Curriculum Vitae

Vic Kam Tuen Law

(August 30, 2024)

Academic qualifications:

08/2003-08/2008	Ph.D. in Physics, Brown University. (Advisor: D. Feldman).
01/2002-08/2002	UC Berkeley (on an undergraduate exchange program).
09/2000-08/2003	B.Sc. in Physics, Hong Kong University of Science and Technology (HKUST).

Postdoctoral positions:

08/2009-05/2011	Croucher Postdoctoral Fellow, Massachusetts Institute of Technology (MIT). (Advisor: Patrick Lee)
08/2008-08/2009	Joint Postdoctoral Fellow, Institute for Advanced Study-HKUST/MIT. (Advisor: Patrick Lee)

Positions at HKUST:

07/2022-present	Associate Dean of Science, HKUST
07/2024-Present	Chair Professor, Department of Physics, HKUST
07/2021-06/2024	Professor, Department of Physics, HKUST
07/2017- 06/2021	Dr. Tai-chin Lo Associate Professor of Science, HKUST.
06/2011- 06/2017	Assistant Professor, Department of Physics, HKUST.

Research interest:

In general, I am interested in theoretical condensed matter physics with emphasis on topological materials, moiré materials and unconventional superconductors. Currently, our group is studying 1. The Berry curvature multipole (such as quadrupole) induced higher order anomalous Hall effects; 2. The electron interaction-induced correlated states in twisted bilayer graphene and moiré transition metal dichalcogenides; 3. Quantum metric effects in flat band superconductors and magnets; 4. The realization of topological and other superconducting qubits using Majorana zero modes and unconventional Josephson junctions. 5. Heesch Weyl fermions (a new type of Weyl fermions we discovered) in anti-ferromagnets. More information about our research group can be found at: https://phlaw.ust.hk .

Bibliometrics:

Google Scholar: https://scholar.google.com/citations?hl=en&user=5Z73YxcAAAAJ
Scopus: https://www.scopus.com/authid/detail.uri?authorId=35229499900

Selected Publications:

1. "Anomalous h/2e periodicity and Majorana zero modes in chiral Josephson junctions" Zi-Ting Sun, Jin-Xin Hu, Ying-Ming Xie*, **K. T. Law***, Phys. Rev. Lett. 133, 056601 (2024).

2. "Ginzburg-Landau Theory of Flat-Band Superconductors with Quantum Metric" Shuai A. Chen and **K. T. Law***, Phys. Rev. Lett. 132, 026002 (2024). *Editors' Suggestion.*

3. “Quantum geometry quadrupole-induced third-order nonlinear transport in antiferromagnetic topological insulator MnBi2Te4”
Hui Li, Chengping Zhang, Chengjie Zhou, Chen Ma, Xiao Lei, Zijing Jin, Hongtao He, Baikui Li, and **Kam Tuen Law***, Jiannong Wang*, Nature Communications 2024, In press.

4. “Nonlinear Hall effect in an insulator”
Chengping Zhang*, **K. T. Law***, News and Views (invited), Nature Nanotechnology 2024. https://www.nature.com/articles/s41565-024-01755-6

5. “Nonlinear transport and radio frequency rectification in BiTeBr at room temperature”
Xiu Fang Lu, Cheng-Ping Zhang, Naizhou Wang, Dan Zhao, Xin Zhou, Weibo Gao, Xian Hui Chen, **Kam Tuen Law***, Kian Ping Loh* Nature Communications 15: 245 (2024).

6. “Nonlinear optical diode effect in a magnetic Weyl semimetal”
Christian Tzschaschel, Jian-Xiang Qiu, Xue-Jian Gao, Hou-Chen Li, Chunyu Guo, Hung-Yu Yang, Cheng-Ping Zhang, Yingming Xie, Yu-Fei Liu, Anyuan Gao, Damien Bérubé, Thao Dinh, Sheng-Chin Ho, Yuqiang Fang, Fuqiang Huang, Johanna Nordlander, Qiong Ma, Fazel Tafti, Philip Moll, and **Kam Tuen Law**, Suyang Xu*, Nature Communications 15: 3017 (2024).

