

TING-KAI, HSU

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<https://tingkaihsu.github.io>

EDUCATION

National Taiwan University	Taipei, Taiwan
Bachelor of Science in Engineering	2022 - 2026(expected)
<ul style="list-style-type: none">• Major: Electrical Engineering• GPA: 4.23/4.30• Rank: 7/266 (3%)	

RESEARCH PROJECTS

An On-shell Approach to Anomalous Threshold	2024.08 - present
Department of Physics, National Taiwan University	
<ul style="list-style-type: none">• Research Assistant to Professor Yu-tin Huang.• Study the analytic structure of amplitudes and the dispersion relation for unstable particles.• Design an on-shell approach to anomalous threshold.• Restoration of EFT positivity bound in the unstable region.• K. Aoki, Y.-t. Huang, T.-K. Hsu, <i>On-shell Approach to Anomalous Threshold</i>, under construction.	
Reconstruction of <i>B</i> Meson Decay Process via Deep Learning	2023.09 - present
Department of Physics, National Taiwan University	
<ul style="list-style-type: none">• Mentored by Professor Kai-feng Chen.• Study the deep learning algorithms and collider physics.• Training neural networks for capturing non-linear features of collision process.• Compare CNN model and Transformer model efficiency.	

INTERNSHIPS

n_TOF, CERN Geneva, Switzerland	2025.07 - 2025.08
<ul style="list-style-type: none">• Mentored by Professor Alberto Mengoli.• Developed an online nuclear cross-section database for astrophysical simulations.• Supported experimental analysis and data organization for the n_TOF facility.• The modular design allows extension, as more measurements become available.• T.-K. Hsu, <i>CERN n_TOF Database of Maxwellian-Averaged Cross Sections (MACS)</i>, CERN, 2025. https://doi.org/10.17181/9vj1x-arb77 and https://ntofdb.web.cern.ch/.	
Institute of Physics, Academia Sinica Taipei, Taiwan	2024.07 - 2024.08

Institute of Physics, Academia Sinica Taipei, Taiwan	2024.07 - 2024.08
<ul style="list-style-type: none">• Mentored by Professor Wen-Chen Chang.• Participated in the design and construction of a fixed-target cosmic-ray detector.• Built automation programs for data acquisition and monitoring of cosmic rays.• Project Presentation	
• Best Maker Prize, MAKENTU Makerthon Contest,	2024.05
• Outstanding Academic Achievement Awards, National Taiwan University,	2023.09
• Outstanding Academic Achievement Awards, National Taiwan University,	2023.06

AWARDS

- Best Maker Prize, MAKENTU Makerthon Contest, 2024.05
- Outstanding Academic Achievement Awards, National Taiwan University, 2023.09
- Outstanding Academic Achievement Awards, National Taiwan University, 2023.06

ACADEMIC &
LEADERSHIP
EXPERIENCE

Teaching Assistant Classical Mechanics, under Professor Yu-tin Huang	Fall, 2025
Research Assistant Theoretical Physics, under Professor Yu-tin Huang	Spring, 2025
Host MAKENTU Makerthon Contest	Spring, 2025
Head of R&D Department NTU Learning Optimization Club	Spring, 2024

COURSE
PROJECTS

A Brief Introduction to Integrable Systems in Statistical Mechanics <i>Statistical Physics (II)</i>	Fall, 2025
• First introduced the Bethe ansatz for integrable spins, and then discussed its applications in statistical mechanics.	
A Brief Introduction to Black Hole Entropy <i>Advanced Topics in Gravity</i>	Spring, 2025
• Introduced two methods for calculating the entropy of Schwarzschild black holes and discussed the concept of microstates.	
Anisotropic Transmission of Quantum Information through Quantum Fields <i>Quantum Information and Computation</i>	Spring, 2025
• Studied quantum information transmission, combining the non-perturbative quantum field theory with the Unruh-De Witt model, and tried some approaches to the anisotropic transmission.	
A Brief Introduction to the Effective Theory of Binary Inspirals <i>Special Topics on Effective Field Theory and Scattering Amplitudes</i>	Fall, 2024
• Introduced the EFT framework, the hierarchy of scales, and the power counting rules for binary inspirals, and calculated the gravitational potential using Feynman diagrams.	
A Brief Introduction to Conformal Bootstrap <i>Quantum Field Theory (II)</i>	Fall, 2024
• First introduced the basic concepts of conformal group, and then explained the algorithm of primary spectrum from the OPE associativity in Euclidean signature.	

LANGUAGES &
SKILLS

Languages: English (TOEFL iBT 106 : 29/28/22/27), Chinese

Programming: Mathematica, ROOT, MadGraph, Python, C++, L^AT_EX.

RELEVANT
COURSE-
WORK

Basic: Quantum Field Theory (I) & (II) (A+), Classical Mechanics (A+), Electromagnetics (I) & (II) (A+), General Relativity (A), Quantum Mechanics (I), Statistical Physics (II).

Advanced: Special Topics on Effective Field Theory and Scattering Amplitudes (A+), Quantum Information and Computation (A+), Advanced Topics in Gravity (A+), Basics of String Theory: from conformal field theory to supersymmetry (A+), Quantum Fields in Cosmology (A).