

Yi-Ting Hsu

CONTACT INFORMATION	Physics Department, University of Notre Dame 333c Nieuwland Science Hall Notre Dame, IN, 46368, USA	e-mail: yhsu2@nd.edu
PROFESSIONAL EXPERIENCE	Department of Physics and Astronomy , University of Notre Dame, IN <i>Assistant Professor</i> Condensed Matter Theory Center , University of Maryland, MD <i>Postdoctoral Research Associate</i>	2020 – 2017 – 2020
EDUCATION	Cornell University , Ithaca, New York <i>Doctor of Philosophy</i> Thesis title: Topological Phases in the Real World Advisor: Eun-Ah Kim National Tsing-Hua University , Hsinchu, Taiwan <i>Bachelor of Science</i>	May 2017 May 2009
RESEARCH INTERESTS	Theoretical Condensed Matter Physics: Unconventional superconductivity, non-interacting and interacting topological phases, quantum geometry, few-layer van der Waals materials, prediction and interpretation by machine-learning in quantum materials. Yi-Ting Hsu is an Assistant Professor of Physics and Astronomy at the University of Notre Dame. She leads a research program at the forefront of quantum materials discovery, with the long-term vision of enabling the rational design of materials with programmable quantum properties. Her work tackles the fundamental challenge of connecting microscopic quantum geometry, topology, and many-body interactions to experimentally measurable signatures of emergent phases. In recent years, her group has predicted new Van der Waals platforms hosting exotic superconducting states and introduced innovative experimental diagnostics to reveal and control these phases, opening pathways toward next-generation quantum technologies.	
AWARDS AND GRANT INFORMATION	Department of Energy Award (2025 - 2029) “Materials Design and Detection of Topological Crystalline Superconductors” National Science Foundation CAREER Award (2023 - 2028) “CAREER: Designing topological superconductivity and correlated phases in Van der Waals materials” Department of Energy Award (2023 - 2026, 2026 - 2029) “Berry Curvature Engineering of Superconductors” (co-PI) “Berry curvature and exchange coupling at superconductor/altermagnet interfaces” (co-PI)	
WORKSHOPS ORGANIZATION	KITP Program: Quantum Geometry Meets Correlation, Symmetry Breaking, and Topology Kavli Institute of Theoretical Physics, Santa Barbara, CA (Mar 15, 2027 - May 20, 2027) Controlling Low-dimensional Quantum Matter: Theory and Experiment University of Notre Dame, Notre Dame, IN (19-20 Oct. 2024)	

