

Tommy Chin

Institute for Gravitation & the Cosmos
The Pennsylvania State University
104 Davey Lab, Box 189
University Park, PA 16802 USA

Email: wjc5509@psu.edu

Mobile: +1 (669) 233-1822

ORCID: [0000-0002-7675-3960](https://orcid.org/0000-0002-7675-3960)

I develop theoretical frameworks for open quantum systems that infer global properties from ensembles of local subsystem descriptions, with emphasis on correlations, non-Markovian dynamics, and quantum Fisher information for global parameters from local observations. These questions arise directly in cosmology and high-energy physics, where observations are fundamentally limited to partial access to correlated subsystems of a larger quantum system.

Education

- 2022–present Ph.D. Candidate, Physics, Institute for Gravitation & the Cosmos and Department of Physics, The Pennsylvania State University.
Advisor: Sarah Shandera.
Research focus: Open quantum dynamics, correlations and information dynamics.
- 2017–2022 B.S. in Physics (Summa Cum Laude); Minor in Mathematics, San José State University.

Publications

PEER-REVIEWED

- 2024 S. Prudhoe, U. Akhouri, **T. Chin**, S. Shandera, Effective Dynamics of Qubit Networks via Phase-Covariant Quantum Ensembles, *Open Systems & Information Dynamics* **31**, 2450016 (2024).
[doi:10.1142/S1230161224500161](https://doi.org/10.1142/S1230161224500161)

PREPRINTS

- 2026 **T. Chin** and S. Shandera, Excitation Flow, Positivity, and Fisher Information for Open Subsystems of an N -Qubit Network, [arXiv:2605.15036 \[quant-ph\]](https://arxiv.org/abs/2605.15036).

MANUSCRIPTS IN PREPARATION

- In prep. **T. Chin**, K. Bates, and C. Smallwood, Impact of Strain and Dark States on Spectroscopic Measurements of Silicon-Vacancy Centers in Diamond.

Talks

GRADUATE

- Apr 2026 Nicht-Markowsche Dynamik und Fisher Information von Qubits, *Open Quantum Systems: Dissipation and Decoherence from Subatomic to Cosmic Scales*, Mainz Institute for Theoretical Physics,

Johannes Gutenberg University Mainz.

- Apr 2026 Open Quantum Dynamics, *The 8th Neighborhood Workshop*, Institute for Gravitation & the Cosmos, Penn State.
- Nov 2025 Ensembles of Propagators, Not Single Hamiltonians, Govern Open Quantum Dynamics, *APS Mid-Atlantic Section Meeting 2025*, Penn State Harrisburg.
- Oct 2025 Open Quantum Systems via Dynamical Maps, *Primordial Universe & Gravity Seminar*, Institute for Gravitation & the Cosmos, Penn State.
- Jul 2025 Relative Correlations, Not Initial States, Govern Positivity in Open Quantum Dynamics, *Quantum Gravity 2025*, Institute for Gravitation & the Cosmos, Penn State.
- Apr 2025 Open Quantum Systems via Propagator Maps, *The 7th Neighborhood Workshop*, Institute for Gravitation & the Cosmos, Penn State.
- Feb 2025 Open Quantum Systems via Dynamical Maps, *Quantum Computing Working Seminar*, Department of Mathematics, Penn State.
- Oct 2024 Open Quantum Systems via Dynamical Maps, *Primordial Universe & Gravity Seminar*, Institute for Gravitation & the Cosmos, Penn State.
- Sep 2024 Open Quantum Systems via Dynamical Maps, *Colloquium*, Department of Physics and Astronomy, San José State University.
- Sep 2024 Open Quantum Systems via Dynamical Maps, *Cal-Bridge Fall Conference*, Cal-Bridge, UC Irvine.

