraduate studies at HKUST. The curriculum provides a strong foundation of courses and requires students to complete a research project and thesis in their final year.
- **Physics and Mathematics Option** - This option is intended for students with a strong interest in both physics and mathematics. It is particularly useful for students who plan to pursue further studies in theoretical physics.

Study Pathway

In Year 1, students will enroll in science foundation courses according to their interests and background, as well as language and other courses in other areas to fulfill the University Common Core requirement.

After completing the major pre-requisite courses, students can declare Physics (PHYS) as their major program at the end of Year 1. Students who are competent and interested in a research career can also apply for the International Research Enrichment (IRE) Track, which offers outstanding students additional resources and opportunities to nurture their research abilities. Students who are interested in emerging technology and innovation can opt for PHYS with an Extended Major in Artificial Intelligence.

Major in Physics with an Extended Major in Artificial Intelligence

The curriculum of this program is cross-disciplinary and practical. Students will learn solid knowledge in physics plus innovative applications of artificial intelligence in physics-related areas. Upon successful completion of the program, the student will be awarded the BSc degree in Physics with an Extended Major in Artificial Intelligence.

Research Excellence

Research Foci

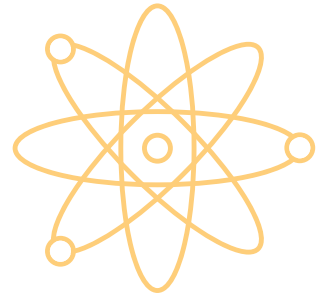
- Cold Atoms, Optics and Quantum Information
- Condensed Matter Experiments and Advanced Materials
- Condensed Matter Theory, Statistical and Computational Physics
- Particle Physics and Cosmology
- Soft Matter and Biological Physics
- Wave Functional Materials and Physics

Research in the Physics Department covers a broad range of topics, from the smallest to the largest scale, with complementary strengths in theory and experiment. Faculty members work both independently and collaboratively, in affiliation with several research institutes and centers:

- Institute for Advanced Study's Center for Fundamental Physics
- Institute for Advanced Study's Center for Quantum Technologies
- HKUST Energy Institute
- William Mong Institute of Nano Science and Technology
- Center for Metamaterials Research
- Center for Quantum Materials
- Center for Scientific Computation
- Center for Theoretical Condensed Matter Physics

Internship and Research Opportunities

A PHYS student working under Prof. George Smoot (2006 Physics Nobel Laureate) on the development of a single-photon imaging detector in the Quantum Optics for Astrophysics and Cosmology Laboratory of HKUST



“Listening” for gravitational wave signals with one of the LIGO detector arms right behind the PHYS student who participated in the LIGO Summer Undergraduate Research Fellowship program



Teaching internship at a secondary school



Visiting an acoustic metamaterials company at which Physics students have their internships



Ceremony for the first exhibition of a working quantum computer





Words from PHYS Graduate

HKUST has provided me with various research opportunities, which allow me to explore different fields, including optical microscopy, nonlinear dynamics analysis, and astronomical instrumentation. In particular, I got the precious opportunity to work with a Physics Nobel Prize Laureate for the astronomical instrumentation project. These experiences have trained me up as a future scientist.

Carol CHAN

BSc in Physics (International Research Enrichment Track), Class of 2022

Admissions Requirements

Prospective students may apply for the *Science (Group A) program (JS5102)* through direct choice in the JUPAS / Non-JUPAS admissions scheme.

Students who want to opt for an Extended Major may also apply for the *Science (Group A) with an Extended Major in Artificial Intelligence program (JS5181)*.

Upon completion of the major pre-requisite courses at the end of the first year, students can declare major in Physics.

PHYS Major Pre-requisite Courses:

- PHYS 1111 General Physics I
(for those with no calculus background) OR
PHYS 1112 General Physics I with Calculus
(for those with calculus background) OR
PHYS 1312 Honors General Physics I
(subject to students' preference and qualification)
- PHYS 1114 General Physics II
(for those having completed PHYS 1111/1112/1312) OR
PHYS 1314 Honors General Physics II (subject to students' preference and qualification)

JOIN PHYS PROGRAM GO BEYOND YOUR LIMITS FIND TRANSFORMATION HERE

School of Science – Undergraduate Admissions

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PHYS website



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