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CURRICULUM VITAE

Xiao-Ming Lu, Ph.D.

Education

- Ph.D. (2011)* Sep. 2006 – Mar. 2011 (Excellent Ph.D. of Zhejiang Province Award)
Zhejiang Institute of Modern Physics, Department of Physics, Zhejiang University,
Hangzhou, P.R. China
Advisor: Prof. Xiaoguang Wang
Ph.D. Thesis Title: Quantum Information in Open Quantum systems
- B.Sc. (2006)* Oct. 2002 – Jun. 2006
Department of Physics, Zhejiang University, Hangzhou, P.R. China

Professional Experience

- Special-Term Professor*
24 Apr. 2017 – Present
Department of Physics, School of Sciences, Hangzhou Dianzi University, Hangzhou
310018, China
- Research Fellow* 1 Sep. 2014 – 30 Aug. 2016
Quantum measurement group, Department of Electrical and Computer Engineering,
National University of Singapore, 4 Engineering Drive 3, Singapore 117583
Advisor: Mankei Tsang
- Research Fellow* 3 May 2011 – 31 Aug. 2014
Centre for Quantum Technologies, National University of Singapore, 3 Science Drive
2, Singapore 117543
Advisors: Choo Hiap Oh and Sixia Yu

Research Interest

My broad research interests include quantum measurement and estimation theory, quantum information theory, and the dynamics of open quantum systems. I am particularly interested in understanding the physical laws and achievable limits in open quantum processes and realistic quantum measurements.

Academic Visits

- 1 Dec. 2016–7 Dec. 2016*
School of Computer Science, Shaanxi Normal University, Xi'an, P.R. China
Prof. Zhengjun Xi
- 14 Nov. 2016–26 Nov. 2016*
Center for Quantum Sciences, Northeast Normal University, Changchun, P.R. China
Prof. Xue Xi Yi

8 Nov. 2016 – 11 Nov. 2016

Wuhan Institute of Physics and Mathematics, Chinese Academy of Science, Wuhan,
P.R. China
Prof. Mang Feng

Aug. 2008 – Oct. 2008

Department of Physics, The University of Hong Kong, Hong Kong, P.R. China
Advisors: Prof. Zidan Wang
Research Assistant

Jun. 2007 – Jul. 2007

Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, P.R. China
Advisors: Prof. Chang-Pu Sun

Honors and Awards

Excellent graduated Ph. D student of Zhejiang Province, 2011.

Toshiba Scholarship, 2009 – 2010.

Excellent Graduate of Zhejiang University, 2006.

Professional Services

Manuscript Referee for *Nature Communications*, *Physical Review X*, *Physical Review A*, *Scientific Reports*, *Annals of Physics*, *Physica Scripta*, *Quantum Information Processing*, *Optical and Quantum Electronics*.

Awarded certificate of outstanding contribution in reviewing by *Annals of Physics* in October 2014.

Programming Skills

Preferentially Python, although I have some experience of Mathematica, Matlab, C, C++, PHP, and MySQL.

Conferences and Workshops

Invited

22-23 July 2017 *Quantum metrology and its applications on quantum imaging*, 2017 Youth Workshop on Quantum Physics, Northeast Normal University, Changchun, China.

Peer-Reviewed

26-27 December 2016

Quantum uncertainty and quantum metrology, contributed talk, East Lake International Forum for Outstanding Overseas Young Scholars, Huazhong University of Science and Technology, Wuhan, China.

4 July 2016

Weiss-Weinstein Error Bounds for Quantum Parameter Estimation, Poster Presentation P-32, The International Conference on Quantum Communication, Measurement and Computing (QCMC), Singapore.

15 October 2009

Operator fidelity susceptibility, decoherence, and quantum criticality, Hangzhou Workshop on Theoretical Physics for Ph.D. Students, Hangzhou, China.

Seminar Talks

25-28 December 2016

Quantum uncertainty and quantum metrology, East Lake International Forum for Outstanding Overseas Young Scholars, Huazhong University of Science and Technology, Wuhan, China.

6 December 2016

Quantum uncertainty and quantum metrology, Xi'an University of Posts & Telecommunications, Xi'an, China.

