AO CHEN

chenao.phys@gmail.com

EDUCATION

University of Augsburg — *Augsburg, Germany*
PhD in Physics — *Apr. 2022 – Apr. 2025*
- **Supervisor:** Markus Heyl
- Summa cum laude (highest distinction)

ETH Zurich — *Zurich, Switzerland*
Master in Physics — *Sept. 2019 – Feb. 2022*
- **Supervisor:** Titus Neupert

Fudan University — *Shanghai, China*
Bachelor in Physics — *Sept. 2015 – June 2019*

RESEARCH EXPERIENCE

California Institute of Technology — *Pasadena, United States*
Postdoctoral researcher — *May 2025 - In progress*
- **Supervisor:** Garnet Chan

Center for Computational Quantum Physics, Flatiron Institute — *New York, United States*
Pre-doctoral researcher — *Sept. 2024 - Dec. 2024*
- **Supervisor:** Antoine Georges

HONORS & SCHOLARSHIPS

ETH Scholarship for international students — *Aug. 2021*
Chinese National Scholarship — *Oct. 2017*

SELECTED PUBLICATIONS & PREPRINTS

1. Ao Chen*, Vighnesh Dattatraya Naik*, Markus Heyl
Convolutional transformer wave functions
arXiv:2503.10462

2. Ao Chen, and Markus Heyl
Empowering deep neural quantum states through efficient optimization
Nat. Phys. 20, 1476 (2024)

3. Allen Scheie, Minseong Lee, Kevin Wang, Pontus Laurell, Eun Sang Choi, Daniel Pajerowski, Qingming Zhang, Jie Ma, Haidong Zhou, Sangyun Lee, Sean Thomas, M. O. Ajeesh, P. F. S. Rosa, Ao Chen, Vivien Zapf, Markus Heyl, Cristian Batista, Elbio Dagotto, Joel Moore, and D. Alan Tennant
Spectrum and low-energy gap in triangular quantum spin liquid $NaYbSe_2$
arXiv:2406.17773

4. Ao Chen, Kenny Choo, Nikita Astrakhantsev, and Titus Neupert
Neural network evolution strategy for solving quantum sign structures
Phys. Rev. Res. 4, L022026 (2022)

5. Nikita Astrakhantsev, Tom Westerhout, Apoorv Tiwari, Kenny Choo, Ao Chen, Mark H. Fischer, Giuseppe Carleo, and Titus Neupert
Broken-symmetry ground states of the Heisenberg model on the pyrochlore lattice
Phys. Rev. X 11, 041021 (2021)

CONFERENCE

Machine Learning for Quantum Matter International Workshop *Dresden, Germany*
Oral presenter *Feb. 2025*

- **Topic:** Hidden fermion pfaffian state

73rd Lindau Nobel Laureate Meeting *Lindau, Germany*
Young scientist *July 2024*

Joint ICTP-WE Heraeus School and Conference *Trieste, Italy*
Invited speaker *Apr. 2024*

- **Topic:** Empowering deep neural quantum states through efficient optimization

American Physical Society (APS) March Meeting *Minneapolis, U.S.*
Oral presenter *Mar. 2024*

- **Topic:** Pushing deep neural quantum states toward machine precision

PROGRAMMING

Skills

- Languages for scientific computing: Python, C++, and MATLAB.
- Packages for high-performance computing and neural networks: JAX and PyTorch.

Scientific software development

- Development of Quantax, a flexible package for deep neural quantum states with JAX, based on which the simulations in [2] were performed.
- Contribution to QuSpin, a Python package for doing ED calculations on many-body systems.
- Contribution to Equinox, an easy-to-use package for neural networks + scientific computing in JAX.

Computing grants

- Juelich supercomputing center. Markus Schmitt, Tiago Mendes Santos, Jonas Rigo, Ao Chen, and Markus Heyl. 3M A100 GPU hours per year (2022 – 2025).
- NHR@FAU (Erlangen) cluster. Ao Chen and Markus Heyl. 120k A100 GPU hours per year (2022 – 2025).

PROFESSIONAL ACTIVITY

Reviewer: Physical Review X, Physical Review B

Teaching assistant:

- Tools in scientific computing
- Machine learning in physics