Zhian Jia *

Personal Data

Address:	Centre for Quantum Technologies, NUS
email:	giannjia@foxmail.com
Research Blog:	Chronicle of Physics
Homepage:	https://polyidoit.github.io/jia/
ArXiv page:	https://arxiv.org/a/jia_z_2.html
Physics.StackExchange:	https://physics.stackexchange.com/users/149857/zhian-jia

Academic Experience

Sep 2021 - present	Centre for Quantum Technologies, **National University of Singapore**, *Singapore* *Supervisor: Dagomir Kaszlikowski* *Research Fellow*
Nov 2018 - Dec 2019	Microsoft Station Q, Department of Mathematics, **University of California, Santa Barbara**, *California, United States* *Supervisor: Zhenghan Wang* *Visiting scholar program*
Sep 2017 - Aug 2018	Yau Mathematical Sciences Center, Department of Mathematical Sciences, **Tsinghua University**, *Beijing, China* *Supervisor: Liang Kong* *Visiting Ph.D.*

Education

Sep 2015 - Jun 2021	CAS Key Laboratory of Quantum Information, **University of Science and Technology of China**, *Hefei, China* *Supervisor: Guang-Can Guo, Yu-Chun Wu* *PhD degree in Physics* Thesis: Classification, criteria and properties of quantum correlations and their applications in quantum many-body systems
Sep 2011 - Jun 2015	Institute of Super-microstructure and Ultrafast Process in Advanced Materials, School of Physics and Electronics, **Central South University**, *Changsha, China* *B.S. in Applied Physics* Thesis: Impurity effect of vacancy in two-dimensional crystals and the related applications in quantum Hall effect

Selected Awards

2017 Guorui scholarship for graduate students

2016 National scholarship for graduate students

2016 The Best Presenters' Prize
Talk title: monogamy as a fundamental quantum phenomenon
The third PFUNT(Physics Five Universities,the National Top) PhD Student Forum

*Chinese (Mandarin): Zhian Jia or Zhi-An Jia; Also known as: Zhih-Ahn Jia.

2016 The Third Prize of Talk
Talk title: graph theoretic approach to quantum contextuality
The sixth graduate student academic annual meeting of USTC

2015 *The Outstanding Project Prize*
project title: First Principle Method of Single Layer Graphene-like Material and Its Functional Devices Design
College students' innovative and entrepreneurial project

2014 College scholarships of Physics and Electronics, Central South University

2010 *The Second Prize* of The 27th national physics olympiad, 2010.

Publications and preprints [Google scholar]

