Weiguo Ma

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Address: Institute of Physics, Chinese Academy of Sciences, Haidian, Beijing

Education

Ph.D. Candidate| Institute of Physics, Chinese Academy of Sciences   Sep. 2021 – Present
Condensed Matter Physics | Supervisor: Dr. Prof. Heng Fan and Dr. Prof. Kai Xu   Beijing, P.R.China

Ph.D. Candidate| University of Chinese Academy of Sciences   Sep. 2021 – Present
Condensed Matter Physics | Supervisor: Dr. Prof. Heng Fan and Dr. Prof. Kai Xu   Beijing, P.R.China

B.S. | Lanzhou University   Sep. 2017 – June 2021
Theoretical Physics   Lanzhou, Gansu, P.R.China

Research Interests

Tensor Network
Tensor network technologies for quantum computing, many-body physics

Machine Learning
Deep learning with quantum computing, hybrid quantum-classic computing

Quantum Computing
Random measurements and quantum computing for non-equilibrium physics

Patents & Software Copyrights

[1] **Ma, Weiguo**, Kaixuan Huang, Yunhao Shi, Kai Xu, and Heng Fan. "Dilution Refrigerator Temperature and Pressure Monitoring Software V1.0". Chinese Software Copyright Registration No. 2024SR1260882, issued August 28, 2024.

[2] Huang, Kaixuan, **Weiguo Ma**, Yunhao Shi, Kai Xu, and Heng Fan. "Method, Equipment, and Storage Medium for Parameter Standardization of Super-Guided Quantum Bits". Chinese Patent Application CN118095470A, filed January 31, 2024, published May 28, 2024.

Publications

[1] Shi, Y.-H.; Sun, Z.-H.; Wang, Y.-Y.; Wang, Z.-A.; Zhang, Y.-R.; Ma, **W.-G.**; Liu, H.-T., et al. Probing Spin Hydrodynamics on a Superconducting Quantum Simulator. Nat Commun 2024, 15 (1), 7573.

[2] **Ma, W.**; Shi, Y.-H.; Xu, K.; Fan, H. Tomography-Assisted Noisy Quantum Circuit Simulator Using Matrix Product Density Operators. Phys. Rev. A 2024, 110 (3), 032604.

[3] Xu, H.-Z.; Zhuang, W.-F.; Wang, Z.-A.; Huang, K.-X.; Shi, Y.-H.; **Ma, W.-G.**; Li, T.-M., et al. Quafu-Qcover: Explore Combinatorial Optimization Problems on Cloud-Based Quantum Computers. Chinese Phys. B 2024, 33 (5), 050302.

[4] Jin, Y.-X.; Xu, H.-Z.; Wang, Z.-A.; Zhuang, W.-F.; Huang, K.-X.; Shi, Y.-H.; **Ma, W.-G.**; Li, T.-M., et al. Quafu-RL: The Cloud Quantum Computers Based Quantum Reinforcement Learning. Chinese Phys. B 2024, 33 (5), 050301.

[5] Wang, Y.-Y.; Shi, Y.-H.; Sun, Z.-H.; Chen, C.-T.; Wang, Z.-A.; Zhao, K.; Liu, H.-T.; **Ma, W.-G.**; Wang, Z., et al. Exploring Hilbert-Space Fragmentation on a Superconducting Processor. arXiv March 14, 2024. (Under Review)

[6] Liu, Y.; Zhang, Y.-R.; Shi, Y.-H.; Liu, T.; Lu, C.; Wang, Y.-Y.; Li, H.; Li, T.-M.; Deng, C.-L.; Zhou, S.-Y.; Liu, T.; Zhang, J.-C.; Liang, G.-H.; Mei, Z.-Y.; **Ma, W.-G.**; Liu, H.-T., et al. Disorder-Induced Topological Pumping on a Superconducting Quantum Processor. arXiv:2401.01530. (Under Review)

[7] Shi, Y.-H.; Liu, Y.; Zhang, Y.-R.; Xiang, Z.; Huang, K.; Liu, T.; Wang, Y.-Y.; Zhang, J.-C.; Deng, C.-L.; Liang, G.-H.; Mei, Z.-Y.; Li, H.; Li, T.-M.; **Ma, W.-G.**; Liu, H.-T., et al. Quantum Simulation of Topological Zero Modes on a 41-Qubit Superconducting Processor. Phys. Rev. Lett. 2023, 131 (8), 080401.

[8] Jiang, Y.; Zhang, Z.; Yang, J.; Han, X.; Xiao, H.; **Ma, W.**; Ren, G.; Mitchell, A.; Tian, Y. A Flexible and Reconfigurable Optical Add-Drop Multiplexer for Mode Division Multiplexing Systems. IEEE Photon. Technol. Lett. 2020, 32 (24), 1515–1518.

RESEARCH EXPERIENCE

Research Assistant — Feb. – Dec. 2019

Lanzhou University | Advisor: Dr. Prof. Daqiang Gao — Lanzhou, Gansu, P.R.China

Effect of Flow Cut on Precipitation and Crystallization of Impure Water in a Static Magnetic Field

Intern — Nov. 2019

Okayama University | Adviser: Dr. Prof. Noboru Sasao — Okayama, Japan

Investigated single photon interference using MPPC.

HONORS & AWARDS

Merit Student — 2024

University of Chinese Academy of Sciences

Director's Commendation Award — 2023

Institute of Physics, Chinese Academy of Sciences

Outstanding Graduates — 2021

Lanzhou University

Model Student — 2018, 2019, 2020

Lanzhou University

The First Prize Scholarship — 2018, 2019, 2020

Lanzhou University

University Student Scholarship of Chinese Academy of Sciences — 2019

University of Chinese Academy of Sciences

STUDENT WORK

Member of the Publicity Department — Sep. 2021 – July 2022

Published and maintained the official WeChat account. — University of Chinese Academy of Sciences

Deputy Class Advisor — Aug. 2019 – Sep. 2020

Organized orientation and helped new students adjust to university life. — Lanzhou University

English Broadcaster & Technician — Oct. 2017 – June 2021

Collected and broadcasted news in English; edited and produced recordings. — Lanzhou University

SKILLS

Languages: Chinese (Native), English
Programming: Python, C++, MATLAB, LaTeX