

Ying-Ming Xie

School of Physics and Astronomy, Shanghai Jiao Tong University, Shanghai 200240, China

Email: yingming.xie@sjtu.edu.cn

[Google scholar](#), [arXiv](#), [Personal website](#)

Employment

06/2026 ~ present	Associate Professor Institute of Condensed Matter Physics, School of Physics and Astronomy, Shanghai Jiao Tong University
07/2023 ~ 06/2026	Special Postdoc Researcher (SPDR) Fellow RIKEN Center for Emergent Matter Science (Advisor: Naoto Nagaosa)
05/2022 ~ 06/2023	Hong Kong RGC Postdoc Fellow Hong Kong University of Science and Technology (HKUST)
10/2021 ~ 04/2022	Postdoc Researcher, HKUST (Advisor: Kam Tuen Law)

Related experiences

06/2023 ~ 06/2023	Visiting Postdoc Researcher, MIT (Advisor: Patrick A. Lee)
10/2022 ~ 01/2023	Visiting Postdoc Researcher, Caltech (Advisor: Jason Alicea)

Education

09/2016 ~ 10/2021	PhD in Physics, HKUST (Supervisor: Kam Tuen Law)
02/2016 ~ 06/2016	HKUST (an undergraduate internship program)
09/2012 ~ 07/2016	B.Sc. in Physics, Beijing Normal University, Beijing, China

Research interests

My research interests cover various topics of condensed matter physics: unconventional superconductivity and magnetism, topological superconductors and Majorana fermions, heterostructures and Josephson junctions, topological insulators and semimetals, 2D and moiré materials, density-wave physics, nonlinear optics, strongly correlated physics, as well as applying the concepts of quantum information in condensed matter physics.

Service

Reviewer for Nature (2), Phys. Rev. Lett. (4), Nat. Commun. (2), Phys. Rev. B (7), Phys. Rev. Applied (1), 2D Materials (1).

Awards and Honors

- Special Postdoc Researcher (SPDR) Fellowship, RIKEN, 2023
- Hong Kong RGC Postdoc Fellowship, 2022
- PhD Research Excellence Scholarship, School of Science, HKUST, 2021
- The George K. Lee Foundation Scholarship, The George K. Lee Foundation, 2019.

- Excellent Undergraduate Students of Beijing Normal University, Beijing Normal University, 2016.
- National Scholarship, Beijing Normal University, 2013 and 2014.

Research activities

03/2026	Invited colloquium talk, "When topology meets correlations: emergent quantum matter in two dimensions", School of Physics and Astronomy, Shanghai Jiao Tong University, Shanghai, China
08/2025	Invited talk, "Photon-drag photovoltaic effects and quantum geometric nature", 30th International Conference on Low Temperature Physics (LT30), Bilbao, Spain
05/2025	Invited talk, "Unconventional Josephson effects and FFLO in Moiré crystals", University of Science and Technology of China (USTC), International Center for Quantum Design of Functional Materials, Hefei, China
03/2024	Talk, "Gate-Defined Topological Josephson Junctions in Bernal Bilayer Graphene", APS March Meeting, Minneapolis, USA
08/2023	Invited talk, "Orbital Fulde-Ferrell Pairing State in Moiré Ising Superconductors" Riken CEMS, AB meeting, Japan
05/2023	Invited talk, "Theory of Interaction-Driven Quantum Anomalous Hall States in MoTe ₂ /WSe ₂ Hetero-Bilayers" Gordon Research Seminar, Ventura, USA
03/2023	Talk, "Pauli limit violation, finite-momentum pairing, superconducting diode effect in moire Ising superconductors" APS March meeting, Las Vegas, USA
11/2022	Invited Talk, "Valley-polarized quantum anomalous Hall states and unconventional Josephson effects in moiré materials" CMT seminar, Caltech, USA
03/2021	Talk, "Spin-Orbit-Parity-Coupled Superconductivity in Topological Monolayer WTe ₂ ." APS March Meeting (Online)
03/2019	Talk, "The enhancement of in-plane Hc ₂ in monolayer centrosymmetric superconductor 1T'-WTe ₂ via strong spin-orbital coupling". APS March Meeting, Boston, Massachusetts, USA.
03/2018	Talk, "Quasi-one-dimensional Quantum Anomalous Hall Systems as New Platforms for Scalable Topological Quantum Computation". APS March Meeting, Los Angeles, California, USA.

