Yuxin Wang

CONTACT INFORMATION

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CURRENT POSITION

QuICS, University of Maryland, College Park, MD, USA
Hartree Postdoctoral Fellow — 2023 - present

EDUCATION

University of Chicago, Chicago, IL, USA
Ph.D. in Quantum Science and Engineering — 2017 - 2023
- Thesis Topic: *Noise and Fluctuations in Open Quantum Systems*
- Adviser: Professor Aashish Clerk

Peking University, Beijing, China
B.S. in Physics — 2013 - 2017

RESEARCH INTERESTS

I am broadly interested in the **theory of open quantum systems** and have research expertise in topics such as reservoir engineering, quantum noise spectroscopy, non-reciprocal interactions, and non-Hermitian systems. I also collaborate with multiple experimental groups to implement my theoretical work in different physical systems including solid-state spin defects and superconducting circuits. As a Hartree Postdoctoral Fellow at QuICS, my current research focuses on understanding noise and dissipation in quantum systems and their implications for all facets of quantum information processing.

AWARDS AND HONORS

QuICS, University of Maryland, College Park, MD, USA
Hartree Postdoctoral Fellowship — 2023 - present

Pritzker School of Molecular Engineering (PME), University of Chicago
Harper Dissertation Fellowship — 2022 - 2023

PME 10th Anniversary Celebration Poster Competition
Best Presentation in Quantum Engineering — 2021

2022 MRS Fall Meeting & Exhibit, Symposium EQ07: Diamond Electronics, Devices and Sensors–From Synthesis to Applications
Student Presentation Prize — 2022

Peking University
Fang-Zheng Scholarship — 2014, 2016
Wei-Ming Scholarship of Undergraduate Research — 2015
Jia-Neng Scholarship — 2015

SELECTED PUBLICATIONS (LINK TO PAPERS ON ARXIV)

[1] Y.-Y. Wang, **Y.-X. Wang**, S. van Geldern, T. Connolly, A. A. Clerk, and C. Wang, *Dispersive Non-reciprocity between a Qubit and a Cavity*, Sci. Adv. **10**, eadj8796 (2024).

[2] J. C. Marcks, M. Onizhuk, N. Delegan, **Y.-X. Wang**, M. Fukami, M. Watts, A. A. Clerk, F. J. Heremans, G. Galli, and D. D. Awschalom, *Guiding Diamond Spin Qubit Growth with Computational Methods*, Phys. Rev. Materials **8**, 026204 (2024).

[3] G. Lee, T. Jin, **Y.-X. Wang**, A. McDonald, A. A. Clerk, *Entanglement Phase Transition Due to Reciprocity Breaking without Measurement or Postselection*, PRX Quantum **5**, 010313 (2024).

[4] P. C. Jerger, **Y.-X. Wang**, M. Onizhuk, B. S. Soloway, M. T. Solomon, C. Egerstrom, F. J. Heremans, G. Galli, A. A. Clerk, and D. D. Awschalom, *Detecting spin bath polarization with quantum quench phase shifts of single spins in diamond*, PRX Quantum **4**, 040315 (2023).

[5] Q. Xu, G. Zheng, **Y.-X. Wang**, P. Zoller, A. A. Clerk, and L. Jiang, *Autonomous quantum error correction and fault-tolerant quantum computation with squeezed cat qubits*, npj Quantum Inf. **9**, 78 (2023).

[6] A. Pocklington, **Y.-X. Wang**, and A. A. Clerk, *Dissipative Pairing Interactions: Quantum Instabilities, Topological Light, and Volume-Law Entanglement*, Phys. Rev. Lett. **130**, 123602 (2023).

[7] **Y.-X. Wang**, C. Wang, and A. A. Clerk, *Quantum nonreciprocal interactions via dissipative gauge symmetry*, PRX Quantum **4**, 010306 (2023).

[8] A. Pocklington, **Y.-X. Wang**, Y. Yanay, and A. A. Clerk, *Stabilizing volume-law entangled states of fermions and qubits using local dissipation*, Phys. Rev. B **105**, L140301 (2022).

[9] A. Seif, **Y.-X. Wang**, and A. A. Clerk, *Distinguishing between Quantum and Classical Markovian Dephasing Dissipation*, Phys. Rev. Lett. **128**, 070402 (2022).

[10] Y.-Y. Wang, S. van Geldern, T. Connolly, **Y.-X. Wang**, A. Shilcusky, A. McDonald, A. A. Clerk, and C. Wang, *Low-Loss Ferrite Circulator as a Tunable Chiral Quantum System*, Phys. Rev. Applied **16**, 064066 (2021).

[11] **Y.-X. Wang** and A. A. Clerk, *Intrinsic and induced quantum quenches for enhancing qubit-based quantum noise spectroscopy*, Nat. Commun. **12**, 6528 (2021).

[12] **Y.-X. Wang** and A. A. Clerk, *Spectral characterization of non-Gaussian quantum noise: Keldysh approach and application to photon shot noise*, Phys. Rev. Research **2**, 033196 (2020).

[13] **Y.-X. Wang**, and A. A. Clerk, *Non-Hermitian dynamics without dissipation in quantum systems*, Phys. Rev. A **99**, 063834 (2019).

[14] **Y.-X. Wang**, L.-Z. Mu, V. Vedral, and H. Fan, *Entanglement Rényi α entropy*, Phys. Rev. A **93**, 022324 (2016).

Conference Talks

Uncovering measurement-induced entanglement via directional adaptive dynamics and incomplete information
APS March Meeting 2024, Minneapolis, MN — Mar. 2024

Quantum quenches for enhancing qubit-based quantum noise spectroscopy
JQI Friday Quantum Seminar, UMD, College Park, MD — Oct. 2023

Unbounded deterministic entanglement generation by autonomous quantum measurement and feedforward
APS March Meeting 2023, Las Vegas, NV — Mar. 2023

Control and Sensing of Dark-Spin Bath Polarization via a Single Probe Qubit
MRS Fall Meeting 2022, Boston, MA — Nov. 2022

Non-reciprocal quantum interactions without real or synthetic magnetic fields
APS March Meeting 2022, Chicago, IL — Mar. 2022

Enhancing qubit noise spectroscopy using a quantum quench
APS March Meeting 2021 (virtual) Mar. 2021
NPQC 2021 All Hands Meeting (virtual) Feb. 2021

Dissipation-free non-Hermitian physics using quantum parametric amplifiers
APS March Meeting 2019, Boston, MA Mar. 2019

ACADEMIC SERVICE

Referee for: Physical Review A, Physical Review B, Physical Review Letters

Session Chair: APS March meeting 2020-2024

OUTREACH

PME 10^{th} Anniversary Celebration Poster Competition Sept. 2021

PME Science Communications Program, University of Chicago 2018 - 2021

- Completed a two-year program designed to enhance ones ability to verbally communicate science to a variety of audiences
- Designed and delivered a floor activity about one-way mirrors for guests at the Museum of Science and Industry, Chicago, as well as a Junior Science Cafe aimed at communicating science to middle school students