Dawei Lu

Curriculum Vitae

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Institute for Quantum Computing, University of Waterloo, Waterloo, ON N2L 3G1, Canada
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Education

2012 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*

2007 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

2012.09-present	Postdoctoral fellow	Institute for Quantum Computing and Department of Physics University of Waterloo Raymond Laflamme Group
2007.09-2012.07	PhD candidate	Hefei National Laboratory for Physical Sciences at Microscale University of Science and Technology of China Jiangfeng Du Group

Research Interest

· Quantum information processing in nuclear and electron spin magnetic resonance systems.

· Development of spin control techniques to achieve high-fidelity coherent control.

· Benchmarks in large-scale systems.

· Quantum simulation towards large-scale quantum systems.

· Experimental realization of adiabatic quantum computing model.

Honors and Awards

2012 CAS Presidential Scholarship

2011 Qiu Shi Graduate Student Scholarship

2011 First Prize in The Fifth Academic Forum of Hefei National Laboratory for Physical Sciences at Microscale

2011 Special Award For The First Annual Conference of Doctoral Students in School of Physical Sciences USTC

2010 Guang Hua Graduate Student Scholarship

2005 Outstanding Student Scholarship

2003 Outstanding Freshman Scholarship (Grade 1)

Publications

1. **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).

2. **D. W. Lu**, A. Brodutch, J. Park, H.Katiyar, T. Jochym-O'Connor, and R. Laflamme, *NMR quantum information processing*, **arXiv:1501.01353** (2015).
3. J. Li, **D. W. Lu**, Z. H. Luo, R. Laflamme, X. H. Peng, and J. F. Du, *Maximally Accessible Purity in Coherently Controlled Open Quantum Systems: Application to Quantum State Engineering*, **arXiv:1412.4146** (2014).
4. **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*, **arXiv:1405.6209** (2014).
5. 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).
6. **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).
7. **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 the quantum simulation towards quantum chemistry with an NMR simulator*, **Phil. Trans. R. Soc. A**, **370**, 4734 (2012).
9. 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).
10. 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*, **Scientific Reports 1**, 88 (2011).
11. **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).
12. 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).
13. J. F. Du, C. Lei, G. Qin, **D. W. Lu**, and X. H. Peng, *Search via quantum walk*, Search Algorithms and Applications, Nashat Mansour (Ed.), InTech, Available from: http://www.intechopen.com/articles/show/title/search-via-quantum-walk (2011)
14. **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).
15. 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).
16. 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).

Invited Talks

The First Annual Conference of Doctoral Students in School of Physical Sciences USTC, 2011, USTC
Simulating quantum chemistry on an NMR quantum computer

Weekly Brainstorming in International Center for Quantum Design of Functional Materials, 2011, USTC
Quantum simulation

Contributed Talks

Seminar Talk in Department of Modern Physics, 2015, USTC
Advanced techniques in NMR quantum computing and benchmarking a 7-qubit NMR system

Joint IQC-Technion Workshop, 2014, University of Waterloo
Brief Introduction to NMR quantum computing: experiments and techniques

Seminar Talk in Department of Mathematics and Statistics, 2014, University of Guelph
Experimental estimation of average fidelity of a Clifford gate on a 7-qubit quantum processor

Quantum Innovators Workshop, 2014, University of Waterloo

Experimental estimation of average fidelity of a Clifford gate on a 7-qubit quantum processor

IQC Seminar, 2012, University of Waterloo
Simulation of quantum chemistry on an NMR quantum computer

The Chinese Physical Society Conference, 2010, Nankai University
Factoring 143 adiabatically using an NMR quantum computer

Workshop on Quantum Engineering and Physics of Coherence Device, 2010, South China Normal University
Implementing quantum random-walk search algorithm using strongly coupled systems

Poster Presentations

Quantum Information Science Program Meeting, 2014, University of Waterloo
Experimental Estimation of Average Fidelity of a Clifford Gate on a 7-qubit Quantum Processor

Quantum Information Science Program Meeting, 2014, University of Waterloo
Post selection and weak measurements with an ensemble quantum processor

Spin-based Quantum Information Processing, 2014, University of Konstanz
Randomized Benchmarking on a 7-qubit NMR system

IQC Poster Session, 2014, University of Waterloo
Post selection and weak measurements with an ensemble quantum processor

IQC Poster Session, 2013, University of Waterloo
Benchmarking Quantum Information Processing on a 12-Qubit System

Conference on Quantum Information and Quantum Control, 2011, University of Toronto
Simulation of chemical isomerization reaction dynamics on a NMR quantum simulator

Teaching Experience

Course:	Prospects of Quantum Information Processing (Seminar Course), 2009, USTC
Level:	Graduate
Duties:	Preparing homework assignments, quizzes and grading

Course:	Electromagnetics, 2008, USTC
Level:	Undergraduate
Duties:	Preparing homework assignments, quizzes and grading

Course:	Classical Mechanics, 2007, USTC
Level:	Undergraduate
Duties:	Preparing homework assignments, quizzes and grading

References

Prof. Raymond Laflamme, Postdoctor Supervisor (2012.09-present)
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Prof. Jiangfeng Du, PhD Supervisor (2007.09-2012.07)
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Prof. Jonathan Baugh, Collaborator (2012.09-present)
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Prof. Xinhua Peng, PhD Supervisor (2007.09-2012.07)
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