

# Xiaobin Zhao

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## CONTACT INFORMATION

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## BIRTHDAY

Aug. 29th 1991

## RESEARCH INTERESTS

Quantum Information Theory, especially, Optimization for Quantum Optical Process and Theory for Gaussian States

## EDUCATION

**Hong Kong University**, Hong Kong, China

Ph.D. Candidate, Computer Science, June 2016

- Advisor: Giulio Chiribella (who moved from Tsinghua University in Sep, 2015)

**Tsinghua University**, Beijing, China

Ph.D. Candidate, Physics, September 2014

- Advisor: Giulio Chiribella
- Courses taken: *Quantum Optics*, *Quantum Field Theory*, *Mathematical Method of Physics* and so forth.

**Northwestern Polytechnical University**, Xi'an, Shannxi China

B.A., Optical Information Science and technology, June, 2014

- Ranking: No. 1 in the speciality with a total students of 45 (Both for total and for major courses for 4 years);
- GPA: 88.37/100
- Courses taken: *Nonlinear Optics*, *Quantum Mechanics*, *Thermal Dynamics*, *Statistics Physics* and so forth.

## HONORS AND AWARDS

Outstanding Graduate, NPU 2014

National Scholarship for Undergraduate Students, China 2012

Third prize in Micro and Nano Elf Innovation Contest, NPU 2012

First prize in Mathematical Modeling Competition (MMC) of NPU PRESS CUP, NPU 2012

College Scholarship for Merit Students, School of Science, NPU 2011-2013

## ACADEMIC EXPERIENCE

**Tsinghua University**, Beijing, China

*Graduate Student*

**September, 2014 - present**

Includes current Ph.D. research, Ph.D. and level coursework and research/consulting projects.

The ongoing topics are:

- No Probabilistic Cloning of Gaussian Modulated Thermal States (submitted to Physics Review Letters)  
This work show that there is no genuine probabilistic purification both for quantum and classical cases.

- Optimal Quantum Illumination  
In this work, I used semidefinite programming to determine the quantum limit of the quantum illumination and try to find the implementation to achieve it. But this work is still waiting to be finished.
- Position Based Quantum Cryptography Over Continuous Variables
- Optimal cloning of general pure Gaussian state (collaboration with Prof. Gerardo Adesso in the University of Nottingham)

**Key Laboratory of Space Applied Physics and Chemistry**, Ministry of Education of China, Xi'an, China

*Undergraduate Research Assistant*

**January 2012 - December 2013**

- Involved in National Basic Research Program of China (973 Program), "Linear and nonlinear coupling effects of spatial structure of light field and Microstructure"  
(Doing simulation of non-linear classical optics in fibers and crystals.)
- Applications of Phase Field Method on the Directional Solidification  
(The work is supervised by Hui Xing, one of Prof. Christoph Beckermann's student in University of Iowa. In this work I learned the phase field method and did more than 10k machine-hour and wrote more than 1k lines of codes to finished the work.)

**PUBLICATIONS** Hui Xing, Xiaobin Zhao, Peipei Duan, Changle Chen, Zhi Chen and Kexin Jin. 2014. Stability range of tilted dendritic arrays during directional solidification. *Science China Technological Sciences* 57:2530-2535. (90% of the work was done by myself in bachelor's study.)

**PAPERS IN PREPARATION** Giulio Chiribella and Xiaobin Zhao. No Probabilistic Cloning of Gaussian Modulated Thermal States(submitted to *Physical Review Letters*)

Xiaobin Zhao and Giulio Chiribella. Optimal broadcasting and its quantum benchmarks on displaced thermal states. (To be submitted in a month)

**CONFERENCE PRESENTATIONS** Xiaobin Zhao and Giulio Chiribella. Optimal Purification of Displaced Thermal States. *Quantum Physics of Nature 2015*, Vienna, Austria, May, 2015. (Abstract also accepted by *Quantum Information Processing 2015* in Sydney, which I couldn't participate in for lack of passport.)  
[https://qupon2015.univie.ac.at/fileadmin/user\\_upload/k\\_qupon2015/QuPoN\\_Book\\_of\\_Abstracts\\_17\\_05\\_2015.pdf](https://qupon2015.univie.ac.at/fileadmin/user_upload/k_qupon2015/QuPoN_Book_of_Abstracts_17_05_2015.pdf)

**PROFESSIONAL EXPERIENCE** **Aviation Industry Corporation of China**  
*Summer internship* **August, 2013**

**QuantTech, China** (To be listed in NEEQ Concept Stock, China)  
*Internship* **December, 2015- now**

**MATHEMATICAL SKILLS**

- Analytical Math Backgrounds: Gaussian Integral, Group Theory, Semi-Definite Programming.
- Numeral Math Backgrounds: Non-Linear Differential with Complex Bound Conditions.

**COMPUTER SKILLS**

- Analysis Platform: MATHEMATICA, MATLAB, R-studio.
- Languages: MATLAB, FORTRAN, R, C.
- Applications: COMSOL Multiphysics, L<sup>A</sup>T<sub>E</sub>X, and presentation software

- Algorithms: Finite-Different Time-Domain Method(FDTD), Split-Step Fourier Method(SSF), Applications of Phase Field Method, Post-Test of Multi-Factors for Stocks
- Operating Systems: Linux, Windows.