7. “Experimental evidence for Berry curvature multipoles in antiferromagnets”
Soumya Sankar, Ruizi Liu, Xue-Jian Gao, Qi-Fang Li, Caiyun Chen, Cheng-Ping Zhang, Jiangchang Zheng, Yi-Hsin Lin, Kun Qian, Ruo-Peng Yu, Xu Zhang, Zi Yang Meng, **Kam Tuen Law**, Qiming Shao, Berthold Jäck
Phys. Rev. X 14, 021046 (2024).

8. “Proximity-induced quasi-one-dimensional superconducting quantum anomalous Hall state”
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*, Cell Reports Physical Science 5, 101762 (2024).

9. “Orbital Fulde-Ferrell pairing state in moiré Ising superconductors”
Yingming Xie* and **K. T. Law***, Phys. Rev. Lett. 131, 016001 (2023).

10. “Josephson Diode Effect Induced by Valley Polarization in Twisted Bilayer Graphene”
Jin-Xin Hu, Zi-Ting Sun, Ying-Ming Xie*, **K. T. Law***, Phys. Rev. Lett. 130, 266003 (2023).

11. “Symmetry-broken Josephson junctions and superconducting diodes in magic-angle twisted bilayer graphene”

J Díez-Mérida, A Díez-Carlón, SY Yang, Y-M Xie, X-J Gao, J Senior, K Watanabe, T Taniguchi, X Lu, AP Higginbotham, **KT Law**, Dmitri K Efetov*, Nature Communications 14: 2396 (2023).

12. *"Spin–orbit–parity coupled superconductivity in atomically thin 2M-WS2"*
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, Jingyi Yan, Wei Zhao, Sarah J. Haigh, Xufeng Kou, Jinshan Yang*, Fuqiang Huang*, **K. T. Law***, Faxian Xiu* & Shaoming Dong, Nature Physics 19, 106–113 (2023).

13. "Axion Insulator State in Hundred-Nanometer-Thick Magnetic Topological Insulator Sandwich Heterostructures"
Deyi Zhuo, Zi-Jie Yan, Zi-Ting Sun, Ling-Jie Zhou, Yi-Fan Zhao, Ruoxi Zhang, Ruobing Mei, Hemian Yi, Ke Wang, Moses H. W. Chan, Chao-Xing Liu, **K. T. Law***, and Cui-Zu Chang*, *Nature Communications* 14: 7596 (2023).

14. *"Valley Polarized Quantum Anomalous Hall State in Moiré MoTe2/WSe2 Heterobilayers"*
Ying-Ming Xie, Cheng-Ping Zhang, Jin-Xin Hu, Kin Fai Mak, **K. T. Law***, Phys. Rev. Lett. **128**, 026402 (2022).

15. "Lattice reconstruction induced multiple ultra-flat bands in twisted bilayer WSe2"
En Li, Jin-Xin Hu, Xuemeng Feng, Zishu Zhou, Liheng An, **Kam Tuen Law***, Ning Wang*, Nian Lin*, Nature Communications 12 : 5601 (2021).

16. *Kramers Nodal Line Metals*
Ying-Ming Xie, Xue-Jian Gao, Xiao Yan Xu, Cheng-Ping Zhang, Jin-Xin Hu, Jason Gao, **K. T. Law***, Nature Communications, **12** 3064 (2021).

17. *Spin-orbit-parity coupled superconductivity in topological monolayer WTe2*
Yingming Xie, Benjamin Tong Zhou, **K. T. Law***, Phys. Rev. Lett. 125, 107001 (2020).

18. *"Giant Orbital Magneto-electric effect and Current-driven Magnetization Switching in Twisted Bilayer Graphene"*
Wen-Yu He*, David Goldhaber-Gordon, **K. T. Law***, Nature Communications **11** 1650, (2020).

