

Haotian Wei, Ph. D.

7+ yrs Theoretical Quantum Scientist

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EDUCATION

Ph. D. in Physics , Rice University, <i>Houston, TX</i>	Exp. Aug 2026
M. Sc. in Physics , Rice University, <i>Houston, TX</i>	Dec 2024
B.Sc. in Physics , Fudan University, <i>Shanghai, China</i>	Jun 2020
• Outstanding Graduate of Class 2020	
Visiting Student , University of California, <i>Berkeley, CA</i>	Aug - Dec 2017

PUBLICATIONS

Highlights: 8 papers | 360+ citations | 70+ media coverages | 3 Editors' Suggestions | Nature Physics, PRL, PRX Quantum, Science Advances

Google Scholar: scholar.google.com/citations?user=mu--7-UAAAAJ

- **Hao-Tian Wei** and Kaden R. A. Hazzard. "A universal and efficient hybrid digital-analog fermionic quantum simulator" arXiv:2606.05517 (2026).
- Zheyuan Li, Rupsa De, Rishi Sivakumar, William Huie, **Hao-Tian Wei**, Justin D. Piel, Chris H. Greene, Kaden R. A. Hazzard, Zoe Z. Yan, Jacob P. Covey. "Quantum science with arrays of metastable helium-3 atoms" *PRX Quantum* **7**, 033011 (2026). *[Featured in news]*
- Dasom Kim, Sohail Dasgupta, Xiaoxuan Ma, Joong-Mok Park, **Hao-Tian Wei**, Liang Luo, Jacques Doumani, Xinwei Li, Wanting Yang, Di Cheng, Richard H. J. Kim, Henry O. Everitt, Shojiro Kimura, Hiroyuki Nojiri, Jigang Wang, Shixun Cao, Motoaki Bamba, Kaden R. A. Hazzard, and Junichiro Kono. "Observation of the magnonic Dicke superradiant phase transition" *Science Advances* **11**, eadt1691 (2025). *[Featured in news]*
- **Hao-Tian Wei**, Eduardo Ibarra-García-Padilla, Michael L. Wall, and Kaden R. A. Hazzard. "Hubbard Parameters for Programmable Tweezer Arrays" *Physical Review A* **109**, 013318 (2024). *[Editors' Suggestion]*
- Zoe Z. Yan, Benjamin M. Spar, Max L. Prichard, Sungjae Chi, **Hao-Tian Wei**, Eduardo Ibarra-García-Padilla, Kaden R. A. Hazzard, and Waseem S. Bakr. "Two-Dimensional Programmable Tweezer Arrays of Fermions" *Physical Review Letters* **129**.123201 (2022). *[Editors' Suggestion]* *[Featured in news]*
- Shintaro Taie, Eduardo Ibarra-García-Padilla, Naoki Nishizawa, Yosuke Takasu, Yoshihito Kuno, **Hao-Tian Wei**, Richard T. Scalettar, Kaden R. A. Hazzard, and Yoshiro Takahashi. "Observation of Antiferromagnetic Correlations in an Ultracold SU(N) Hubbard Model" *Nature Physics* **18**.1356–61 (2022). *[Featured in news]*
- Eduardo Ibarra-García-Padilla, Sohail Dasgupta, **Hao-Tian Wei**, Shintaro Taie, Yoshiro Takahashi, Richard T. Scalettar, and Kaden R. A. Hazzard. "Universal Thermodynamics of an SU(N) Fermi-Hubbard Model" *Physical Review A* **104**.043316 (2021). *[Editors' Suggestion]*
- Yuan D. Liao, Han Li, Zheng Yan, **Hao-Tian Wei**, Wei Li, Yang Qi, and Zi Y. Meng. "Phase Diagram of the Quantum Ising Model on a Triangular Lattice under External Field" *Physical Review B* **103**.104416 (2021).

CONFERENCE PRESENTATIONS & TALKS

Invited talks:

- "A universal and efficient hybrid analog-digital fermionic quantum simulator", 2026: *IFF-CSIC, Virginia Tech, URochester*.

Contributed oral & poster presentations:

- "From universal to useful: local efficiency in symmetry-constrained universal tunnel-coupled quantum simulators", 2026: *APS DAMOP Meeting*.
- "A universal and efficient fermionic variational quantum simulator", 2026: *APS Global Physics Summit*; 2025: *ITAMP Winter School, eQMA Spring School & Fall Workshop, QuantIPS, APS DAMOP Meeting, Texas Quantum Summit*.
- "Fermionic programmable quantum simulators running variational algorithms", 2024: *APS DAMOP Meeting*.
- "Parameters and algorithms for programmable Fermi-Hubbard tweezer arrays for quantum simulations", 2023: *RQI Group Meeting*.
- "Effective Hubbard parameters for programmable tweezer arrays", 2023: *APS March Meeting*.
- "Programmable Hubbard model in tweezer arrays", 2023: *QuantIPS*; 2022: *RCQM Workshop*.
- "Hubbard parameters of optical tweezer arrays in arbitrary 1- and 2-D geometries", 2022: *IUPAP Conference on Computational Physics*.
- "Stroboscopic fermion tweezer arrays: heating and Hubbard parameters", 2022: *APS DAMOP Meeting*.

PROFESSIONAL SKILLS

Physics Techniques: Quantum Dynamics, Quantum Criticality, Fermi-Hubbard, RG, Variational Methods, Lie Algebra Representation Theory, Lieb-Robinson Bound, Mean Field Theory

Quantum Hardware: Neutral Atom, Ion Traps, Superconducting Qubits

Programming Languages: 7+ yr Python (NumPy/SciPy/PyTorch/Qiskit), 4+ yr C/C++, MATLAB, Mathematica & Julia
Algorithms: Variational Quantum Algorithms, Optimization, Tensor Networks, Matrix Diagonalization (full /Arnoldi/Lanczos), Monte Carlo, Numerical Analysis, Data Correlation Analysis, Regression, Deep Neural Networks
ML/DL: Coursera Deep Learning Specialization, Reinforcement Learning Course, neural-network design & training, LLM prompt design & engineering, regressions, SGD/Adam/BFGS optimizers, statistics (SSR/SST/Pearson R), SQL
Application Skills: High-performance computing (HPC), Git workflow, data visualization (Matplotlib/Inkscape), MySQL
Open-Source Contributions: GitHub profile github.com/htwei17

- *Pymanopt* (900+★) – extended core functionality of Riemannian manifold optimizer
- *HubbardTweezer* – individually developed gate-engineering toolkit of next-gen neutral-atom quantum hardware
- *Rice-thesis-latex* – restructured and modernized the most popular Rice University thesis LaTeX template

Languages: English (fluent), Chinese Mandarin (native)
Interests: Linguistics (phonetics/phonology), Saxophone

LEADERSHIP & OUTREACH

Physics & Astronomy Graduate Student Association (PAGSA), Rice University, <i>Houston, TX</i>	Jun 2022 – Jun 2024
• Treasurer & Journal club coordinator	
Academic Reviewer , Physical Review X, Physical Review Letters, Physical Review Research, Physical Review Applied, Physical Review A&B, European Physics Journal Plus	Aug 2024 - Present
• Reviewed 20+ top research articles	
APS March Meeting 2023, <i>Las Vegas, NV</i>	Mar 2023
• Chaired a session in the world's largest physics conference with 14,000+ attendees	