Publication list (last update 06/2026)

1. Dong Li, Yuki M. Itahashi, **Ying-Ming Xie**, Menghu Zhou, Yukako Fujishiro, Kunjie Zheng, Yao Guang, Max T. Birch, Ilya Belopolski, Max Hirschberger, Takahiro Morimoto, Xiao-Xiao Zhang, Zhi-An Ren, Naoto Nagaosa, and Yoshihiro Iwasa, Surface-switchable nonreciprocity protected by Fermi arcs in Weyl semimetal TaAs, arXiv:2606.17395 (2026).

2. Zi-Ting Sun, **Ying-Ming Xie**, and Naoto Nagaosa, Quantum Information Geometry of Multicomponent Superconducting Fluctuation Transport, arXiv:2606.15928 (2026).
3. Luca Maranzana, Koki Shinada, **Ying-Ming Xie**, Sergey Artyukhin, and Naoto Nagaosa, Semiclassical Wave-Packet Dynamics in Phase-Space Geometry: Quantum Metric Effects, arXiv:2603.21262 (2026).
4. **Ying-Ming Xie** and Naoto Nagaosa, Theory of Little-Parks oscillations by vortices in two-dimensional superconductors, arXiv:2601.23050 (2026).
5. Grant Z. X. Yang, Zi-Ting Sun, **Ying-Ming Xie**, and K. T. Law, Topological altermagnetic Josephson junctions, *npj Quantum Materials* **11**, 45 (2026).
6. **Ying-Ming Xie**, Naoto Nagaosa, Photon Drag Photovoltaic Effects and Quantum Geometric Nature, *PNAS* **122**, e2424294122 (2025).
7. **Ying-Ming Xie**, Yizhou Liu, and Naoto Nagaosa, Sliding Dynamics of Current-Driven Skyrmion Crystal and Helix in Chiral Magnets, *Phys. Rev. Lett.* **133**, 096702 (2024).
8. **Ying-Ming Xie**, K. T. Law, Orbital Fulde-Ferrell pairing state in moiré Ising superconductors, *Phys. Rev. Lett.* **131**, 016001 (2023).
9. **Ying-Ming Xie**, Étienne Lantagne-Hurtubise, Andrea F. Young, Stevan Nadj-Perge, and Jason Alicea, Gate-Defined Topological Josephson Junctions in Bernal Bilayer Graphene, *Phys. Rev. Lett.* **131**, 146601 (2023).
10. **Ying-Ming Xie**, Cheng-Ping Zhang, Jin-Xin Hu, Kin Fai Mak, and K. T. Law, Valley-Polarized Quantum Anomalous Hall State in Moiré MoTe₂/WSe₂ Heterobilayers. *Phys. Rev. Lett.* **128**, 026402 (2022).
11. **Ying-Ming Xie**, Xue-Jian Gao, Xiao Yan Xu, Cheng-Ping Zhang, Jin-Xin Hu, and K. T. Law. Kramers nodal line metals, *Nat. Commun.* **12**, 3064 (2021).
12. **Ying-Ming Xie**, Benjamin T Zhou, K. T. Law. Spin-orbit-parity coupled superconductivity in topological monolayer WTe₂. *Phys. Rev. Lett.* **125**, 107001 (2020).
13. Jin-Xin Hu, Zi-Ting Sun, **Ying-Ming Xie**[#], and K. T. Law[#], Josephson Diode Effect Induced by Valley Polarization in Twisted Bilayer Graphene, *Phys. Rev. Lett.* **130**, 266003 (2023). [[#] Corresponding author]
14. Zi-Ting Sun, Jin-Xin Hu, **Ying-Ming Xie**[#], and K. T. Law[#], Anomalous $h/2e$ Periodicity and Majorana Zero Modes in Chiral Josephson Junctions, *Phys. Rev. Lett.* **133**, 056601 (2024). [[#] Corresponding author]
15. **Ying-Ming Xie**, Naoto Nagaosa, Probing loop currents and collective modes of charge density waves in Kagome materials with NV centers, *npj Quantum Materials* **10**, 64 (2025).
16. Jin-Xin Hu, Mengli Hu, **Ying-Ming Xie**, and K. T. Law, Unconventional Josephson effects in PT -symmetric antiferromagnetic bilayers, arXiv:2509.08262 (2025).
17. Enze Zhang, Zi-Ting Sun, Zehao Jia, Jinshan Yang, Jingyi Yan, Linfeng Ai, **Ying-Ming Xie**, Yuda Zhang, Xue-Jian Gao, Xian Xu, Shanshan Liu, Qiang Ma, Chaowei Hu, Xufeng Kou, Jin Zou, Ni Ni, Kam Tuen Law, Shaoming Dong, Faxian Xiu, Observation of edge

