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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  
Advisors: 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

- 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  
Advisors: 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

- 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 *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

Peer-Reviewed

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

### Seminars

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.
2. Mankei Tsang, Ranjith Nair, and **Xiao-Ming Lu**, *Semiclassical Theory of Superresolution for Two Incoherent Optical Point Sources*, arXiv:1602.04655.

## 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 Sep. 2016):

- Sum of the Times Cited: 465
- Sum of Times Cited without self-citations: 444
- Average Citations per Article: 21.14
- 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>.
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  $\geq$  88]
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  $\geq$  151] [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  $\geq$  45]
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).
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).