Jiawei Wu

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About me

I am working as a research fellow (postdoc) in Marco Tomamichel's group in Centre for Quantum Technologies, National University of Singapore. My research focuses on fundamental aspects of quantum cryptography, including quantum secure communication, bit commitment, oblivious transfer and coin flipping. I received my PhD degree in Tsinghua University and bachelor's in Huazhong University of Science and Technology.

Employment History

2023 – now ◇ **Research Fellow,** Centre for Quantum Technologies, National University of Singapore

- found security vulnerabilities when composing cryptographic multiple primitives. [2]
- Construct a string commitment scheme from general noisy channel. [1]

Education

2021 ◇ **Visiting student** in Southern University of Science and Technology
Developed a private dense coding framework applicable to various quantum secure protocols.

2017 – 2023 ◇ **Ph.D.** in Physics, Tsinghua University.
Thesis: *Theoretical research on finite-block-length quantum secure direct communication (QSDC).*
Performed comprehensive analysis on the security of QSDC schemes, particularly in the finite-block-length case, using techniques such as information theory, universal hashing, and statistical inference.

2013 – 2017 ◇ **B.sc.** Huazhong University of Science and Technology
Major: Optoelectronic information science.
Studied fibre communication, laser design, optical design, metasurface.

Projects

2022 ◇ **Patent analysis in quantum secure communication**

2016 ◇ **Underwater optical communication**

Skills

Languages ◇ English, Mandarin Chinese

Coding ◇ Matlab, C, Python, Golang

Miscellaneous Experience

Awards and Achievements

2021 ◇ **Zhuoyu scholarship** of Tsinghua University.

2015 ◇ **National Encouragement Scholarship** of China.

◇ **Meritorious Winner** in Mathematical Contest in Modelling (MCM/ICM problem 1, 2015).

Conference talks

2024.9 ◇ Qcrypt 2024, Vigo. Title: *On the composable security of weak coin flipping*.

2024.10 ◇ IPS 2024, Singapore. Title: *On the composable security of weak coin flipping*.

2018.10 ◇ National Quantum Optics Conference, Zhangjiajie, China. Title: *Security of quantum secure direct communication*.

Research Publications (Total citations: 401)

Preprints

1. **J. Wu**, M. Hayashi, and M. Tomamichel, *String commitment from unstructured noisy channel*, Jan. 2025. DOI: 10.48550/2501.00281. arXiv: 2501.00281.
2. **J. Wu**, Y. Hu, A. Bansal, and M. Tomamichel, *On the composable security of weak coin flipping*, Jun. 2024. DOI: 10.48550/arXiv.2402.15233. arXiv: 2402.15233.

Journal Articles

1. B. Wang, J. Wen, **J. Wu**, *et al.*, "Improving the full quantum eigensolver with exponentiated operators," *Physical Review B*, vol. 109, no. 24, p. 245 117, Jun. 2024. DOI: 10.1103/PhysRevB.109.245117.
2. **J. Wu**, G.-L. Long, and M. Hayashi, "Quantum Secure Direct Communication with Private Dense Coding Using a General Preshared Quantum State," *Physical Review Applied*, vol. 17, no. 6, p. 064 011, 2022. DOI: 10.1103/PhysRevApplied.17.064011.
3. P.-H. Niu, **J.-W. Wu**, L.-G. Yin, and G.-L. Long, "Security analysis of measurement-device-independent quantum secure direct communication," *Quantum Information Processing*, vol. 19, no. 10, 2020, ISSN: 1570-0755 1573-1332. DOI: 10.1007/s11128-020-02840-0.
4. D. Pan, Z. Lin, **J. Wu**, *et al.*, "Experimental free-space quantum secure direct communication and its security analysis," *Photonics Research*, vol. 8, no. 9, pp. 1522–1531, 2020. DOI: 10.1364/PRJ.388790.
5. L. Yang, **J. Wu**, Z. Lin, L. Yin, and G. Long, "Quantum secure direct communication with entanglement source and single-photon measurement," *Science China Physics, Mechanics & Astronomy*, vol. 63, no. 11, p. 110 311, 2020, ISSN: 1869-1927. DOI: 10.1007/s11433-020-1576-y.
6. R. He, J.-G. Ma, and **J. Wu**, "A quantum secure direct communication protocol using entangled beam pairs," *EPL (Europhysics Letters)*, vol. 127, no. 5, p. 50 006, 2019, ISSN: 1286-4854. DOI: 10.1209/0295-5075/127/50006.
7. **J. Wu**, Z. Lin, L. Yin, and G.-L. Long, "Security of quantum secure direct communication based on Wyner's wiretap channel theory," *Quantum Engineering*, vol. 1, no. 4, e26, 2019. DOI: 10.1002/que2.26.