- supercurrent in topological antiferromagnet MnBi₂Te₄-based Josephson junctions, [Science Advances](#) **11**, eads8730 (2025).
18. Jin-Xin Hu[#], Akito Daido, Zi-Ting Sun, **Ying-Ming Xie**[#], and K.T. Law[#], Layer Pseudospin Superconductivity in Twisted MoTe₂, arXiv:2506.12767 (2025). [[#] Corresponding author]
 19. Pseudo-Ising superconductivity induced by p -wave magnetism, Zi-Ting Sun, Xilin Feng, **Ying-Ming Xie**, Benjamin T. Zhou, Jin-Xin Hu, K. T. Law, [Phys. Rev. B](#) **112**, 214504 (2025).
 20. **Ying-Ming Xie**, Naoto Nagaosa, Quasi-one-dimensional Supersolids in Luther-Emery Liquids, [Phys. Rev. Research](#) **7**, 023302 (2025).
 21. **Ying-Ming Xie**, Hiroki Isobe, Naoto Nagaosa, Nonreciprocal nonlinear responses in moving charge density waves, [npj Quantum Materials](#) **9**, 82 (2024).
 22. **Ying-Ming Xie**, Naoto Nagaosa, Phase shifts, band geometry and responses in triple-Q charge and spin density waves, [Phys. Rev. B](#) **110**, L241108 (2024).
 23. **Ying-Ming Xie**, Xue-Jian Gao, Tai-Kai Ng, K. T. Law. Creating majorana zero modes in quantum anomalous hall insulator/superconductor heterostructures. [US Patent App.](#) 17/672,434 (2022).
 24. **Ying-Ming Xie**, Cheng-Ping Zhang, Kam Tuen Law, Topological $p_x + ip_y$ inter-valley coherent state in Moiré MoTe₂/WSe₂ heterobilayers, [Phys. Rev. B](#) **110**, 045115 (2024).
 25. Christian Tzschaschel, Jian-Xiang Qiu, Xue-Jian Gao, Hou-Chen Li, Chunyu Guo, Hung-Yu Yang, Cheng-Ping Zhang, **Ying-Ming Xie**, Yu-Fei Liu, Anyuan Gao, Damien Bérubé, Thao Dinh, Sheng-Chin Ho, Yuqiang Fang, Fuqiang Huang, Johanna Nordlander, Qiong Ma, Fazel Tafti, Philip JW Moll, Kam Tuen Law, Su-Yang Xu, [Nat. Commun.](#), 3017 (2024).
 26. Omargeldi Atanov, Wai Ting Tai, **Ying-Ming Xie**, Yat Hei Ng, Molly A Hammond, Tin Seng Manfred Ho, Tsin Hei Koo, Hui Li, Sui Lun Ho, Jian Lyu, Sukong Chong, Peng Zhang, Lixuan Tai, Jiannong Wang, Kam Tuen Law, Kang L Wang, Rolf Lortz, Proximity-induced quasi-one-dimensional superconducting quantum anomalous Hall state, [Cell Reports Physical Science](#) **5.1** (2024).
 27. J. Díez-Mérida, A. Díez-Carlón, S. Y. Yang, **Y.-M. Xie**, X.-J. Gao, K. Watanabe, T. Taniguchi, X. Lu, K. T. Law and Dmitri K. Efetov. Magnetic Josephson Junctions and Superconducting Diodes in Magic Angle Twisted Bilayer Graphene. [Nat. Commun.](#) **14**, 2396 (2023).
 28. **Ying-Ming Xie**, Dmitri K. Efetov, K. T. Law., φ_0 -Josephson junction in twisted bilayer graphene induced by a valley-polarized state, [Phys. Rev. Research](#) **5**, 023029 (2023).
 29. Cheng-Ping Zhang, Xue-Jian Gao, **Ying-Ming Xie**, Hoi Chun Po and K. T. Law. Higher-Order Nonlinear Anomalous Hall Effects Induced by Berry Curvature Multipoles. [Phys. Rev. B](#) **107**, 115142 (2023).
 30. Jin-Xin Hu, **Ying-Ming Xie**[#], and K. T. Law[#], Berry curvature, spin Hall effect, and nonlinear optical response in moiré transition metal dichalcogenide heterobilayers, [Phys. Rev. B](#) **107**, 075424 (2023). [[#] Corresponding author]