19. "*Evidence of Higher Order Topology in Multilayer WTe2 from Josephson Coupling through Anisotropic Hinge States*"
Y. Choi, Yingming Xie, C. Chen, J. Park, S. Song, J. Yoon, B. J. Kim, T. Taniguchi, K. Watanabe, H. Lee, J. Kim, Kin Chung Fong*, Mazhar N. Ali*, **K. T. Law***, Gil-Ho Lee*, Nature Materials, **19** 974 (2020).

20. *"Spectroscopic Fingerprint of Chiral Majorana Modes at the Edge of a Quantum Anomalous Hall Insulator / Superconductor Heterostructure"*
J. Shen, J. Lyu, J. Gao, Y. Xie, C. Chen, C. Cho, O. Atanov, Z. Chen, K. Liu, Y. J. Hu, K. Y. Yip, S. K. Goh, Q. L. He, L. Pan, K. L. Wang*, **K. T. Law***, R. Lortz*, PNAS, **117**, 238 (2020).

21. "*Signature of a pair of Majorana zero modes in superconducting gold surface states*"

S. Manna, P. Wei, Y. Xie, **K. T. Law**, P. A. Lee, J. S. Moodera, PNAS, **117** 8775 (2020).

22. "*Pair Density Wave in the Doped t-J Model with Ring Exchange on a Triangular Lattice*" Xiao Yan Xu*, **K. T. Law***, Patrick A. Lee*, Phys. Rev. Lett. **122**, 167001 (2019).

23. *"Disorder induced multifractal superconductivity in monolayer niobium dichalcogenides"*
K. Zhao, H. Lin, X. Xiao, W. Huang, W. Yao, M. Yan, Y. Xing, Q. Zhang, Z. Li, S. Hoshino, J. Wang, S. Zhou, L. Gu, M. Bahramy, H. Yao, N. Nagaosa, Q. K. Xue, **K. T. Law**, X. Chen*, S.H. Ji*, Nature Physics **15**, 904 (2019) (Selected as the cover page).

24. "*An unusual continuous paramagnetic-limited superconducting phase transition in 2D NbSe2"*
E. Sohn, X. Xi, W-Y He, S. Jiang, Z. Wang, K. Kang, J. Park, H. Berger, L. Forró, ***K. T. Law***, J. Shan*, K. F. Mak*, Nature Materials **17**, 504-508 (2018).

25. "*Spinon Fermi surface in a cluster Mott insulator model on a triangular lattice and possible application to 1T-TaS2*"
Wen-Yu He, Xiao Yan Xu*, Gang Chen, ***K. T. Law****, Patrick A. Lee*, Phys. Rev. Lett. **121**, 046401 (2018).

26. "*1T-TaS2 as a quantum spin liquid*"
K. T. Law and Patrick Lee*, PNAS, 114 6996-7000 (2017).

27. "*Evidence of Ising Pairing in Superconducting Monolayer NbSe2*"
X. Xi, Z. Wang, W. Zhou, J. Park, ***K. T. Law***, H. Berger, L. Forró, J. Shan, and K. F. Mak*, Nature Physics **12**, 139 (2016).

28. "*Two Dimensional Ising Superconductivity in Gated MoS2*"
J. M. Lu, O. Zeliuk, I. Leermarker, Noah F. Q. Yuan, U. Zeitler, ***K. T. Law*** and J. T. Ye*, Science **350**, 1353 (2015).

29. "*Possible Topological Superconducting Phases of MoS_2*"
Noah F. Q. Yuan, Kin Fai Mak, ***K. T. Law****, Phys. Rev. Lett.**113**, 097001 (2014).

30. "*Majorana induced Selective Equal Spin Andreev Reflections*"
James Jun He, T. K. Ng, Patrick A Lee and ***K. T. Law****, Phys. Rev. Lett.**112** 037001(2014).

