Dawei Lu

Curriculum Vitae

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Department of Physics, Southern University of Science and Technology (SUSTech)
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Education

2007.09-2012.07	Ph.D.	Hefei National Laboratory for Physical Sciences at Microscale University of Science and Technology of China Supervisor: Prof. Jiangfeng Du Thesis: *Quantum Simulation towards Quantum Chemistry with NMR Simulators*
2003.09-2007.07	B.Sc.	Special Class for Gifted Young University of Science and Technology of China Supervisor: Prof. Jiangfeng Du Thesis: *Application of Strongly Modulating Pulses in Liquid NMR*

Experience

2019.03-Present	Associate Professor	Department of Physics Southern University of Science and Technology
2018.01-Present	Adjunct Researcher	Shenzhen Institute for Quantum Science and Engineering Southern University of Science and Technology
2017.08-2019.03	Assistant Professor	Department of Physics Southern University of Science and Technology
2016.09-2017.08	Postdoctoral Fellow	Institute for Quantum Computing and Department of Physics University of Waterloo Raymond Laflamme and Bei Zeng Group
2012.09-2016.09	Postdoctoral Fellow	Institute for Quantum Computing and Department of Physics University of Waterloo Raymond Laflamme Group

Research Interest

· Quantum computing using nuclear magnetic resonance and nitrogen-vacancy centers in diamond.

· Quantum control, quantum simulation, quantum thermodynamics, and quantum machine learning.

Honors and Awards

2020 Pearl River Recruitment Program of Talents (Youth)

2020 Peng Cheng Professor

2018 National 1000-Talent Youth Plan

2017 Overseas High-Caliber Personnel in Shenzhen (Peacock Plan)

2012 CAS Presidential Scholarship

Committee Members

2018-present National Technical Committee on Quantum Computing and Metrology of Standardization

2022-present Applied Physics Committee of Chinese Physical Society (CPS)

Grants

2017-2020	RMB 1M	PI, SUSTech Supporting Funds
2018-2023	RMB 5M	PI, Start-Up, Shenzhen Science and Technology Innovation Commission
2019-2022	RMB 2M	PI, National 1000-Talent Youth Plan
2019-2024	RMB 3M	PI, SUSTech Supporting Funds for National 1000-Talent Youth Plan
2019-2022	RMB 0.6M	PI, China National Natural Science Foundation
2019-2020	RMB 0.5M	PI, Shenzhen Science and Technology Innovation Commission
2019-2022	RMB 1.2M/10.54M	Co-PI, China National Natural Science Foundation
2019-2024	RMB 1.4M/4.16M	Co-PI, Ministry of Science and Technology of China
2020-2022	RMB 0.5M	PI, Department of Science and Technology of Guangdong Province
2020-2023	RMB 3M	PI, Shenzhen Science and Technology Innovation Commission
2020-2023	RMB 1.35M	PI, Pengcheng Scholars
2020-2025	RMB 2M/10M	Co-PI, Guangdong Innovative and Entrepreneurial Research Team Program
2020-2025	RMB 4M/20M	Co-PI, Peacock Team Program
2021-2024	RMB 0.63M	PI, China National Natural Science Foundation
2023-2025	RMB 5.25M	PI, Quantum Science Center of Guangdong-HongKong-Macao Greater Bay Area
2024-2026	RMB 10M	PI, Quantum Science Center of Guangdong-HongKong-Macao Greater Bay Area
2025-2027	RMB 0.4M/2M	Co-PI, Quantum Science Center of Guangdong-HongKong-Macao Greater Bay Area

Editorial Board Members

2022-present Editorial Board Member: Frontiers of Physics

2020-present Editorial Board Member: Chinese Physics Letters

2020-present Editorial Board Member: Chinese Physics B

2020-present Editorial Board Member: Acta Physics Sinica

2020-present Editorial Board Member: Physics

Peer-review Services

Grants: China National Natural Science Foundation; Swiss National Science Foundation

Journals: Rev. Mod. Phys., Rep. Prog. Phys, Phys. Rev. Lett./X/A/B/Applied, Nat. Commun., Natl. Sci. Rev., New J. Phys., Quantum Sci. Technol., Sci. Bull., Sci. China Phys. Mech. Astron., Sci. Rep. *etc*

Refereed Papers

(*: equal contributions; †: corresponding author)

2025

79. H. F. Liu*, Z. H. Liu*, S. Chen, X. J. Liu†, X. F. Nie†, and **D. W. Lu**†, *Certifying Quantum Temporal Correlation via Randomized Measurements: Theory and Experiment*, **Phys. Rev. Lett.** **134**, 040201 (2025).

78. Y. L. Huang*, L. Y. Che*, C. Wei*, F. Xu, X. F. Nie, J. Li†, **D. W. Lu**†, and T. Xin†, *Direct Entanglement Detection of Quantum Systems Using Machine Learning*, **npj Quantum Inf.** **11**, 29 (2025).

77. Y. A. Fan*, X. Li*, S. J. Wei*, Y. S. Li, X. Y. Long, H. F. Liu, X. F. Nie, J. Ng†, and **D. W. Lu**†, *Solving Non-Hermitian Physics for Optical Manipulation on a Quantum Computer*, accepted by **Light Sci. Appl.**, (2025).

