


**HKUST School of Science
Department of Physics
Summer Program on Quantum Technology (2023)**

Program details

Program title:	Journey into the Quantum World: From Mechanics to Computation
Program provider:	Department of Physics, The Hong Kong University of Science and Technology
Description:	<p>This three-week summer program offers high school students a unique opportunity to explore the fascinating world of quantum computing. The program covers a range of topics, from the basic principles of quantum computing to advanced applications in cryptography and quantum communication.</p> <p>Through a combination of lectures, hands-on activities and computational tutorials, students will learn about the essential concepts of quantum computing, including qubits, superposition and measurement. They will also gain an understanding of how quantum gates and circuits can be used to perform complex computations and will explore a range of quantum algorithms and their practical applications.</p> <p>In addition to theoretical instruction, students will work with real quantum computers and will engage in hands-on projects that will enable them to apply their knowledge to real-world scenarios. By the end of the program, students will have a comprehensive understanding of the principles and practical applications of quantum computing and will be well-prepared to pursue further studies and careers in this exciting field.</p> <p>Whether you are interested in a career in science, technology, engineering, or mathematics, or simply looking to expand your horizons and explore the frontiers of computing, this program offers a unique and rewarding experience that will equip you with the skills and knowledge needed to succeed in the 21st century.</p>
Instructor:	Dr. CHOY Ting Pong

<p>Course outline & format:</p>	<p>Week 1:</p> <ul style="list-style-type: none"> • Introduction to classical computing • Overview of quantum computing • Qubits, superposition, and measurement • Quantum gates and circuits <p>Week 2:</p> <ul style="list-style-type: none"> • Quantum algorithms and their applications • The search algorithm • Quantum Fourier transform • Shor's algorithm for factoring large numbers • Entanglement <p>Week 3:</p> <ul style="list-style-type: none"> • Cryptography and quantum communication • Breaking RSA encryption • Quantum communication protocols • Quantum error correction <p>Format:</p> <p>This three-week summer program is designed to be interactive and engaging. Students will attend lectures, participate in hands-on activities and computational tutorials.</p> <p>In addition to the lectures, students will have the opportunity to work with real quantum computers, allowing them to gain practical experience in designing and manipulating quantum circuits.</p> <p>By the end of the program, students will have gained a comprehensive understanding of quantum computing and its practical applications, and will be well-prepared to pursue further studies and careers in this exciting field.</p>
<p>Date & time:</p>	<p>19 July to 8 August 2023 (Weekdays) 10:00am to 4:00pm</p>
<p>Venue:</p>	<p>HKUST Campus at Clear Water Bay</p>
<p>Format:</p>	<p>Face-to-face</p>
<p>Language:</p>	<p>English</p>

Eligibility:	Students with genuine interest in Physics: Secondary 4-5 (secondary school students) Year 11-12 (international school students)
Award:	<ul style="list-style-type: none"> • Students with 80% attendance and completed all assessment activities with passing grades will be issued a certificate • In recognition of the student participation, OEA bonus points will be awarded to Secondary 5 students (for 2024 intake) and Secondary 4 students (for 2025 intake), if the participants keep one or more of the following programs as their JUPAS Band A choices: <ul style="list-style-type: none"> ✓ Science (Group A) Program (JS5102) ✓ Science (Group A) with an Extended Major in Artificial Intelligence Program (JS5181) ✓ Science (Group B) Program (JS5103) ✓ International Research Enrichment Program (JS5101) ✓ Biotechnology and Business Program (JS5811) ✓ Mathematics and Economics Program (JS5813)
Enrolment fee:	Free of charge
Application method:	<p>Please click here or scan the following QR code to fill in the online application form.</p>  <p>Due to limited quota, enrollment is on selective basis. Applicants are required to write a short personal statement indicating why they are interested in the summer program. The statement should be within 100 words in English. Please write the statement in the online application form.</p>
Application deadline:	20 April 2023 (Thu)
Date of Announcement of Result:	By early May 2023 (tentatively)
Enquiry:	HKUST School of Science Miss Sherman LO (Tel: 3469 2066)