- **Z. Jia**, Dagomir Kaszlikowski, The spatiotemporal doubled density operator: a unified framework for analyzing spatial and temporal quantum processes, [arXiv:2305.15649]
- **Z. Jia**, Minjeong Song, Dagomir Kaszlikowski, Quantum space-time marginal problem: global causal structure from local causal information, [arXiv:2303.12819]
- **Z. Jia**, Sheng Tan, Dagomir Kaszlikowski, Liang Chang, On weak Hopf symmetry and weak Hopf quantum double model, [arXiv:2302.08131]
- **Z. Jia**, Dagomir Kaszlikowski, Sheng Tan, Boundary and domain wall theories of 2d generalized quantum double model, [arXiv:2207.03970]
- Lu Wei, **Z. Jia**, Dagomir Kaszlikowski, Sheng Tan, Antilinear superoperator and quantum geometric invariance for higher-dimensional quantum systems, [arXiv:2202.10989]
- **Z. Jia**, Dagomir Kaszlikowski, Electric-magnetic duality of $\mathbb{Z}_2$ symmetry enriched cyclic Abelian lattice gauge theory, [arXiv:2201.12361]
- Huan Cao, Ning-ning Wang, **Z. Jia**, Chao Zhang, Yu Guo, Bi-Heng Liu, Yun-Feng Huang, Chuan-Feng Li, Guang-Can Guo, Quantum simulation of indefinite causal order induced quantum refrigeration, Phys. Rev. Research 4, L032029 (2022), [arXiv:2101.07979]
- **Z. Jia**, Lu Wei, Yu-Chun Wu, Guang-Can Guo, Quantum Advantages of Communication Complexity from Bell Nonlocality, Entropy 23 (6), 744 (2021)
- **Z. Jia**, Rui Zhai, Shang Yu, Yu-Chun Wu, and Guang-Can Guo, Hierarchy of Genuine Multipartite Quantum Correlations, Quantum Inf Process 19, 419 (2020)
- Yu Meng, Shang Yu, **Z. Jia**, Yi-Tao Wang, Zhi-Jin Ke, Wei Liu, Zhi-Peng Li, Yuan-Ze Yang, Hang Wang, Yu-Chun Wu, Jian-Shun Tang, Chuan-Feng Li, Guang-Can Guo, Environment-induced sudden change of coherence in quantum systems, Phys. Rev. A 102, 042415 (2020)
- **Z. Jia**, Lu Wei, Yu-Chun Wu, Guang-Can Guo, Guo-Ping Guo, Entanglement Area Law for Shallow and Deep Quantum Neural Network States, New J. Phys. 22 053022 (2020)
- **Z. Jia**, Biao Yi, Rui Zhai, Yu-Chun Wu, Guang-Can Guo and Guo-Ping Guo, Quantum Neural Network States: A Brief Review of Methods and Applications, Adv. Quantum Technol.2019, 1800077
- **Z. Jia**, Yuan-Hang Zhang, Yu-Chun Wu, Liang Kong, Guang-Can Guo, and Guo-Ping Guo, Efficient Machine Learning Representations of Surface Code with Boundaries, Defects, Domain Walls and Twists, Phys. Rev. A 99, 012307 (2019)
- Yuan-Hang Zhang, **Z. Jia**, Yu-Chun Wu, and Guang-Can Guo, An Efficient Algorithmic Way to Construct Boltzmann Machine Representations for Arbitrary Stabilizer Code, [arXiv:1809.08631]

- **Z. Jia**, Rui Zhai, Bai-Chu Yu, Yu-Chun Wu, and Guang-Can Guo, Entropic No-Disturbance as a Physical Principle, Phys. Rev. A 97, 052128 (2018)
- Shang Yu, Chang-Jiang Huang, Jian-Shun Tang, **Z. Jia**, Yi-Tao Wang, Zhi-Jin Ke, Wei Liu, Zong-Quan Zhou, Ze-Di Cheng, Jin-Shi Xu, Yu-Chun Wu, Yuan-Yuan Zhao, Guo-Yong Xiang, Chuan-Feng Li, Guang-Can Guo, Gael Sentís, and Ramon Muñoz-Tapia, Experimentally Detecting a Quantum Change Point via Bayesian Inference, Phys. Rev. A 98, 040301(R) (2018)
- Bai-Chu Yu, **Z. Jia**, Yu-Chun Wu, and Guang-Can Guo, Geometric Local Hidden State Model for Some Two-qubit States, Phys. Rev. A 98, 052345 (2018)
- Bai-Chu Yu, **Z. Jia**, Yu-Chun Wu, and Guang-Can Guo, Geometric Steering Criterion for Two-qubit States, Phys. Rev. A 97, 012130 (2018)
- **Z. Jia**, Gao-Di Cai, Yu-Chun Wu, Guang-Can Guo, and Adán Cabello, The Exclusivity Principle Determines the Correlation Monogamy, [arXiv:1707.03250]
- **Z. Jia**, Yu-Chun Wu, and Guang-Can Guo, Characterizing nonlocal correlations via universal uncertainty relations, Phys. Rev. A 96, 032122(2017)
- **Z. Jia**, Yu-Chun Wu, and Guang-Can Guo, Monogamy Relation in No-disturbance Theories, Phys. Rev. A 94, 012111(2016)
- Yan Shao, Fang-Ping Ouyang, Sheng-Lin Peng, Qi Liu, **Z. Jia**, Hui Zou, First-Principles Calculations of Electronic Properties of Defective Armchair MoS_2 Nanoribbons, [J]. Acta Phys. -Chim. Sin., 2015,31 (11): 2083-2090.

Lecture notes

- **Z. Jia**, Lecture notes on string theory
- **Z. Jia**, Lecture notes on quantum information theory