31. "*Correlated spin currents generated by resonant-crossed Andreev reflections in topological superconductors*"
James Jun He, Jiansheng Wu, Ting-Pong Choy, Xiong-Jun Liu, Y. Tanaka, ***K. T. Law****, Nature Communications **5**:3232 (2014).

32. "*Non-Abelian Majorana Doublets in Time-Reversal Invariant Topological Superconductor*"
Xiong-Jun Liu*, Chris L. M. Wong and ***K. T. Law****, Phys. Rev. X **4**, 021018 (2014).

33. "*Realization of 2D Spin-orbit Interaction and Exotic Topological Orders in Cold Atoms*"
Xiong-Jun Liu, ***K. T. Law***, T. K. Ng, Phys. Rev. Lett. **112**, 086401 (2014).

34. "*Detecting Topological Orders in Cold Atoms*"
Xiong-Jun Liu, ***K. T. Law***, T. K. Ng and Patrick A. Lee, Phys. Rev. Lett. **111** 120402 (2013).

35. "*Zero-bias peaks in spin-orbit coupled superconducting wires with and without Majorana end-states*"
Jie Liu, A.C. Potter, ***K. T. Law*** and P.A. Lee*, Phys. Rev. Lett. **109**, 267002 (2012).

36. "*Majorana Fermion Induced Resonant Andreev Reflection*"
K. T. Law, Patrick A. Lee, and T. K. Ng, Phys. Rev. Lett.**103**, 237001 (2009).

Honors and Awards:

1. Achievement in Asia Award 2023 (awarded by the International Organization of Chinese Physicists and Astronomers).

2. RGC Research Fellow (awarded by the Hong Kong Research Grants Council, 2020).

3. Elected Member and Founding President of The Hong Kong Young Academy of Sciences, 2018.

4. Dr. Tai-chin Lo Associate Professor of Science, 2017-2021.

5. The Croucher Innovation Award, 2015.

6. The HKUST School of Science Research Award, 2015.

7. The Croucher Postdoc Fellowship at MIT, 2009-2011.

8. The Anthony Houghton Award for Theoretical Physics, Brown University, 2008.

Full Publication List:

Publications (2024)

1. "Ginzburg-Landau Theory of Flat-Band Superconductors with Quantum Metric"
Shuai A. Chen and **K. T. Law***, Phys. Rev. Lett. 132, 026002 (2024).

2. "Nonlinear transport and radio frequency rectification in BiTeBr at room temperature"
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3. “Nonlinear optical diode effect in a magnetic Weyl semimetal”
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4. “Proximity-induced quasi-one-dimensional superconducting quantum anomalous Hall state”
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5. “3D Quantum Anomalous Hall Effect in Magnetic Topological Insulator Trilayers of Hundred-Nanometer Thickness”
Zhao, Yi-Fan; Zhang, Ruoxi; Sun, Zi-Ting; Zhou, Ling-Jie; Zhuo, Deyi; Yan, Zi-Jie; Yi, Hemian; Wang, Ke; Chan, Moses H. W.; Liu, Chao-Xing; **Law K.T.;** Chang, Cui-Zu*
Advanced Materials 36, 2310249 (2024).

6. “Experimental evidence for Berry curvature multipoles in antiferromagnets”
Soumya Sankar, Ruizi Liu, Xue-Jian Gao, Qi-Fang Li, Caiyun Chen, Cheng-Ping Zhang, Jiangchang Zheng, Yi-Hsin Lin, Kun Qian, Ruo-Peng Yu, Xu Zhang, Zi Yang Meng, **Kam Tuen Law**, Qiming Shao, Berthold Jäck
Phys. Rev. X 14, 021046 (2024).