5 December 2016

Quantum uncertainty and quantum metrology, Shaanxi Normal University, Xi'an, China.

24 November 2016

Quantum uncertainty and quantum metrology, School of Sciences, Changchun University, Changchun, China.

23 November 2016

Quantum uncertainty and quantum metrology, Center for Quantum Sciences, Northeast Normal University, Changchun, China.

22 September 2016

Quantum uncertainty and quantum metrology, School of Physics Science and Engineering, Tongji University, Shanghai China.

17 June 2016

Quantum information and quantum metrology, Wilczek Quantum Center, Zhejiang University of Technology, Hangzhou, China.

23 May 2012

Distribution and flows of quantum Fisher information in composite quantum systems, National Center for Mathematics and Interdisciplinary Sciences, Chinese Academy of Sciences, Beijing, China.

Preprint

1. **Xiao-Ming Lu**, Ranjith Nair, and Mankei Tsang, *Quantum-optimal detection of one-versus-two incoherent sources with arbitrary separation*, arXiv:1609.03025.

Journal Publications

Nature Communications (1), PRX(1), PRA(10, including 1 Rapid Communications), Quantum Science and Technology(1), NJP(1), EPL(1), QIC(2), JPA(3), JPB(4), and others (1).

Citation Metrics in ISI Web of Science (Updated by Jul. 2017):

- Sum of the Times Cited: 575
- Sum of Times Cited without self-citations: 552
- Average Citations per Article: 23
- h-index: 11

Publication List:

25. Mankei Tsang, Ranjith Nair, and **Xiao-Ming Lu**, *Quantum theory of superresolution for two incoherent optical point sources*, Physical Review X **6**, 031033 (2016).

[Experimentally tests of our theory has been reported by three groups].

Coverages:

- Viewpoint in Physics: <http://link.aps.org/doi/10.1103/Physics.9.100>.
- Physics World: <http://physicsworld.com/cws/article/news/2016/sep/02/tapping-into-lights-hidden-information-to-push-fundamental-diffraction-limit>.
- Physics Buzz Blog by APS Physics Central: <http://physicsbuzz.physicscentral.com/2016/08/resolving-starlight-with-quantum.html>.

Chosen as 2rd of top physics breakthroughs of 2016 by the Foundational Questions Institute (FQXi) podcast

24. **Xiao-Ming Lu** and Mankei Tsang, *Quantum Weiss-Weinstein bounds for quantum metrology*, Quantum Science and Technology **1**, 015002 (2016).
23. **Xiao-Ming Lu**, *Structure of Correlated Initial States Guaranteeing Completely Positive Reduced Dynamics*, Phys. Rev. A **93**, 042332 (2016).
22. Jing Liu, **Xiao-Ming Lu**, Zhe Sun, Xiaoguang Wang, *Quantum multiparameter metrology with generalized entangled coherent state*, J. Phys. A: Math. Theor. **49**, 115302 (2016).
21. **Xiao-Ming Lu**, Sixia Yu, and C.H. Oh, *Robust quantum metrological schemes based on protection of quantum Fisher information*, Nature Communications **6**, 7282 (2015).
20. **Xiao-Ming Lu**, Sixia Yu, Kazuo Fujikawa, and C.H. Oh, *Improved error-tradeoff and error-disturbance relations in terms of measurement error components*, Phys. Rev. A **90**, 042113 (2014).
19. Wei Zhong, **Xiao-Ming Lu**, Xiaoxing Jing, Xiaoguang Wang, *Optimal condition for measurement observable via error-propagation*, J. Phys. A: Math. Theor. **47**, 385304 (2014).
18. **Xiao-Ming Lu**, Zhe Sun, Xiaoguang Wang, Shunlong Luo, and C.H. Oh, *Broadcasting quantum Fisher information*, Phys. Rev. A **87**, 050302 (Rapid Communication) (2013).
17. Jing Liu, **Xiao-Ming Lu**, Xiaoguang Wang, *Nonunitary non-Markovianity of quantum dynamics*, Phys. Rev. A **87**, 042103 (2013).
16. Jing Liu, **Xiao-Ming Lu**, Jian Ma, Xiaoguang Wang, *Fidelity and fidelity susceptibility based on Hilbert-Schmidt inner product*, Science China-Physics Mechanics & Astronomy **55**, 1529 (2012).
15. **Xiao-Ming Lu**, Shunlong Luo, and C.H. Oh, *Hierarchy of measurement-induced Fisher information for composite states*, Phys. Rev. A **86**, 022342 (2012).
14. Zhengjun Xi, **Xiao-Ming Lu**, Xiaoguang Wang, and Yongming Li, *Necessary and sufficient condition for saturating the upper bound of quantum discord*, Phys. Rev. A **85**, 032109 (2012).
13. Heng-Na Xiong, **Xiao-Ming Lu**, and Xiaoguang Wang, *Partial Entangling Power for Jaynes-Cummings model*, J. Phys. B: At. Mol. Opt. Phys. **45**, 015501 (2012).
12. Xiaolei Yin, Zhengjun Xi, **Xiao-Ming Lu**, Zhe Sun, and Xiaoguang Wang, *Geometric measure of quantum discord for superpositions of Dicke states*, J. Phys. B: At. Mol. Opt. Phys. **44**, 245502 (2011).
11. Zhengjun Xi, **Xiao-Ming Lu**, Zhe Sun and Yongming Li, *Dynamics of quantum discord in a quantum critical environment*, J. Phys. B: At. Mol. Opt. Phys. **44**, 215501 (2011).