2024

76. X. F. Nie*, X. R. Zhu*, Y. A. Fan, X. Y. Long, H. F. Liu, K. Y. Huang, C. Xi, L. Y. Che, Y. X. Zheng, Y. F. Feng, X. D. Yang, and **D. W. Lu**†, *Self-Consistent Determination of Single-Impurity Anderson Model Using Hybrid Quantum-Classical Approach on a Spin Quantum Simulator*, **Phys. Rev. Lett.** **133**, 140602 (2024).
75. J. F. Wang, R. S. Mao, X. Q. Xu, Y. Z. Lu, J. H. Dai, X. Liu, G. Q. Liu, **D. W. Lu**, H. Z. Hu, S. Y. Zhu, H. Cai†, and D. W. Wang†, *Velocity Scanning Tomography for Room-Temperature Quantum Simulation*, **Phys. Rev. Lett.** **133**, 183403 (2024).
74. C. Xi*, X. J. Liu*, H. F. Liu, K. Y. Huang, X. Y. Long, D. Ebler, X. F. Nie†, O. Dahlsten†, and **D. W. Lu**†, *Experimental Validation of Enhanced Information Capacity by Quantum Switch in Accordance with Thermodynamic Laws*, **Phys. Rev. Lett.** **133**, 040401 (2024).
73. K. Y. Huang, C. Xi, X. Y. Long, H. F. Liu, Y. A. Fan, X. Y. Wang, Y. X. Zheng, Y. F. Feng, X. F. Nie†, and **D. W. Lu**†, *Experimental Realization of Self-Contained Quantum Refrigeration*, **Phys. Rev. Lett.** **132**, 210403 (2024).
72. J. J. Niu*, Y. S. Li*, L. B. Zhang*, J. J. Zhang, J. Chu, J. X. Huang, W. H. Huang, L. F. Niu, J. W. Qiu, X. D. Sun, Z. Y. Tao, W. W. Wei, J. W. Zhang, Y. X. Zhou, Y. Z. Chen, L. Hu, Y. Liu, S. Liu, Y. P. Zhong†, **D. W. Lu**†, and D. P. Yu, *Demonstrating Path-Independent Anyonic Braiding on a Modular Superconducting Quantum Processor*, **Phys. Rev. Lett.** **132**, 020601 (2024).
71. H. B. Hu*, Y. Zhou*,†, A. L. Yi*, T. Y. Bao, C. Y. Liu, Q. Luo, Y. Zhang, Z. Wang, Q. Li, **D. W. Lu**, Z. T. Liu, S. M. Xiao, X. Ou†, and Q. H. Song†, *Room-Temperature Waveguide Integrated Quantum Register in a Semiconductor Photonic Platform*, **Nat. Commun.** **15**, 10256 (2024).
70. X. D. Yang, Y. C. Li, R. Liu, X. F. Nie, T. Xin, **D. W. Lu**†, and J. Li†, *Quantum Control for Time-Dependent Noise by Inverse Geometric Optimization*, **Sci. China Phys. Mech. Astron.** **67**, 290312 (2024).
69. X. D. Yang*, X. Y. Long*, R. Liu, K. Tang, Y. Zhai, X. F. Nie, T. Xin†, J. Li†, and **D. W. Lu**†, *Control-Enhanced non-Markovian Quantum Metrology*, **Commun. Phys.** **7**, 282 (2024).
68. Z. D. Lin*, H. F. Liu*, K. Tang*, Y. D. Liu*, L. Y. Che, X. Y. Long, Y. A. Fan, K. Y. Huang, T. Xin, X. F. Nie†, and **D. W. Lu**†, *Hardware-Efficient Quantum Principal Component Analysis for Medical Image Recognition*, **Front. Phys.** **19**, 51202 (2024).
67. J. Y. He, Y. Tian, Z. Y. Hu, R. C. Ye, X. Y. Wang, **D. W. Lu**†, and N. Y. Xu†, *Direct Readout of a Nitrogen-Vacancy Hybrid-Spin Quantum Register in Diamond by Analysis of Photon Arrival Time*, **Phys. Rev. Applied** **21**, 054041 (2024).
66. B. W. Shao, X. D. Yang†, R. Liu, Y. Zhai, **D. W. Lu**, T. Xin†, and J. Li†, *Multiple Classical Noise Mitigation by Multiobjective Robust Quantum Optimal Control*, **Phys. Rev. Applied** **21**, 034042 (2024).

2023

65. Y. A. Fan*, Y. C. Li*, Y. T. Hu*, Y. S. Li, X. Y. Long, H. F. Liu, X. D. Yang, X. F. Nie, J. Li, T. Xin, **D. W. Lu**†, and Y. D. Wan†, *Experimental Realization of a Topologically Protected Hadamard Gate via Braiding Fibonacci Anyons*, **The Innovation** **4**, 100480 (2023).
64. H. F. Liu, X. D. Yang†, K. Tang, L. Y. Che, X. F. Nie, T. Xin, J. Li, and **D. W. Lu**†, *Practical Quantum Simulation of Non-Hermitian Dynamics*, **Phys. Rev. A** **107**, 062608 (2023).
63. X. Lin, J. W. Fan, R. C. Ye, M. T. Zhou, Y. M. Song, **D. W. Lu**†, and N. Y. Xu†, *Online Optimization for Optical Readout of a Single Electron Spin in Diamond*, **Front. Phys.** **18**, 21301 (2023).
62. Y. Zhai, X. D. Yang†, K. Tang, X. Y. Long, X. F. Nie, T. Xin, **D. W. Lu**, and J. Li†, *Control-Enhanced Quantum Metrology Under Markovian Noise*, **Phys. Rev. A** **107**, 022602 (2023).
61. B. Cheng, X. H. Deng, X. Gu, Y. He, G. C. Hu, P. H. Huang, J. Li, B. C. Lin, **D. W. Lu**, Y. Lu, C. D. Qiu, H. Wang, T. Xin, S. Yu, M. H. Yung, J. K. Zeng, S. Zhang, Y. P. Zhong, X. H. Peng, F. Nori, and D. P. Yu†, *Noisy Intermediate-Scale Quantum Computers (Review)*, **Front. Phys.** **18**, 21308 (2023).
60. Y. C. Li*, T. Xin*, C. D. Qiu, K. R. Li, G. Q. Liu, J. Li, Y. D. Wan†, and **D. W. Lu**†, *Dynamical-Invariant-based Holonomic Quantum Gates: Theory and Experiment*, **Fundam. Res.**, **3**, 229 (2023).