7. “Anomalous h/2e periodicity and Majorana zero modes in chiral Josephson junctions”
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10. “Nematic Ising superconductivity with hidden magnetism in few-layer 6R-TaS2”
Shao-Bo Liu, Congkuan Tian, Yuqiang Fang, Hongtao Rong, Lu Cao, Xinjian Wei, Hang Cui, Mantang Chen, Di Chen, Yuanjun Song, Jian Cui, Jiankun Li, Shuyue Guan, Shuang Jia, Chaoyu Chen, Wen-Yu He, Fuqiang Huang, Yuhang Jiang, Jinhai Mao, X. C. Xie, and **Kam Tuen Law**, Jian-Hao Chen, Nature Communications 2024, In Press.

Publications (2023)

1. "Orbital Fulde-Ferrell pairing state in moiré Ising superconductors"
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2. "Josephson Diode Effect Induced by Valley Polarization in Twisted Bilayer Graphene"
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3. "Symmetry-broken Josephson junctions and superconducting diodes in magic-angle twisted bilayer graphene"
J Díez-Mérida, A Díez-Carlón, SY Yang, Y-M Xie, X-J Gao, J Senior, K Watanabe, T Taniguchi, X Lu, AP Higginbotham, **KT Law**, Dmitri K Efetov*
Nature Communications 14: 2396 (2023).

4. *"Spin–orbit–parity coupled superconductivity in atomically thin 2M-WS2"*
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, Jingyi Yan, Wei Zhao, Sarah J. Haigh, Xufeng Kou, Jinshan Yang*, Fuqiang Huang*, **K. T. Law***, Faxian Xiu* & Shaoming Dong
Nature Physics 19, 106 (2023).

5. "Axion Insulator State in Hundred-Nanometer-Thick Magnetic Topological Insulator Sandwich Heterostructures"
Deyi Zhuo, Zi-Jie Yan, Zi-Ting Sun, Ling-Jie Zhou, Yi-Fan Zhao, Ruoxi Zhang, Ruobing Mei, Hemian Yi, Ke Wang, Moses H. W. Chan, Chao-Xing Liu, **K. T. Law***, and Cui-Zu Chang*, *Nature Communications* 14: 7596 (2023).

6. "*Higher-order nonlinear anomalous Hall effects induced by Berry curvature multipoles*"
CP Zhang, XJ Gao, YM Xie, HC Po, ***KT Law****, Physical Review B 107, 115142 (2023).

7. "*Berry curvature, spin Hall effect, and nonlinear optical response in moiré transition metal dichalcogenide heterobilayers*"
Jin-Xin Hu, Ying-Ming Xie, ***KT Law****, Phys. Rev. B 107, 075424 (2023).

8. "Valley-Polarized State Induced phi_0-Josephson Junction in Twisted Bilayer Graphene"
Ying-Ming Xie, Dmitri K Efetov, ***KT Law****, Phys. Rev. Research 5, 023029 (2023).

9. "*Kramers nodal lines and Weyl fermions in SmAlSi*"
Yichen Zhang, Yuxiang Gao, Xue-Jian Gao, Shiming Lei, Zhuoliang Ni, Ji Seop Oh, Jianwei Huang, Ziqin Yue, Marta Zonno, Sergey Gorovikov, Makoto Hashimoto, Donghui Lu, Jonathan D Denlinger, Robert J Birgeneau, Junichiro Kono, Liang Wu, **Kam Tuen Law**, Emilia Morosan, Ming Yi
Communications Physics 6 : 134 (2023).

10. "*Giant nonlinear Hall effect in twisted bilayer WSe2*"
Meizhen Huang, Zefei Wu, Jinxin Hu, Xiangbin Cai, En Li, Liheng An, Xuemeng Feng, Ziqing Ye, Nian Lin, **Kam Tuen Law**, Ning Wang

National Science Review, 10, 4, nwac232 (2023).

11. "Visualizing the localized electrons of a kagome flat band"
Caiyun Chen, Jiangchang Zheng, Ruopeng Yu, Soumya Sankar, Kam Tuen Law, Hoi Chun Po, Berthold Jäck, Phys. Rev. Research 5, 043269 (2023).

