

Yi-Ting Tu (涂懿庭)

Email: yttu@umd.edu Google Scholar: [Link](#) Pronouns: he/him

EDUCATION

University of Maryland, College Park, MD, USA

Aug. 2021 – Present

Ph.D. candidate in Physics

- Advisor: Sankar Das Sarma

National Tsing Hua University, Hsinchu, Taiwan

Sep. 2015 – Jun. 2020

Bachelor of Science

- Double Major: Physics and Mathematics
- Graduated with Honors in Physics

RESEARCH EXPERIENCE

Graduate Research Assistant

Apr. 2022 – Present

Condensed Matter Theory Center, University of Maryland

Advisor: Sankar Das Sarma

- Quantum dynamics and many-body localization
 - Numerically simulated the bath-coupled dynamics of quasiperiodic many-body localized systems to study its avalanche instability [4] (see the list of publications) and to differentiate the non-ergodic extended regime from other regimes [6].
 - Proposed an explanation of the non-ergodic extended behavior in the prethermal regime, supported by numerical and perturbative arguments [10].
 - Mentored a first year graduate student to study the many-body localization in a slowly varying potential [12] and on mirror symmetric potential [15].
- Transport and phases of electron gases
 - Calculated the Lorenz ratio of graphene using Boltzmann transport theory with the bipolar diffusion effect [5], offering an alternative explanation for the experimental paper [Crossno *et al.*, 2016]. Also studied its magnetotransport [7].
 - Determined the phases in a two-dimensional electron-hole bilayer system by calculating ground state energies of exciton gas and electron-hole plasma [8].
 - Investigated the linear-in- T electronic resistivity due to phonon scattering, discussing the role of many phonon modes [9] and the apparent negative intercept [11].
 - Investigate the attractive regime of screened Coulomb interaction for possible plasmon-induced superconductivity [14].
- Lattice anomalies

Studied the lattice analogs of 't Hooft anomalies of global symmetries using quantum cellular automata, extracted their cohomological invariants, and explored the implications for symmetric commuting projector models [13] (a collaboration independent of my advisor).
- Moiré and related materials

(ongoing project).

Full-time Research Assistant*Condensed Matter Theory Group, National Tsing Hua University*

Jul. 2020 – Aug. 2021

Advisor: Po-Yao Chang

- Fracton systems

Developed a generalized gauging procedure for a mixture of global and subsystem symmetries, and used it to construct models that host non-Abelian fractons [1].

- Non-Hermitian quantum systems

Generalized the entanglement entropy to non-Hermitian quantum systems, preserving conformal field theory scaling properties at quantum critical points [2]. Also analyzed the behavior of the fidelity susceptibility near such critical points [3].

Undergraduate Research Assistant*Quantum Optics Group, National Tsing Hua University*

Feb. 2018 – Mar. 2019

Advisor: Ray-Kuang Lee

- Quantum information theory

Formulated the positive partial transpose criterion in the phase space using symplectic geometry, and analyzed the entanglement properties of selected quantum optical states using this formulation.

AWARDS & SCHOLARSHIPS

Academic Achievement Award, seven semesters (top 5% in class)	2016 – 2019
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2019 NTHU College of Science Elite Student Award	Spring 2019
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Undergraduate Research Scholarship, Ministry of Science and Technology, Taiwan	Fall 2018
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The Zhu Shun Yi He Qin Scholarship	Spring 2018
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- NT\$100,000 awarded to top one junior student in College of Science, NTHU for outstanding performance in research and coursework

PROGRAMMING LANGUAGES & SOFTWARE

- Mathematica (Advanced)
- Julia (Advanced)
- Python (Intermediate)
- C (Intermediate)
- MATLAB (Basic)

PUBLICATIONS & PREPRINTS

- [1] Yi-Ting Tu and Po-Yao Chang, “Non-Abelian fracton order from gauging a mixture of subsystem and global symmetries,” arXiv: 2103.08603, Phys. Rev. Research **3**, 043084 (2021).
- [2] Yi-Ting Tu, Yu-Chin Tzeng, and Po-Yao Chang, “Rényi entropies and negative central charges in non-Hermitian quantum systems,” arXiv: 2107.13006, SciPost Phys. **12**, 194 (2022).
- [3] Yi-Ting Tu, Iksu Jang, Po-Yao Chang, and Yu-Chin Tzeng, “General properties of fidelity in non-Hermitian quantum systems with PT symmetry,” arXiv: 2203.01834, Quantum **7**, 960 (2023).
- [4] Yi-Ting Tu, DinhDuy Vu, and Sankar Das Sarma, “Avalanche stability transition in interacting quasiperiodic systems,” arXiv: 2207.05051, Phys. Rev. B **107**, 014203 (2023).
- [5] Yi-Ting Tu and Sankar Das Sarma, “Wiedemann-Franz law in graphene,” arXiv: 2211.05192, Phys. Rev. B **107**, 085401 (2023).

- [6] Yi-Ting Tu, DinhDuy Vu, and Sankar Das Sarma, “Localization spectrum of a bath-coupled generalized Aubry-André model in the presence of interactions,” arXiv: 2305.15471, Phys. Rev. B **108**, 064313 (2023).
- [7] Yi-Ting Tu and Sankar Das Sarma, “Wiedemann-Franz law in graphene in the presence of a weak magnetic field,” arXiv: 2307.05477, Phys. Rev. B **108**, 245415 (2023).
- [8] Yi-Ting Tu, Seth M. Davis, and Sankar Das Sarma, “Energetic comparison of exciton gas versus electron-hole plasma in a bilayer two-dimensional electron-hole system,” arXiv: 2402.00866, Phys. Rev. B **109**, 165307 (2024).
- [9] Sankar Das Sarma and Yi-Ting Tu, “Role of many phonon modes on the high-temperature linear-in- T electronic resistivity,” arXiv: 2403.09890, Phys. Rev. B **109**, 235118 (2024).
- [10] Yi-Ting Tu, David M. Long, and Sankar Das Sarma, “Interacting quasiperiodic spin chains in the prethermal regime,” arXiv: 2405.01622, Phys. Rev. B **109**, 214309 (2024).
- [11] Yi-Ting Tu and Sankar Das Sarma, “Negative intercept of the apparent zero-temperature extrapolated linear-in- T metallic resistivity,” arXiv: 2407.01664, Phys. Rev. B **110**, 075151 (2024).
- [12] Zi-Jian Li, Yi-Ting Tu, and Sankar Das Sarma, “Many-body Localization in a Slowly Varying Potential,” arXiv: 2503.22096, Phys. Rev. B **112**, 014203 (2025).
- [13] Yi-Ting Tu, David M. Long, and Dominic V. Else, “Anomalies of global symmetries on the lattice,” arXiv: 2507.21209 (2025).
- [14] Sankar Das Sarma, Jay D. Sau, Yi-Ting Tu, and Shuyang Wang, “Conventional and practical metallic superconductivity arising from repulsive Coulomb coupling,” arXiv: 2511.00625 (2025).
- [15] Zi-Jian Li, Yi-Ting Tu, and Sankar Das Sarma, “Coherently synchronized oscillations in many-body localization,” arXiv: 2512.11953 (2025).