2022

59. X. F. Nie*, X. R. Zhu*, K. Y. Huang, K. Tang, X. Y. Long, Z. D. Lin, Y. Tian, C. D. Qiu, C. Xi, X. D. Yang, J. Li, Y. Dong†, T. Xin†, and **D. W. Lu**†, *Experimental Realization of a Quantum Refrigerator Driven by Indefinite Causal Orders*, **Phys. Rev. Lett.** **129**, 100603 (2022).

58. X. Y. Long*, W. T. He*, N. N. Zhang*, K. Tang, Z. D. Lin, H. F. Liu, X. F. Nie, G. R. Feng, J. Li, T. Xin, Q. Ai†, and **D. W. Lu**†, *Entanglement-Enhanced Quantum Metrology in Colored Noise by Quantum Zeno Effect*, **Phys. Rev. Lett.** **129**, 070502 (2022).

57. F. F. Zhou*, Y. Tian*, Y. M. Song, C. D. Qiu, X. Y. Wang, M. T. Zhou, N. Y. Xu†, and **D. W. Lu**†, *Preserving Entanglement in a Solid-Spin System Using Quantum Autoencoders*, **Appl. Phys. Lett.** **121**, 134001 (2022).

56. Y. Tian, L. Y. Che, X. Y. Long, C. L. Ren†, and **D. W. Lu**†, *Machine Learning Experimental Multipartite Entanglement Structure*, **Adv. Quantum Technol.**, 2200025 (2022).

55. S. Z. Xue*, Y. L. Huang*, D. F. Zhao, C. Wei, J. Li, Y. Dong, J. C. Gao, **D. W. Lu**†, T. Xin†, and G. L. Long, *Experimental Measurement of Bipartite Entanglement using Parameterized Quantum Circuits*, **Sci. China Phys. Mech. Astron.** **65**, 280312 (2022).

54. Z. D. Lin*, L. Zhang*, X. Y. Long*, Y. A. Fan, Y. S. Li, K. Tang, J. Li, X. F. Nie, T. Xin†, X. J. Liu†, and **D. W. Lu**†, *Experimental Quantum Simulation of Non-Hermitian Dynamical Topological States using Stochastic Schrödinger Equation*, **npj Quantum Inf.** **8**, 77 (2022).

53. X. Y. Wang, Z. D. Lin, L. Y. Che, H. Y. Chen, and **D. W. Lu**†, *Experimental Quantum-Enhanced Machine Learning in Spin-Based Systems*, **Adv. Quantum Technol.**, 2200005 (2022).

52. Z. Zhang*, X. Y. Long*, X. Z. Zhao, Z. D. Lin, K. Tang, H. F. Liu, X. D. Yang, X. F. Nie, J. S. Wu, J. Li, T. Xin†, K. R. Li†, and **D. W. Lu**†, Identifying Abelian and Non-Abelian Topological Orders in the String-Net Model using a Quantum Scattering Circuit, **Phys. Rev. A (Letter)** **105**, L030402 (2022).

51. X. D. Yang, X. F. Nie, Y. L. Ji, T. Xin, **D. W. Lu**†, and J. Li†, Improved Quantum Computing with Higher-Order Trotter Decomposition, **Phys. Rev. A** **106**, 042401 (2022).

2021

50. T. Xin*, L. Y. Che*, C. Xi, A. Singh, X. F. Nie, J. Li†, Y. Dong†, and **D. W. Lu**†, *Experimental Quantum Principal Component Analysis via Parametrized Quantum Circuits*, **Phys. Rev. Lett.** **126**, 110502 (2021).

49. L. Y. Che*, C. Wei*, Y. L. Huang, D. F. Zhao, S. Z. Xue, X. F. Nie, J. Li†, **D. W. Lu**†, and T. Xin†, *Learning Quantum Hamiltonians from Single-Qubit Measurements*, **Phys. Rev. Res.** **3**, 023246 (2021).

48. D. F. Zhao*, C. Wei*, S. Z. Xue, Y. L. Huang, X. F. Nie, J. Li, D. Ruan, **D. W. Lu**†, T. Xin†, and G. L. Long, *Characterizing Quantum Simulations with Quantum Tomography on a Spin Quantum Simulator*, **Phys. Rev. A** **103**, 052403 (2021).

47. D. F. Zhao, S. Z. Xue, D. Ruan, J. Li, **D. W. Lu**, W. Huang, T. Xin, H. Li†, X. F. Nie†, and G. L. Long, *Experimental Observation of a Quadrupolar Phase via Quench Dynamics on a Spin Simulator*, **Phys. Rev. A** **104**, 062615 (2021).