31. Enze Zhang*, **Ying-Ming Xie***, Yuqiang Fang*, Jinglei Zhang*, Xian Xu, Yi-Chao Zou, Pengliang Leng, Xue-Jian Gao, Yong Zhang, Linfeng Ai, Yuda Zhang, Zehao Jia, Shanshan Liu, Wei Zhao, Sarah J. Haigh, Xufeng Kou, Jinshan Yang, Fuqiang Huang, K. T. Law, Faxian Xiu, Shaoming Dong. Spin-Orbit-Parity Coupled Superconductivity in Atomically thin 2M-WS₂. *Nat. Phys.* **19**, 106-113 (2023). [* equally contribution]
32. Jin-Xin Hu, Cheng-Ping Zhang, **Ying-Ming Xie**, K. T. Law. Nonlinear Hall Effects in Strained Twisted Bilayer WSe₂, *Communications Physics* **5**, 255 (2022).
33. Cheng-Ping Zhang, Jiewen Xiao, Benjamin T. Zhou, Jin-Xin Hu, **Ying-Ming Xie**, Binghai Yan, and K. T. Law. Giant nonlinear Hall effect in strained twisted bilayer graphene. *Phys. Rev. B*: **106**(4), L041111 (2022).
34. **Ying-Ming Xie**, K. T. Law, and Patrick A. Lee. Topological superconductivity in EuS/Au/superconductor heterostructures, *Phys. Rev. Research* **3**, 043086 (2021).
35. Yong-Bin Choi*, **Ying-Ming Xie***, Chui-Zhen Chen, Jinho Park, Su-Beom Song, Jiho Yoon, Bum Joon Kim, Takashi Taniguchi, Kenji Watanabe, Jonghwan Kim, Kin Chung Fong, Mazhar N Ali, Kam Tuen Law, Gil-Ho Lee. Evidence of higher-order topology in multilayer WTe₂ from Josephson coupling through anisotropic hinge states. *Nature Materials* **19**, 974–979 (2020). [* equally contribution].
36. Manna, Sujit, Peng Wei, **Ying-Ming Xie**, Kam Tuen Law, Patrick Lee, and Jagadeesh Moodera. Signature of a pair of Majorana zero modes in superconducting gold surface states, *Proceedings of the National Academy of Sciences* **117**, 8775 (2020).
37. Junying Shen, Jian Lyu, Jason Z Gao, **Ying-Ming Xie**, Chui-Zhen Chen, Chang-woo Cho, Omargeldi Atanov, Zhijie Chen, Kai Liu, Yajian J Hu, King Yau Yip, Swee K Goh, Qing Lin He, Lei Pan, Kang L Wang, Kam Tuen Law, and Rolf Lortz. Spectroscopic fingerprint of chiral Majorana modes at the edge of a quantum anomalous Hall insulator/superconductor heterostructure, *Proceedings of the National Academy of Sciences* **117**, 238 (2020).
38. **Ying-Ming Xie**, Benjamin T Zhou, T. K. Ng, and K. T. Law. Strongly enlarged topological regime and enhanced superconducting gap in nanowires coupled to Ising superconductors, *Physical Review Research* **2**, 013026 (2020).
39. Chui-Zhen Chen, **Ying-Ming Xie**, Jie Liu, Patrick A. Lee, and K. T. Law. Quasi-one-dimensional Quantum Anomalous Hall Systems as New Platforms for Scalable Topological Quantum Computation, *Phys. Rev. B* **97**, 104504 (2018).