10. Zhengjun Xi, **Xiao-Ming Lu**, Xiaoguang Wang and Yongming Li, *The upper bound and continuity of quantum discord*, J. Phys. A: Math. Theor. **44**, 375301 (2011).
9. **Xiao-Ming Lu**, Jian Ma, Zhengjun Xi, Xiaoguang Wang, *Optimal measurements to access classical correlations of two-qubit states*, Phys. Rev. A **83**, 012327 (2011).
[Times Cited \geq 93]
8. **Xiao-Ming Lu**, Xiaoguang Wang, C.P. Sun, *Quantum Fisher Information Flow and Non-Markovian processes of open systems*, Phys. Rev. A **82**, 042103 (2010).
[Times Cited \geq 192] [ESI Highly Cited Paper]
7. **Xiao-Ming Lu**, Zhengjun Xi, Zhe Sun, and Xiaoguang Wang, *Geometric measure of quantum discord under decoherence*, Quantum Inf. Comput. **10**, 0994 (2010).
[Times Cited \geq 47]
6. **Xiao-Ming Lu** and Xiaoguang Wang, *Operator Quantum Geometric Tensor and Quantum Phase Transitions*, EPL (Europhysics Letters) **91**, 30003 (2010).
5. Zhe Sun, **Xiao-Ming Lu**, and Lijun Song, *Quantum discord induced by a spin chain with quantum phase transition*, J. Phys. B: At. Mol. Opt. Phys. **43**, 215504 (2010).
4. Zhe Sun, Jian Ma, **Xiao-Ming Lu**, and Xiaoguang Wang, *Fisher information in a quantum-critical environment*, Phys. Rev. A **82**, 022306 (2010).
3. Zhe Sun, **Xiao-Ming Lu**, Heng-Na Xiong and Jian Ma, *Operator fidelity approach to the quantum phase transition of the spin-1/2 XX chain with three-spin interaction and the (1/2,1) XXZ mixed-spin chain*, New J. Phys. **11**, 113005 (2009).
2. **Xiao-Ming Lu**, Zhe Sun, Xiaoguang Wang, and Paolo Zanardi, *Operator fidelity susceptibility, decoherence, and quantum criticality*, Phys. Rev. A **78**, 032309 (2008). [Times Cited \geq 30]
1. **Xiao-Ming Lu**, Xiaoguang Wang, Yang Yang, and Jian Chen, *Matrix rearrangement approach for the entangling power with hybrid qudit systems*, Quantum Inf. Comput. **8**, 0671 (2008).

Conference Proceedings

1. Mankei Tsang, Ranjith Nair, and Xiao-Ming Lu, *Quantum information for semiclassical optics*, Proc. SPIE **10029**, 1002903-1002903-7 (2016).