46. C. D. Qiu, X .F. Nie†, and **D. W. Lu**†, *Quantum Simulations with Nuclear Magnetic Resonance System (Invited Review)*, **Chin. Phys. B** **30**, 048201 (2021).

45. Y. Tian, Z. D. Lin, X. Y. Wang, L. Y. Che, and **D. W. Lu**†, *Experimental Progress of Quantum Machine Learning based on Spin Systems (Invited Review, in Chinese)*, **Acta. Phys. Sin.** **70**, 140305 (2021).

44. S. Y. Hou, G. R. Feng, Z. P. Wu, H. Y. Zou, W. Shi, J. F. Zeng, C. F. Cao, S. Yu, Z. K. Sheng, X. Rao, B. Ren, **D. W. Lu**, J. T. Zou, G. X. Miao†, J. G. Xiang†, and B. Zeng†, *SpinQ Gemini: a Desktop Quantum Computing Platform for Education and Research*, **EPJ Quantum Technol.** **8**, 1 (2021).

2020

43. T. Xin*, Y. S. Li*, Y. A. Fan, X. R. Zhu, Y. J. Zhang, X. F. Nie, J. Li†, Q. H. Liu†, and **D. W. Lu**†, *Quantum Phases of Three-Dimensional Chiral Topological Insulators on a Spin Quantum Simulator*, **Phys. Rev. Lett.** **125**, 090502 (2020).

42. X. F. Nie*, B. B. Wei*, X. Chen, Z. Zhang, X. Z. Zhao, C. D. Qiu, Y. Tian, Y. L. Ji, X. Tao†, **D. W. Lu**†, and J. Li†, *Experimental Observation of Equilibrium and Dynamical Quantum Phase Transitions via Out-of-Time-Ordered Correlators*, **Phys. Rev. Lett.** **124**, 250601 (2020).

41. H. Y. Wang, S. J. Wei, C. Zheng, X. Y. Kong, J. W. Wen, X. F. Nie, J. Li, **D. W. Lu**, and T. Xin†, *Experimental Simulation of the Four-Dimensional Yang-Baxter Equation on a Spin Quantum Simulator*, **Phys. Rev. A** **102**, 012610 (2020).
40. Y. M. Song*, Y. Tian*, Z. Y. Hu, F. F. Zhou, T. T. Xing, **D. W. Lu**, B. Chen†, Y. Wang, N. Y. Xu†, and J. F. Du†, *Pulse-Width-Induced Polarization Enhancement of Optically-Pumped N-V Electron Spin in Diamond*, **Photonics Res.** **8**, 1289 (2020).
39. T. Xin, X. F. Nie, X. Y. Kong, **D. W. Lu**†, and J. Li†, *Quantum State Tomography via a Variational Hybrid Quantum-Classical Method*, **Phys. Rev. Applied** **13**, 024013 (2020).
38. T. Xin, S. J. Wei, J. L. Cui, J. X. Xiao, I. Arrazola, L. Lamata, X. Y. Kong, **D. W. Lu**†, E. Solano, and G. L. Long†, *Quantum Algorithm for Solving Linear Differential Equations: Theory and Experiment*, **Phys. Rev. A** **101**, 032307 (2020).

2019

37. T. Xin, S. R. Lu, N. P. Cao, G. Anikeeva, **D. W. Lu**, J. Li†, G. L. Long, and B. Zeng†, *Local-Measurement-based Quantum State Tomography via Neural Networks*, **npj Quantum Inf.** **5**, 109 (2019).
36. Y. Wang, W. T. Ji, Z. H. Chai, Y. H. Guo, M. Q. Wang, X. Y. Ye, P. Yu, L. Zhang, X. Qin, P. F. Wang, F. Z. Shi, X. Rong, **D. W. Lu**†, X. J. Liu†, and J. F. Du†, *Experimental Observation of Dynamical Bulk-Surface Correspondence for Topological Phases*, **Phys. Rev. A** **100**, 052328 (2019).
35. K. R. Li, Y. N. Li, M. X. Han, S. R. Lu, J. Zhou, D. Ruan, G. L. Long, Y. D. Wan†, **D. W. Lu**†, B. Zeng†, and R. Laflamme, *Quantum Spacetime on a Quantum Simulator*, **Commun. Phys.** **2**, 122 (2019).
34. J. Li†, Z. H. Luo, T. Xin, H. Y. Wang, D. Kribs, **D. W. Lu**†, B. Zeng†, and R. Laflamme, *Experimental Implementation of Efficient Quantum Pseudorandomness on a 12-spin System*, **Phys. Rev. Lett.** **123**, 030502 (2019).
33. W. Q. Zheng, H. Y. Wang, T. Xin, X. F. Nie†, **D. W. Lu**†, and J. Li†, *Optimal Bounds on State Transfer Under Quantum Channels with Application to Spin System Engineering*, **Phys. Rev. A** **100**, 022313 (2019).
32. Z. H. Luo, Y. Z. You, J. Li, C. M. Jian, **D. W. Lu**†, C. K. Xu, B. Zeng†, and R. Laflamme, *Observing Fermion Pair Instability of the Sachdev-Ye-Kitaev Model on a Quantum Spin Simulator*, **npj Quantum Inf.** **5**, 7 (2019).
31. K. R. Li*, M. X. Han*, D. X. Qu, Z. C. Huang, G. L. Long, Y. D. Wan†, **D. W. Lu**†, B. Zeng, and R. Laflamme, *Measuring Holographic Entanglement Entropy on a Quantum Simulator*, **npj Quantum Inf.** **5**, 30 (2019).

