Langxu Bai

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RESEARCH INTERESTS & PROFESSIONAL SUMMARY

Quantum Information, Quantum Computing especially Quantum Machine Learning

My future research interests include the geometrical structure of quantum information and the interpretable condensed matter statistics.

Coding Skills: C++, python(opencv, scipy, numpy, scikit-learn, pytorch), MATLAB and Mathematica; Other Tools: LaTex, HTML, CSS, Markdown

EDUCATION

Bachelor's Degree Sept 2021 - Present

School of Physics, Nankai University, China Major Grade: 86.6/100 Rank:18%

Advanced Courses: Advanced Quantum Mechanics, Advanced Physics Experiments, Lie Group Theory, Special Functions, Soft Condensed Matter Physics.

RESEARCH EXPERIENCE

Presence and Absence of Barren Plateaus in Quantuam Fisher Kernel Oct 2023 - Present

Prof. Li-Wei Yu | *Chern Institute of Mathematics, Nankai University*

- Focus on the Barren Plateaus phenomenon in quantum fisher kernel algorithm in Matrix Product State systems focused on investigating the phenomenon of the Barren Plateau in quantum machine learning
- Target on the impact of different global or local loss functions on the presence or absence of barren plateaus in quantum neural networks
- Utilize the quantum Fisher kernel algorithm to compute the mean and variance corresponding to the Matrix Product State model under both local and global loss functions to assess whether the Barren Plateau phenomenon persists
- Some notes on papers: Notes for Barren Plateaus in Quantum Neural Network Training Landscapes

Tensor Networks Algorithm in Machine Learning July 2023 - August 2023

Prof. Pan Zhang | *Institute of Theoretical Physics, Chinese Academy of Sciences*

- Learn the basics of tensor networks theory including DMRG and a preliminary understanding of tensor network construction and applications
- Acquire relevant skills on programming tools and software including ITensor(C++) and JuliaTensor (Julia)

Gainless parity-time symmetric optical system May 2023 - Present

Prof. Huanan Li | *Nankai University*

- Focus on the realization of unique scattering phenomena in parity-time symmetric optical systems under evanescent wave excitations
- Target on studying the effective Hamiltonian of the systems which is derived using the quasi-normal mode method
- Simulate parity-time symmetric optical systems under evanescent wave excitations with Mathematica

ACEDMIC EXPERIENCE

Quantum Phase Transition in Open Quantum Systems July 2023

Prof. Shu Chen | *Institute of Physics, Chinese Academy of Sciences*

- as Yan Jici Talent Program in Physics which is a talent training class co founded by Nankai University and the Institute of Physics of the Chinese Academy of Sciences
- Learn the basics of superconductivity theory including London Theory, Ginzburg-Landau Theory, BCS Theory, Density Functional Theory and the Monte-Carlo simulation of Ising model

Quantum Computing Talent Training Plan June 2023 - Present

Prof. Zhaofeng Su | *University of Science and Technology of China*

[1]For the latest information, please visit my personal pages.

- Quantum Computing Talent Training Plan is a long-term seminar organized by Prof. Su
- Learn the basics through the Chap. 1 - 6 of *Quantum Computation and Quantum Information, Nielsen M A, Chuang I L*.

HONORS

Outstanding Student Award(awarded for top 10% students) | *School of Physics, Nankai University* Oct 2023

Third Prize of Nankai University Young Physicists' Tournament | *Nankai University* May 2023

Nankai University Scholarship | *Nankai University* Sept 2022