- SPECIAL PUBLICATIONS **“35+1 challenges in materials science being tackled by PIs under 35(ish) in 2023”**, Y.-T. Hsu among 37 authors, Matter 6, 2480-2487, (2023)
- “Superconductivity in a graphene system survives a strong magnetic field”**, Y.-T. Hsu, Nature *News & views*, 595, 495-496 (2021)
- PUBLICATION LIST **Google Scholar Page:** <https://scholar.google.com/citations?hl=en&user=LBa20HsAAAAJ>
- “Intrinsic Nernst Effect from Berry Curvature in Superconductors”**
T.-C. Hsieh, C. Xiao, and Y.-T. Hsu, Phys. Rev. Lett. 137, 046002 (2026). Editor’s Suggestion.
- “Competing Superconductivity and Valley Ferromagnetism Tuned by Displacement Field in Van Hove Metals”**
H.-J. Yang and Y.-T. Hsu, arXiv:2508.21119. Accepted by Communications Physics (2026). DOI:10.1038/s42005-026-02784-4.
- “Directional Manipulation of a Staggered Charge Density Wave and Kondo Resonance in UTe₂”**
N. Sharma, F. Cheng, H.-J. Yang, M. Toole, J. McKenzie, M. Bordelon, S. Thomas, P. Rosa, Y.-T. Hsu, X. Liu, arXiv:2603.12097 (2026). Under review at Science Advances.
- “g-Factor Enhanced Upper Critical Field in Superconducting PdTe₂ due to Quantum Confinement”**
K. Yoshimura, T.-C. Hsieh, H. Ma, D. V. Chichinadze, S. Zou, M. Stuckert, D. Graf, R. Nowell, M. Abdul Karim, D. Kozawa, R. Kitaura, X. Liu, X. Liu, D. Jin, C. Lewandowski, Y.-T. Hsu, B. A. Assaf, arXiv:2508.07547 (2025). Under review at ACS nano.
- “Defect-Nucleated Charge Density Wave in Monolayer 1H-NbSe₂”** F. Cheng, X. Liu, M. Toole, J. McKenzie, N. Sharma, Y.-T. Hsu, B. Assaf, X. Liu, “Defect-Nucleated Charge Density Wave in Monolayer 1H-NbSe₂”. Under review at Phys. Rev. B (2026).
- “Observation of Persistent Zero Modes and Superconducting Vortex Doublets in UTe₂”**
N. Sharma, M. Toole, J. McKenzie, F. Cheng, M. M. Bordelon, S. M. Thomas, P. FS Rosa, Y.-T. Hsu, X. Liu, ACS nano 19, 31539 (2025).
- “Probing Berry curvature in magnetic topological insulators through resonant infrared magnetic circular dichroism”**
S.-K. Bac, F. le Mardelé, J. Wang, M. Ozerov, K. Yoshimura, I. Mohelský, X. Sun, B. Piot, S. Wimmer, A. Ney, T. Orlova, M. Zhukovskiy, G. Bauer, G. Springholz, X. Liu, M. Orlita, K. Park, Y.-T. Hsu, B. A. Assaf, Phys. Rev. Lett. 134, 016601 (2025). Cover and editor’s suggestion.
- “Switching between superconductivity and current density waves in Bernal bilayer graphene”**
J.-H. Song, Y.-T. Hsu, E.-A. Kim, Phys. Rev. B 111, 115144 (2025). Editor’s suggestion.
- “Optical absorption signatures of superconductors driven by Van Hove singularities”**
H.-J. Yang and Y.-T. Hsu, Phys. Rev. B 111, 054514 (2025).

“Detecting Topological Superconductivity via Berry Curvature Effects in Spectral Functions”

Y. Liao and Y.-T. Hsu, Phys. Rev. B **111**, 064508 (2025).

“Unsupervised machine learning for detecting mutual independence among eigenstate regimes in interacting quasiperiodic chains”

Colin Beveridge, Cassio Cristani, Xiao Li, Enrico Barbierato, Y.-T. Hsu, Phys. Rev. B **111**, L140202 (2025).

“Spectral analysis of the magnetooptical response in valley polarized $\text{Pb}_{1-x}\text{Sn}_x\text{Se}$ ”

Xiaoqi Ding, Jiashu Wang, Mykhaylo Ozerov, Muhsin Abdul Karim, Seul-Ki Bac, Xinyu Liu, Badih A Assaf, Yi-Ting Hsu, Xiao Li, Phys. Rev. B **111**, 205302 (2025). Editor’s suggestion.

“Hybrid-order topological superconductivity in a topological metal $1\text{T}'\text{-MoTe}_2$ ”

S.-J. Huang, K. Park, Y.-T. Hsu, npj Quantum Materials **9**, 21 (2024).

“Non-Hermitian skin effects on many-body localized and thermal phases”

Y.-C. Wang, K. Suthar, H.-H. Jen, Y.-T. Hsu, J.-S. You, Phys. Rev. B **107**, L220205 (2023).

“Observation of coexisting weak localization and superconducting fluctuations in strained $\text{Sn}_{1-x}\text{In}_x\text{Te}$ thin films”

J. Wang, W. Powers, Z. Zhang, M. Smith, B. J. McIntosh, S.-K. Bac, L. Riney, M. Zhukovskiy, T. Orlova, L. P. Rokhinson, Y.-T. Hsu, X. Liu, B. A. Assaf, Nano Lett. **22**, 792-800 (2022).