2018

30. G. R. Feng, F. Cho, H. Katiyar, J. Li, **D. W. Lu**, J. Baugh†, and R. Laflamme†, *Closed-Loop Quantum Optimal Control in a Solid-State Two-Qubit System*, **Phys. Rev. A** **98**, 052341 (2018).
29. S. R. Lu*, S. L. Huang*, K. R. Li, J. Li†, J. X. Chen, **D. W. Lu**†, Z. F. Ji, Y. Shen, D. L. Zhou, and B. Zeng, *A Separability-Entanglement Classifier via Machine Learning*, **Phys. Rev. A** **98**, 012315 (2018).
28. **D. W. Lu**†, *Speeding up the "Quantum" Mountain Climb*, **Front. Phys.** **13**, 130313 (2018).
27. T. Xin, S. L. Huang, S. R. Lu, K. R. Li, Z. H. Luo, Z. Q. Yin, J. Li†, **D. W. Lu**†, G. L. Long†, B. Zeng, *NMRCloudQ: A Quantum Cloud Experience on a Nuclear Magnetic Resonance Quantum Computer*, **Sci. Bull.** **63**, 17 (2018).

2017

26. **D. W. Lu***†, K. R. Li*, J. Li*, H. Katiyar, A. J. Park, G. R. Feng, T. Xin, H. Li, G. L. Long, A. Brodutch, J. Baugh, B. Zeng†, and R. Laflamme, *Enhancing Quantum Control by Bootstrapping a Quantum Processor of 12 qubits*, **npj Quantum Inf.** **3**, 45 (2017).
25. J. Li†, S. L. Huang†, Z. H. Luo, K. R. Li, **D. W. Lu**, and B. Zeng†, *Optimal Design of Measurement Settings for Quantum-State-Tomography Experiments*, **Phys. Rev. A** **96**, 032307 (2017).
24. K. R. Li, Y. D. Wan, L. Y. Hung, T. Lan, G. L. Long, **D. W. Lu**†, B. Zeng, and R. Laflamme, *Experimental Identification of Non-Abelian Topological Orders on a Quantum Simulator*, **Phys. Rev. Lett.** **118**, 080502 (2017).

23. K. R. Li, G. F. Long, H. Katiyar, T. Xin, G. R. Feng, **D. W. Lu**†, and R. Laflamme, *Experimentally Superposing Two Pure States with Partial Prior Knowledge*, **Phys. Rev. A 95**, 022334 (2017).
22. H. Katiyar†, A. Brodutch†, **D. W. Lu**†, and R. Laflamme†, *Experimental Violation of the LeggettÍCGarg Inequality in a Three-Level System*, **New J. Phys. 19**, 023033 (2017).
21. T. Xin*, **D. W. Lu***, J. Klassen*, N. K. Yu†, Z. F. Ji, J. X. Chen, X. Ma, G. L. Long, B. Zeng†, and R. Laflamme, *Quantum State Tomography via Reduced Density Matrices*, **Phys. Rev. Lett. 118**, 020401 (2017).