UNDERGRADUATE

- Mar 2022 Modeling Hidden Silicon-Vacancy Centers in Diamond, *APS March Meeting 2022*, Chicago, IL. youtu.be/vc_sjr4ZVRM
- Aug 2021 3-Neutrino Oscillation in Matter, *Cal-Bridge Research Symposium*, UC Irvine. youtu.be/OfyGc_vkQoU
- Aug 2021 3-Neutrino Oscillation in Matter, *Summer Undergraduate Research Symposium*, UC Irvine. youtu.be/M8KDSa11ojQ
- Aug 2020 Measuring Neutral Hydrogen Regions Between the Stars, *Cal-Bridge Research Symposium*, UCLA. youtu.be/AG45grICoKQ

Posters

- Jun 2026 **T. Chin** and S. Shandera, Excitation Flow, Positivity, and Fisher Information for Open Subsystems of an N -Qubit Network, *Quantum Thermodynamics and Decoherence*, University of Rochester (2026). “Entropy Whisperer” poster award. [arXiv:2605.15036](https://arxiv.org/abs/2605.15036)
- Jan 2021 **T. Chin** and S. Furlanetto, The Size Distribution of Neutral Islands During Reionization, *American Astronomical Society Meeting Abstracts*, Vol. 53, 154.07 (2021). bit.ly/AAS237-Chin-Poster

Teaching

GRADUATE

- Spring 2026 PHYS 212: General Physics – Electromagnetism, Teaching Assistant.
- Fall 2025 PHYS 212: General Physics – Electromagnetism, Teaching Assistant.
- Fall 2024 PHYS 4II: Undergraduate Quantum Mechanics II, Guest Lecturer (3 lectures): Composite Hilbert Spaces; Quantum and Classical Correlations; Time-Independent Perturbation Theory.

UNDERGRADUATE

Spring 2020	PHYS 105A: Classical Mechanics I, Teaching Assistant.
Summer 2019	PHYS 52: General Physics – Optics & Thermodynamics, Teaching Assistant.
2018–2020	Tutor, College of Science Tutoring Center.
2021	Editor, <i>Essentials of Modern Thermodynamics</i> (A. Garcia).
2019	Author, PHYS 52 Lab Manual (1 experiment).

Honors & Awards

GRADUATE

2024–2026	W. Donald Miller Graduate Fellowship
2024–2025	David C. Duncan Graduate Fellowship
2022–2025	Verne M. Willaman Distinguished Graduate Fellowship
2024	NSF Graduate Research Fellowship (Honorable Mention)
2022–2023	Nellie H. and Oscar L. Roberts Graduate Fellowship

UNDERGRADUATE

2020–2022	Cal-Bridge Scholarship
2018–2022	McNair Scholarship
2017–2022	President’s Scholar (4.0 GPA; Dean’s Scholar, Spring 2019 & Spring 2020)
2020–2022	The National Society of Leadership & Success
2022	Nadine Barlow Undergraduate Research Support Award
2020–2021	Herbert & Nell Richards Scholarship
2020	Ramiro Compean & Lupe Diaz Compean Merit Scholars Scholarship
2020	Hazel Anderson Estate Scholarship
2019	San José State Support Our Staff Scholarship
2018, 20, 21	Asian/Pacific Islander American Scholarship
2017, 18, 20	ACE Inland Empire Scholarship
2017–2019	MESA Engineering Scholarship

Service & Outreach

2022–2025	Physics & Astronomy for Women+ (PAW+) <ul style="list-style-type: none">• Leadership board member and website chair — represented PAW+ in departmental decisions, managed online presence, and organized graduate student social events.• Local organizing committee, Conferences for Undergraduate Women in Physics (CUWiP) 2023 — coordinated logistics, sessions, hotel information, and tours for participants.• Graduate student town hall — organized and moderated meetings, recorded minutes, and gathered feedback on departmental initiatives including qualifying exam reform.• APS site visit — organized and hosted departmental meetings with APS site visitors on behalf of PAW+ leadership.
-----------	---

- PAW Pals outreach — taught K–2 science classes and ran demonstrations at an elementary school science fair.
- Continued involvement in Tuesday Tea, prospective student recruitment events, and first-year graduate student welcome activities.

- 2025 Physics Graduate Program SharePoint — developed and launched a SharePoint site consolidating graduate student resources for the department.
- 2022–2023 Climate, Diversity & Inclusion Committee — participated in Department Head search, including candidate interviews and provision of graduate student perspective.
- 2022–2023 Cal-Bridge Mentorship — mentored underrepresented undergraduate students through the graduate school application process.
- 2023–2024 College Democrats, Outreach Coordinator — led voter registration initiatives, coordinated outreach events with off-campus organizations, and organized large-scale canvassing efforts.
- 2021 **T. Chin** and E. Foxell, “UR: The Size Distribution of Neutral Islands During the Epoch of Reionization,” *Astrobites*. bit.ly/Astrobites-Chin

Last updated: June 19, 2026