“Boundary-diagnosing topological invariants beyond symmetry indicators: A case study of two-fold rotational symmetric superconductors”

Y. Chen, S.-J. Huang, Y.-T. Hsu, T.-C. Wei, Phys. Rev. B **105**, 094518 (2022).

“Spin-valley locked instabilities in moiré transition metal dichalcogenides with conventional and higher-order Van Hove singularities”

Y.-T. Hsu, F. Wu, S. Das Sarma, Phys. Rev. B **104**, 195134 (2021).

“Faithful derivation of symmetry indicators: A case study for topological superconductors with time-reversal and inversion symmetries

S.-J. Huang and Y.-T. Hsu, Phys. Rev. Research **3**, 013243 (2021)

“Topological superconductivity, ferromagnetism, and valley-polarized phases in moiré systems: Renormalization group analysis for twisted double bilayer graphene”

Y.-T. Hsu, F. Wu, S. Das Sarma, Phys. Rev. B **102**, 085103 (2020). Editor’s suggestion.

“Higher-Order Topological Dirac Superconductors”

R.-X. Zhang, Y.-T. Hsu, S. Das Sarma, Phys. Rev. B **102**, 094503 (2020)

“Inversion-protected topological crystalline superconductivity in monolayer WTe_2 ”

Y.-T. Hsu, W. S. Cole, R.-X. Zhang, J. D. Sau, Phys. Rev. Lett. **125**, 097001 (2020)

“Butterfly effect in interacting Aubry-Andre model: Thermalization, slow scrambling, and many-body localization”

S. Xu, X. Li, Y.-T. Hsu, B. Swingle, S. Das Sarma, Phys. Rev. Research **1**, 032039 (2019)

“Machine learning many-body localization: Search for the elusive nonergodic

metal”

Y.-T. Hsu, X. Li, D.-L. Deng, S. Das Sarma, Phys. Rev. Lett. **121**, 245701 (2018)

“Hybridization-induced interface states in a topological insulator-magnetic metal heterostructure”

Y.-T. Hsu, K. Park, E.-A. Kim, Phys. Rev. B **96**, 235433 (2017)

“Topological superconductivity in monolayer transition metal dichalcogenides”

Y.-T. Hsu, A. Vaezi, M. H. Fischer, E.-A. Kim, Nat. Comm. **8**, 14985 (2017)

“Manipulating superconductivity in ruthenates through Fermi surface engineering”

Y.-T. Hsu, W. Cho, A. F. Rebola, B. Burganov, C. Adamo, K. M. Shen, D. G. Schlom, C. J. Fennie, E.-A. Kim, Phys. Rev. B **94**, 045118 (2016)

“Effects of surface-bulk hybridization in three-dimensional topological metals”

Y.-T. Hsu, M. H. Fischer, T. L. Hughes, K. Park, E.-A. Kim, Phys. Rev. B **89**, 205438 (2014)

“Field-induced long-lived supermolecules”

S.-J. Huang, Y.-T. Hsu, H. Lee, Y.-C. Chen, A. G. Volosniev, N. T. Zinner, D.-W. Wang, Phys. Rev. A **85**, 055601 (2012)

“Interaction-induced ferroelectricity in the rotational states of polar molecules”

C.-H. Lin, Y.-T. Hsu, H. Lee, D.-W. Wang, Phys. Rev. A **81**, 031601(R) (2010)

SELECTED

Invited talk, IAS-APS Physical Review Workshop on Frontiers in Quantum Geometry and Correlations, Hong Kong (August 2026)

INVITED

PRESENTATIONS Seminar, National Tsing-Hua University, Hsinchu, Taiwan (May 2026)

