

Zhian Jia *

PERSONAL DATA [\[ORCID\]](#) [\[GOOGLE SCHOLAR\]](#)

ADDRESS: Centre for Quantum Technologies, NUS
EMAIL: giannjia@foxmail.com
RESEARCH BLOG: [The lost worldline](#)
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>
ZHIHU: <https://www.zhihu.com/people/polyidiot>

ACADEMIC EXPERIENCE

- | | |
|---------------------|---|
| SEP 2021 - PRESENT | Centre for Quantum Technologies, National University of Singapore , Singapore
<i>Supervisor: Dagomir Kaszlikowski</i>
<i>Research Fellow</i> |
| SEP 2015 - JUN 2021 | CAS Key Laboratory of Quantum Information, University of Science and Technology of China , Hefei, China
<i>Supervisor: Guang-Can Guo, Yu-Chun Wu</i>
<i>PhD degree in Physics</i>
Thesis: Classification, criteria and properties of quantum correlations and their applications in quantum many-body systems |
| NOV 2018 - DEC 2019 | Microsoft Station Q, Department of Mathematics, University of California, Santa Barbara , California, United States
<i>Supervisor: Zhenghan Wang</i>
<i>Visiting scholar program</i> |
| SEP 2017 - AUG 2018 | Yau Mathematical Sciences Center, Department of Mathematical Sciences, Tsinghua University , Beijing, China
<i>Supervisor: Liang Kong</i>
<i>Visiting Ph.D.</i> |
| SEP 2011 - JUN 2015 | Institute of Super-microstructure and Ultrafast Process in Advanced Materials, School of Physics and Electronics, Central South University , Changsha, China
<i>B.S. in Applied Physics</i>
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

[ARXIV][GOOGLE SCHOLAR]

- 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 MoS₂ 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](#)

COMPUTER SKILLS

Programming Languages: Python, C, C++, Matlab, \LaTeX
 Operating System: Windows, macOS, Ubuntu

SELECTED ATTENDED CONFERENCES

- OCT 14-15,2021 [Quantum Boundaries 2021](#) (Online)
 University of Nottingham, Nottingham
- NOV 23 - 25, 2020 [Fields, Gravity and Information](#) (Online)
 Fudan University, Shanghai, China
- DEC 16 - 20, 2019 [Topological quantum computing \(TQC2019\)](#)
 Southern University of Science and Technology, Peng Cheng Laboratory
 Institute for quantum science and engineering, Shenzhen, China
- AUG 13 - 17, 2018 [Summer school on AdS/CFT](#)
 Center for High Energy Physics, Peking University, Beijing, China
- JUL 16 - 20, 2018 [Tsinghua Summer School on Quantum Physics \(TSSQP\)](#)
 State Key Laboratory of Low-Dimensional Quantum Physics,
 Tsinghua University, Beijing, China
- JUL 4 - 6, 2018 [The First International Conference on Machine Learning and Physics](#)
 Institute for Advanced Study, Tsinghua University, Beijing, China
- MAY 4 - 6, 2018 [Conference: Topological Matter and Topological Computation](#)
 Kavli Institute for Theoretical Sciences,
 University of Chinese Academy of Sciences, Beijing, China
- MAR 19 - 23, 2018 [Quantum Machine Learning and Biomimetic Quantum Technologies](#)
 University of the Basque Country, Leioa, Spain

- JUN 20 - 30, 2017 Workshop: Tensor categories and topological quantum matter
Fudan University, Shanghai, China
- JUN 4 - 5, 2017 [Workshop: Quantum Contextuality in Quantum Mechanics and Beyond](#)
Talk title: *Exclusivity principle determines the correlation monogamy*
Prague, Czech Republic
- JAN 23 - 26, 2017 [Conference on 90 Years of Quantum Mechanics](#)
Nanyang technological university, Singapore
- DEC 15 - 17, 2016 The Third PFUNT(Physics Five Universities,the National Top) PhD Student Forum
Talk title: *monogamy as a fundamental quantum phenomenon*
Tsinghua university, Beijing, China
- NOV 26, 2016 The Sixth Graduate Student Academic Annual Meeting of USTC
Talk title: *graph theoretical approach to quantum contextuality*
University of Science and Technology of China, Hefei, China
- AUG 6 - 8, 2016 The 17th National Conference on Quantum Optics
Talk title: *monogamy relations of different kinds of quantum correlations*
Lanzhou university, Lanzhou, China
- AUG 1 - 6, 2016 Strings 2016 conference
Tsinghua University, Beijing, China
- JUN 16- JUL 16, 2016 Summer School on Supersymmetry and Fiber bundle
University of Chinese Academy of Sciences, Beijing, China
- MAY 23 - 24, 2015 The First Conference of The Second Revolution of Quantum Mechanics
University of Science and Technology of China, Hefei, China