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Education

B.S. Computer Science, Nanjing Institution of Science and Technology, 2008–2012.

Ph.D. Physics, Nanjing University, 2012–2017. (Advisor: Prof. Qiang-Hua Wang)

Awards

First prize of Physics Olympiad in JiangSu Province, 2007

Academic Excellence Scholarship, 2016

First prize of ZTE Fantastic Algorithm, 2017

Research interest & experience

I am interested in using and developing numeric methods for **tensor networks**, **quantum simulation** and **machine learning**, to solve valuable problems in the cross discipline of quantum physics and computer sciences. I am the maintainer of several open source projects (listed at the end of this CV), as well as the organizer of numeric club and QuantumBFS.
I list my research experiences in the following:

1 Inspired by the beautiful algorithms of quantum computation, I spent one year in Prof. Yang Yu's group learning quantum computation and quantum information in 2012-2013. Yu is a nice advisor, but I like theories and numerics more than experiments.

2 The next 4 years in NanJing University, I studied in Prof. Qiang-Hua Wang's group. I mastered tensor networks algorithms and renormalizationing group theories, and became a geek in simulating quantum many body systems. Most of my works are about designing creative numeric algorithms to solve really important problems like multi-channel Kondo problem and fractional topological excitations.

3 I won the first prize in ZTE fantastic algorithm that worth $15,000 in 2017 as a doctor candidate, which is a good proof of my solid algorithmic background of matrix computation, optimization algorithms and combinatorial optimization. Then I became a postdoc of that young and charming guy Lei-Wang, the most smart and nice advisor I have ever met. He is not only helpful to my research, but also creates a lot of opportunities for me to give lectures and talks in international meetings and summer schools.

4 Now, it is the second year of my postdoc career in IOP, CAS. My research interest is quantum machine learning, this is a field that can incubate several killer apps. With the help of Lei Wang, I am able to do some sounding works in this field. Especially, he is one of the strongest supporters of I and Xiu-Zhe Luo's quantum differentiable learning framework Yao.jl.

Publications

1 **Jin-Guo Liu**, Da Wang and Qiang-Hua Wang, Quantum impurities in channel mixing baths. Phys. Rev. B **93**, 035102 (2016).

2 **Jin-Guo Liu**, Zhao-Long Gu, Jian-Xin Li and Qiang-Hua Wang, Sub-system fidelity for ground states in one dimensional interacting systems. arXiv:1609.09309 (2016).

3 Yang Yang, Wan-Sheng Wang, **Jin-Guo Liu**, Hua Chen, Jian-Hui Dai and Qiang-Hua Wang, Superconductivity in doped Sr_2IrO_4: A functional renormalization group study. Phys. Rev. B **89**, 094518 (2014).

4 Yao Wang, **Jin-Guo Liu**, Wan-Sheng Wang, and Qiang-Hua Wang, Electronic order near the type-II van Hove singularity in BC_3. Phys. Rev. B **97**, 174513 (2018)

5 Zi Cai, and **Jin-Guo Liu**, Approximating quantum many-body wave functions using artificial neural networks. Phys. Rev. B **97**, 035116 (2018).

6 **Jin-Guo Liu**, and Lei Wang, Differentiable learning of quantum circuit Born machine. arXiv:1804.04168 (2018).

7 JinFeng Zeng, YuFeng Wu, **JinGuo Liu***, Lei Wang and JiangPing Hu, Learning and Inference on Generative Adversarial Quantum Circuits. arXiv:1808.03425 (2018)

Conferences

1 Statistic Physics and Machine Learning (An Qing), talk: "Machine Learning in frustrated quantum spin system".

2 The FOR 1807 Winter School on Numerical Methods for Strongly Correlated Quantum Systems (Marburg), lecture: "Deep learning and quantum many body systems".

3 The 8th Workshop on Quantum Many-Body Computation (Hang Zhou), poster: "Differentiable learning of quantum circuit Born machine"

4 Computational Approaches for Quantum Many Body Systems 2016 (Bei Jing), talk: "Local indistinguishability and topological phase of matter"

5 The First International Conference on Machine Learning and Physics (Bei Jing), poster: "Differentiable learning of quantum circuit Born machine"

6 Julia Meetup in BeiJing 2018, talk: Tutorial for high performance matrix computations, in Julia

7 Quantum Information for Developers 2018 (Zurich), Hackathon: "Funny Tensor Networks"

Slection of Repositories

viznet: network (neural network, tensor networks and quantum circuit) visualization toolbox.

Layers: computation graph framework with complex value support.

Yao.jl: quantum circuit simulator aiming for quantum machine learning.

QuAlgotithmZoo.jl: quantum algorithm zoo based on Yao.jl, including Grover Search, HHL, QuGAN, QCBM, Hamiltonian Solver et. al.

marbug: neural network for physicists tutorial code.

FunnyTN.jl: Tensor Network Pictograph.

Last updated: October 26, 2018