(AFTER 2020) Invited talk, APS Global Physics Summit Meeting, Denver, Co (March 2026)

Invited talk, 2026 U Chicago-UIUC Meeting, Chicago, IL (Feb. 2026)

Invited talk, The 65th Sanibel Symposium, St. Augustine, FL (Feb. 2026)

Seminar, University of Illinois, Chicago (Nov. 2025)

Seminar, Purdue University (Sep. 2025)

Seminar, Condensed Matter Theory Center at University of Maryland College Park (Sep. 2025)

Invited talk, APS Global Physics Summit Meeting, Anaheim, CA (March 2025)

Seminar, U of Utah (March 2025)

Invited talk, CINT User Meeting of Los Alamos and Sandia National Laboratories, Santa Fe (Sep. 2024)

Invited talk, KITP (May 2024)

Seminar, U of Michigan Ann Arbor (Feb. 2024)

Invited talk, Workshop “Recent Advances in Superconductivity” (supported by Simons foundation, FTPI, and IFT), University of Florida (Dec. 2023)

Seminar, U of Illinois Urbana-Champaign (Oct. 2023)

Invited keynote talk, Grete Hermann Network workshop at Wurzburg, Germany (July 2023)

Invited talk and discussion, KITP (May 2023)

Seminar, U of Tennessee (April 2023)

Invited talk, AVS 68 (Nov. 2022)

Invited talk, International Conference on Complexity and Topology in Quantum Matters (Jul. 2022)

Seminar, Texas A&M (May 2022)
 Seminar, Indiana University Bloomington (April 2022)
 Invited talk, March meeting (March 2022)
 Contributed Talk, Aspen winter conference (Jan. 2022)
 Seminar, Harvard (April 2021)
 Invited talk, MRS Spring Meeting (April 2021)
 Seminar, Virginia Tech (Feb. 2021)
 Colloquium, City University of Hong Kong (Feb. 2021)
 Virtual talk, KITP (Oct. 2020)
 Seminar, Leibniz Institute for Solid State and Materials Research Dresden (May 2020)

RECENT WORKSHOPS AND CONFERENCES	Ultra Quantum Matter, Aspen summer workshop (4-15 August 2025) Quantum Matter Through the Lens of Moire Materials, Aspen summer workshop (23 June-7 July 2024) Correlated Gapless Quantum Matter, KITP (6-24 May 2024) Workshop “Recent Advances in Superconductivity” (supported by Simons foundation, FTPL, and IFT) (14-16 Dec. 2023) Quantum Materials: Experimental Enigmas and Theoretical Challenges, Aspen summer workshop (18 June-9 July 2023) Quantum Universe in a Crystal: Symmetry and Topology across the Correlation Spectrum, KITP (8 May-2 June 2023) Novel Quantum States of Matter in Moire Materials, Aspen winter conference (12 Mar.-17 Mar. 2023) 2022 Correlated Electron Systems Gordon Research Conference, Mount Holyoke College (26 June-1 July 2022) New Directions in Strong Correlation Physics: From Strange Metals to Topological Superconductivity, Aspen (23 Jan.-28 Jan. 2022) Correlated Systems with Multicomponent Local Hilbert Spaces, KITP (28 Sep.-18 Dec. 2020) Spin and heat transport in quantum and topological materials, KITP (4-22 Nov. 2019) Machine-learning for Many-body Physics, KITP (28 Jan.-22 Feb. 2019) Intertwined Order and Fluctuation in Quantum Materials, KITP (17 July-25 Aug. 2017) Synthetic Quantum Matter, KITP (17 Oct.-10 Nov. 2016) Topological Phases of Quantum Matter, Boulder summer school (27-29 Mar 2016)
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REFeree SERVICE	Nature, Nature Physics, Nature Communications, Asia Materials, npj Quantum Materials, Physical Review Letter, Physical Review X, Physical Review Research, Physical Review B, Physical Review Materials, Physica B
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