Before 2017

20. G. R. Feng, B. Buonacorsi, J. J. Wallman, F. H. Cho, D. Park, T. Xin, **D. W. Lu**, J. Baugh, and R. Laflamme, *Estimating the Coherence of Noise in Quantum Control of a Solid-State Qubit*, **Phys. Rev. Lett. 117**, 260501 (2016).
19. X. Rong, **D. W. Lu**, X. Kong, J. P. Geng, Y. Wang, F. Z. Shi, C. K. Duan, and J. F. Du†, *Harnessing the Power of Quantum Systems based on Spin Magnetic Resonance: from Ensembles to Single Particles*, Invited Review article, **Adv. Phys.: X 2**, 125 (2016).
18. H. Y. Wang, W. Q. Zheng, N. K. Yu, K. R. Li, **D. W. Lu**, T. Xin, C. Li, Z. F. Ji, D. Kribs, B. Zeng†, X. H. Peng†, and J. F. Du, *Quantum State and Process Tomography via Adaptive Measurements*, **Sci. China Phys. Mech. Astron. 59**, 100313 (2016).
17. J. Li, **D. W. Lu**, Z. H. Luo, R. Laflamme, X. H. Peng†, and J. F. Du†, *Approximation of Reachable Set for Coherently Controlled Open Quantum Systems: Application to Quantum State Engineering*, **Phys. Rev. A 94**, 012312 (2016).
16. **D. W. Lu***, T. Xin*, N. K. Yu*, Z. F. Ji, J. X. Chen, G. L. Long, J. Baugh, X. H. Peng, B. Zeng†, and R. Laflamme, *Tomography is Necessary for Universal Entanglement Detection with Single-Copy Observables*, **Phys. Rev. Lett. 116**, 230501 (2016).
15. A. J. Park†, E. McKay, **D. W. Lu**†, and R. Laflamme, *Simulation of Anyonic Statistics and its Topological Path Independence using a 7-qubit Quantum Simulator*, **New J. Phys. 18**, 043043 (2016).
14. **D. W. Lu**†, J. Biamonte, J. Li, H. Li, T. Johnson, V. Bergholm, M. Faccin, Z. Zimborás, R. Laflamme, J. Baugh, and S. Lloyd, *Chiral Quantum Walks*, **Phys. Rev. A 93**, 042302 (2016).
13. X. Ma, T. Jackson, H. Zhou, J. X. Chen, **D. W. Lu**, M. D. Mazurek, K. A. G. Fisher, X. H. Peng, D. Kribs, K. J. Resch, Z. F. Ji, B. Zeng†, and R. Laflamme, *Pure-State Tomography with the Expectation Value of Pauli Operators*, **Phys. Rev. A 93**, 032140 (2016).
12. **D. W. Lu**, H. Li, D. Trottier, J. Li, A. Brodutch, A. P. Krismanich, A. Ghavami, G. I. Dmitrienko, G. Long, J. Baugh, and R. Laflamme†, *Experimental Estimation of Average Fidelity of a Clifford Gate on a 7-qubit Quantum Processor*, **Phys. Rev. Lett. 114**, 140505 (2015).
11. Z. K. Li, H. Zhou, C. Y. Ju, H. W. Chen, W. Q. Zheng, **D. W. Lu**, X. Rong, C. K. Duan, X. H. Peng†, and J. F. Du†, *Experimental Realization of a Compressed Quantum Simulation of a 32-Spin Ising Chain*, **Phys. Rev. Lett. 112**, 220501 (2014).
10. **D. W. Lu**, A. Brodutch†, J. Li, H. Li, and R. Laflamme†, *Experimental Realization of Post-Selected Weak Measurements on an NMR Quantum Processor*, **New J. Phys. 16**, 053015 (2014).
9. **D. W. Lu**, B. R. Xu, N. Y. Xu, Z. K. Li, H. W. Chen, X. H. Peng, R. X. Xu, and J. F. Du†, *Quantum Chemistry Simulation on Quantum Computers: Theories and Experiments*, **Phys. Chem. Chem. Phys. *Perspective* 14**, 9411 (2012).
8. **D. W. Lu**, N. Y. Xu, B. R. Xu, Z. K. Li, H. W. Chen, X. H. Peng, R. X. Xu, and J. F. Du†, *Experimental Study of Quantum Simulation for Quantum Chemistry with a Nuclear Magnetic Resonance Simulator*, **Phil. Trans. R. Soc. A 370**, 4734 (2012).
7. N. Y. Xu, J. Zhu, **D. W. Lu**, X. Y. Zhou, X. H. Peng†, and J. F. Du†, *Quantum Factorization of 143 on a Dipolar-Coupling NMR System*, **Phys. Rev. Lett. 108**, 130501 (2012).
6. Z. K. Li*, M. H. Yung*, H. W. Chen, **D. W. Lu**, J. D. Whitfield, X. H. Peng, A. Aspuru-Guzik, and J. F. Du†, *Solving Quantum Ground-State Problems with Nuclear Magnetic Resonance*, **Sci. Rep. 1**, 88 (2011).
5. **D. W. Lu**, N. Y. Xu, R. X. Xu, H. W. Chen, J. B. Gong, X. H. Peng, and J. F. Du†, *Simulation of Chemical Isomerization Reaction Dynamics on a NMR Quantum Simulator*, **Phys. Rev. Lett. 107**, 020501 (2011).
4. H. W. Chen, **D. W. Lu**, B. Chong, G. Qin, X. Y. Zhou, X. H. Peng†, and J. F. Du†, *Experimental Demonstration of Probabilistic Quantum Cloning*, **Phys. Rev. Lett. 106**, 180404 (2011).

3. **D. W. Lu**, J. Zhu, P. Zhou, X. H. Peng, Y. H. Yu, S. M. Zhang, Q. Chen, and J. F. Du†, *Experimental Implementation of a Quantum Random-Walk Search Algorithm using Strongly Dipolar Coupled Spins*, **Phys. Rev. A** **81**, 022308 (2010).
2. J. F. Du†, N. Y. Xu, X. H. Peng, P. F. Wang, S. F. Wu, and **D. W. Lu**, *NMR Implementation of a Molecular Hydrogen Quantum Simulation with Adiabatic State Preparation*, **Phys. Rev. Lett.** **104**, 030502 (2010).
1. C. L. Ren, **D. W. Lu**, X. H. Peng, M. J. Shi, and J. F. Du†, *Experimentally Simulating the Violation of Bell-Type Inequalities for Generalized GHZ States*, **Phys. Lett. A** **373**, 46, 4222-4226 (2009).

Books

1. B. Zeng, **D. W. Lu**, and G. R. Feng, *Quantum Computing: Principles and Practices* (Press of University of Science and Technology of China, 2022). order the book

Book Chapters

1. **D. W. Lu**, A. Brodutch, J. Park, H. Katiyar, T. Jochym-O'Connor, and R. Laflamme, NMR Quantum Information Processing, *Electron Spin Resonance (ESR) Based Quantum Computing* (Springer Publishing, 2016). arXiv; order the book
2. J. F. Du, C. Lei, G. Qin, **D. W. Lu**, and X. H. Peng, Search via quantum walk, *Search Algorithms and Applications* (InTech Publishing, 2011). PDF; order the book

Conference Organization

2023.11.24 - 2023.11.27, Jinhua, China
QPhotoniX 2023
Session Organizer (Quantum Computing and Algorithms)

2023.07.04 - 2023.07.07, Prague, Czech
PIERS 2023
Session Organizer (Quantum Precision Measurement)

2022.11.18 - 2022.11.20, SUSTech
CPS Fall Meeting
Session Organizer (Quantum Information)

