Tongyin Lin (林桐音)

Email: 12232812@mail.sustech.edu.cn
Google Scholar

Research Interest

My research interest lies in **quantum information science**, with a particular focus on

- Quantum error correction
- Fault-tolerant quantum computing
- Quantum algorithms in the NISQ/early fault-tolerant era
- Quantum combinatorial optimization

Education

2022–2025 *M.Sc. in Quantum Science and Technology*
Southern University of Science and Technology (SUSTech)
Advisor: Man-Hong Yung

2018–2022 *B.Sc. in Physics*
Southern University of Science and Technology (SUSTech)
Advisor: Man-Hong Yung

Work Experience

2026.11–now *Research Assistant*
Hong Kong University of Science and Technology (Guangzhou) (HKUST(GZ))
Principal investigator: Xin Wang

2026.01–2026.10 *Research Assistant*
Shenzhen International Quantum Academy (SIQA)
Principal investigator: Bujiao Wu

Honors and Awards

- Honor Graduate of the College of Science at SUSTech, 2022
- SUSTech Scholarship for Outstanding Undergraduate, 2019-2022

Publications & Preprints

1. Tongyin Lin, Bujiao Wu, Bin Cheng
Asymptotically Good Quantum Codes with Addressable Transversal T Gates. arXiv:2609.35129

2. Bujiao Wu, Tongyin Lin, Bin Cheng
Substantially Improved Rate and Distance for Addressable Transversal Phase Gates. arXiv:2611.04964

Current Projects

1. **Hardware- and resource-efficient universal fault-tolerant quantum computing (UFTQC):**
   - Developing a low-overhead universal fault-tolerant quantum computing protocol that is feasible on near-term superconducting quantum devices

- Collaborative project with an experimental group
- Simulation result shows that the logical state achieves a higher fidelity after error correction
- Experimental implementation is in progress
- Advised by Bujiao Wu

2. **Large-scale combinatorial optimization in the NISQ era:**
   - Developed a new hybrid quantum-classical framework, called Induced-Subgraph-QAOA, for solving large-scale combinatorial optimization problems on NISQ devices
   - First author, paper under review
   - Advised by Man-Hong Yung

Academic Competitions

1. National Challenge Cup - Quantum Track (2024) - 2nd Prize
   - Team member, responsible for algorithm design, coding and report writing
   - Our team propose the circuit cutting scheme for Quantum Fourier Transform and apply it to Shor's algorithm
2. Asia and Pacific Mathematical Contest in Modeling - Wuyue Cup (2024) - 2nd Prize
   - Team member, assisting in algorithm design and writing the report
   - This contest is to model the AI-related problems into Quantum Unconstrained Binary Optimization (QUBO) problems for potential quantum speedup.

Professional Service

- Co-reviewer for Nature Communications

Conference Presentations

- 25th Asian Quantum Information Conference (AQIS 2025), poster presentation

Teaching Experience

- TA, Quantum Computing (Autumn 2024)