# THE UNIVERSITY OF HONG KONG

HK Institute of Quantum Science & Technology 香港量子研究院

Department of Physics
THE UNIVERSITY OF HONG KONG

# High Energy Physics Opportunities in the Quantum Computing Era


## Prof. Ying-Ying LI

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Abstract:

Quantum simulation of High Energy Physics (HEP) has seen remarkable growth in recent years. Nevertheless, there is a continuous need for advancements in the overall simulation framework. In my talk, I will first motivate the critical need for quantum computing in HEP and discuss recent developments. Then I will focus on a specific element - digitization, the step to encode field variables into qubits. This is particularly relevant for gauge theories with local symmetry and field variables of infinite dimension. I will explore the connection between gauge theory digitization methods and approximate error correction codes, present the existence of error thresholds below which gauge-redundant digitization combined with error correction has higher fidelity than removing these redundancies.


Biography:

Ying-Ying Li obtained her Ph.D. from Hong Kong University of Science and Technology in 2019. From 2019 to 2022, she was a research associate (postdoc) at Fermilab in the United States. In 2023, she joined the University of Science and Technology of China as an assistant professor. Her research focuses on quantum simulations of lattice quantum chromodynamics (QCD) and particle physics phenomenology. Ying-Ying Li has published over 20 papers in top journals including PRL. She was awarded the prestigious HKPFS from Hong Kong Government, KITP Graduate Fellowship from UCSB and IPPP Distinguished Visiting Academic (DIVA) Award from Durham University.

## Thursday, May 16, 2024, 4:00 pm

Room 522, 5/F, Chong Yuet Ming Physics Building,
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