2018.01.04 - 2018.01.08, SUSTech
International Workshop on Physics of Information
Executive Chair

2018.01.03 - 2018.01.07, Harbin Institute of Technology
Quantum Information, Spacetime and Topological Matter: the 3rd International Conference (QuIST III)
Organizer

Invited Talks (Selected)

2024.11.10, International Symposium on Quantum Computing and Quantum Optics, Hangzhou, China
Experimental Quantum Thermodynamics Using Nuclear Magnetic Resonance

2023.07.20, Celebrating Raymond Laflamme's 60th Birthday's Conference, Waterloo, Canada
Density Matrix Exponentiation and Its Applications

2023.07.06, Progress In Electromagnetics Research Symposium (PIERS 2023), Prague, Czech
Realizing Quantum Refrigeration by Density Matrix Exponentiation

2023.06.12, 18th China Laser Conference (LTO 2023), Shanghai
Realizing Quantum Refrigeration by Density Matrix Exponentiation

2023.04.22, Editorial Board Meeting and Youth Academic Forum for CAS Journals, IOP

Realizing Quantum Refrigeration by Density Matrix Exponentiation

2022.11.30, Horizonte China II - Diálogos con Líderes Chinos del Futuro, Spain-China
Panelist for the Chinese Future Leaders Program

2022.11.20, Chinese Physical Society (CPS) Fall Meeting, Shenzhen
Density Matrix Exponentiation and Its Applications

2022.11.10, 40th Anniversary of the Bilateral Agreement Brazil-China on Science and Technology Cooperation, Brazil
Quantum Information Science in China

2022.05.29, Science Forum of Nanshan District: Public Lecture, Shenzhen
Exploring the Quantum World

2021.12.18, 16th Singapore-China Joint Symposium on Research Frontiers in Physics , Singapore (Online)
Experimental Quantum Principal Component Analysis via Parameterized Quantum Circuits

2021.05.22, Quantum Information, Spacetime and Topological Matter: the 6th International Conference (QuIST VI) , Chongqing University
Experimental Quantum Principal Component Analysis via Parameterized Quantum Circuits

2021.04.08, The 1st Conference on Applied Physics, Liyang
Quantum-enhanced Magnetometer using Silicon-based Nuclear Electric Resonance

2020.12.16, KAIST Symposium on Quantum Machine Learning, KAIST, Korea
Experimental Quantum Principal Component Analysis via Parameterized Quantum Circuits

2020.12.09, Quantum Foundations, Technology and Applications (QFTA2020), 09/12/2020, IISER Mohali, India
Experimental Quantum Principal Component Analysis via Parameterized Quantum Circuits

2019.10.20, Workshop for Quantum Computing and the Physical Realizations, Nanjing University
Experimental Implementation of Efficient Quantum Pseudorandomness on a 12-Spin System

2019.10.17, Frontiers in Quantum Computing and Quantum Information, Sichuan Normal University
Experimental Implementation of Efficient Quantum Pseudorandomness on a 12-Spin System

2019.03.08, Quantum Information, Spacetime and Topological Matter: the 5th International Conference (QuIST V) , Yunnan University
Experimental Implementation of Efficient Quantum Pseudorandomness on a 12-Spin System

2019.06.30, The 5th Conference on Condensed Matter Physics (CCMP V), Liyang
Experimental Implementation of Efficient Quantum Pseudorandomness on a 12-Spin System

2019.06.19, Progress In Electromagnetics Research Symposium (PIERS 2019), Roma
Identifying Topological Orders on an NMR Quantum Processor

2019.05.26, International Symposium on Quantum Computing and Quantum Optics II, Zhejiang University
Celebrating Marlan Scully's 80th Birthday: Quantum Simulation of Topological Orders using NMR

2019.05.18, AI Prospects · Youth Academic Forum, University of Chinese Academy of Sciences
When Quantum Computing Meets Artificial Intelligence

2019.04.23, Forum on Quantum Artificial Intelligence, Peng Cheng Laboratory
From Schrödinger's Cat to Quantum Computing

2018.12.08, Guangdong Physical Society Conference, South China Normal University
NMR Quantum Cloud Computing

2018.10.25, China National Computer Congress (CNCC 2018) , Hangzhou, China
From Schrödinger's Cat to Quantum Computing

2018.08.03, Progress In Electromagnetics Research Symposium (PIERS 2018) , Toyama, Japan
Control of 12 Qubits in Nuclear Magnetic Resonance (NMR)

2018.07.07, The 4th Conference on Condensed Matter Physics (CCMP IV) , Shanghai
Control of 12 Qubits in Nuclear Magnetic Resonance (NMR)

2018.07.03, Quantum Information, Spacetime and Topological Matter: the 4th International Conference (QuIST IV) , Huangshan University

Control of 12 Qubits in Nuclear Magnetic Resonance (NMR)

2018.05.27, Yunqi 2050 Conference, Public Lecture , Hangzhou
From Schrödinger's Cat to Quantum Computing

2017.07.04, Quantum Information, Spacetime and Topological Matter: the 2nd International Conference (QuIST II) , Jishou University
Quantum Computing in Nuclear Magnetic Resonance

2017.05.19, Micius Forum, USTC
Quantum Computing in Nuclear Magnetic Resonance

2017.03.19, Global Scientists Forum, SUSTech
Quantum Computing in Nuclear Magnetic Resonance

2016.06.11, Summit forum on quantum science and information science, SUSTech
Twelve-Coherence Creation Supervised by a Quantum Computer

2014.09.18, Joint IQC-Technion Workshop, University of Waterloo
Brief Introduction to NMR Quantum Computing: Experiments and Techniques

2014.01.28, Quantum Innovators Workshop, University of Waterloo
Experimental Estimation of Average Fidelity of a Clifford Gate on a 7-Qubit Quantum Processor

2011.12.24, The First Annual Conference of Doctoral Students in USTC, USTC
Simulating Quantum Chemistry on an NMR Quantum Computer

Contributed Talks (Selected)

2024.06.06, Seminar Talk in Department of Physics, Qufu Normal University
Experimental Quantum Thermodynamics Using Nuclear Magnetic Resonance

2023.12.20, Seminar Talk in Department of Physics, Hunan Normal University
Density Matrix Exponentiation and Its Applications

2023.06.29, Seminar Talk in Department of Physics, South China Normal University
NMR Quantum Simulation Towards Condensed Matter Physics

2023.05.08, Seminar Talk in Department of Physics, Lanzhou University
NMR Quantum Simulation Towards Condensed Matter Physics

2023.04.23, Seminar Talk in Department of Physics, Beijing Institute Of Technology
Realizing Quantum Refrigeration by Density Matrix Exponentiation

2023.04.17, Seminar Talk in Department of Physics, Zhejiang Univeristy
Realizing Quantum Refrigeration by Density Matrix Exponentiation

2019.10.27, Seminar Talk in Department of Physics, Sun Yat-Sen Univeristy
From Wave-Particle Duality to Quantum Computing

2019.05.20, Seminar Talk in Department of Physics, Sichuan Normal University
Quantum Simulation of Topological Orders using NMR

2019.05.07, Seminar Talk in Department of Physics, Tianjin University
Quantum Simulation of Topological Orders using NMR

2019.01.03, Seminar Talk in Department of Physics, Shandong University
Quantum Simulation of Topological Orders using NMR

2018.04.12, Huawei HiSilicon Technologies Co., Ltd
Spin-based Quantum Computing

2017.12.08, Seminar Talk in Department of Physics, Zhejiang Sci-Tech University
Quantum Computing in Nuclear Magnetic Resonance

2017.10.18, Seminar Talk in Department of Physics, Zhejiang University
Quantum Computing in Nuclear Magnetic Resonance

2017.10.16, Seminar Talk in Institute of Fundamental and Frontier Sciences, UESTC
Quantum Computing in Nuclear Magnetic Resonance

2017.06.03, Seminar Talk in Department of Physics and Astronomy, Wayne State University

Quantum Computing in Nuclear Magnetic Resonance

2016.03.16, APS March Meeting, Baltimore, MD
Experimental Estimation of Average Fidelity of a Clifford Gate on a 7-Qubit Quantum Processor

2015.01.28, Seminar Talk in Department of Modern Physics, USTC
Advanced Techniques in NMR Quantum Computing and Benchmarking a 7-Qubit NMR System

2014.09.03, Seminar Talk in Department of Mathematics and Statistics, University of Guelph
Experimental Estimation of Average Fidelity of a Clifford Gate on a 7-Qubit Quantum Processor

2012.02.04, IQC Seminar, University of Waterloo
Simulation of Quantum Chemistry on an NMR Quantum Computer

2011.12.09, Weekly Brainstorming in ICQD, USTC
Quantum Simulation

2010.09.18, The Chinese Physical Society Conference, Nankai University
Factoring 143 Adiabatically using an NMR Quantum Computer

2010.06.20, Workshop on Quantum Engineering and Physics of Coherence Device, South China Normal University
Implementing Quantum Random-Walk Search Algorithm using Strongly Coupled Systems

Teaching Experience

Course: General Physics I, Fall 2024, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics II, Spring 2024, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics I, Fall 2023, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics II, Spring 2023, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics I, Fall 2022, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics II, Spring 2022, SUSTech
Level: Freshmen (110 students); Capacity: 110
Duties: Instructor

Course: General Physics I, Fall 2021, SUSTech
Level: Freshmen (100 students); Capacity: 100
Duties: Instructor

Course: General Physics II, Spring 2021, SUSTech
Level: Freshmen (130 students); Capacity: 130
Duties: Instructor

Course: General Physics I, Fall 2020, SUSTech
Level: Freshmen (130 students); Capacity: 130
Duties: Instructor

Course: General Physics II, Spring 2020, SUSTech
Level: Freshmen (170 students); Capacity: 150
Duties: Instructor

Course: General Physics I, Fall 2019, SUSTech
Level: Freshmen (168 students); Capacity: 150
Duties: Instructor

Course: General Physics II, Spring 2019, SUSTech
Level: Freshmen (157 students); Capacity: 150
Duties: Instructor

Course: General Physics I, Fall 2018, SUSTech
Level: Freshmen (150 students); Capacity: 150
Duties: Instructor

Course: General Physics II, Spring 2018, SUSTech
Level: Freshmen (130 students); Capacity: 150
Duties: Instructor

Course: Undergraduate School on Experimental Quantum Information Processing (USEQIP), 2016, University of Waterloo
Level: Undergraduate
Duties: Teaching NMR basics and operations on the NMR spectrometer

Course: Undergraduate School on Experimental Quantum Information Processing (USEQIP), 2015, University of Waterloo
Level: Undergraduate
Duties: Teaching NMR basics and operations on the NMR spectrometer