Publications (2022)

1. "Valley Polarized Quantum Anomalous Hall State in Moiré MoTe2/WSe2 Heterobilayers"
Ying-Ming Xie, Cheng-Ping Zhang, Jin-Xin Hu, Kin Fai Mak, ***K. T. Law****, Phys. Rev. Lett. **128**, 026402 (2022).

2. "Giant nonlinear Hall effect in strained twisted bilayer graphene"
Cheng-Ping Zhang, Jiewen Xiao, Benjamin T. Zhou, Jin-Xin Hu, Ying-Ming Xie, Binghai Yan*, and ***K. T. Law****, Phys. Rev. B 106, L041111 (2022).

3. *"Topological superconductivity in multifold fermion metals"*
Zhe Shen Gao , Xue-Jian Gao , Wen-Yu He , Xiao Yan Xu , T.K. Ng and ***K.T. Law****, Quantum Frontiers https://doi.org/10.1007/s44214-022-00001-1 (2022).

4. "Giant nonlinear Hall effect in twisted bilayer WSe2"
Meizhen Huang, Zefei Wu, Jinxin Hu, Xiangbin Cai, En Li, Liheng An, Xuemeng Feng, Ziqing Ye, Nian Lin, ***Kam Tuen Law***, Ning Wang
National Science Review, nwac232, https://doi.org/10.1093/nsr/nwac232

5. "Nonlinear Hall effects in strained twisted bilayer WSe2"
JX Hu, CP Zhang, YM Xie, ***KT Law****
Communications Physics 5: 255 (2022).

Publication (2021)

1. "*Superconducting orbital magnetoelectric effect and its evolution across the superconductor-normal metal phase transition"*
WY He*, **KT Law*** Physical Review Research 3, L032012 (2021)

2. *Lattice reconstruction induced multiple ultra-flat bands in twisted bilayer WSe2*
En Li, Jin-Xin Hu, Xuemeng Feng, Zishu Zhou, Liheng An, **K. T. Law***, Ning Wang*, Nian Lin*
Nature Communications 12, 5601 (2021).

3. Kramers Nodal Line Metals
Ying-Ming Xie, Xue-Jian Gao, Xiao Yan Xu, Cheng-Ping Zhang, Jin-Xin Hu, Jason Gao, **K. T. Law***, Nature Communications, **12** 3064 (2021).

4. "*Topological superconductivity in EuS/Au/superconductor heterostructures*"
Y.M. Xie, **K.T. Law**, PA Lee* Physical Review Research 3, 043086 (2021).

5. “Kramers Weyl Semimetals as Quantum Solenoids and Their Applications in Spin-Orbit Torque Devices” Wen-Yu He, Xiao Yan Xu, **K. T. Law***, Communications Physics 4, 66 (2021).

Publication (2020)

1. Spin-orbit-parity coupled superconductivity in topological monolayer WTe2

Yingming Xie, Benjamin Tong Zhou, **K. T. Law***, Phys. Rev. Lett. 125, 107001 (2020).

2. “Giant Orbital Magneto-electric effect and Current-driven Magnetization Switching in Twisted Bilayer Graphene”
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4. “Spectroscopic Fingerprint of Chiral Majorana Modes at the Edge of a Quantum Anomalous Hall Insulator / Superconductor Heterostructure”

J. Shen, J. Lyu, J. Gao, Y. Xie, C. Chen, C. Cho, O. Atanov, Z. Chen, K. Liu, Y. J. Hu, K. Y. Yip, S. K. Goh, Q. L. He, L. Pan, K. L. Wang*, **K. T. Law***, R. Lortz*, PNAS, **117**, 238 (2020).

5. “*Signature of a pair of Majorana zero modes in superconducting gold surface states*”
S. Manna, P. Wei, Y. Xie, **K. T. Law**, P. A. Lee, J. S. Moodera, PNAS, **117** 8775 (2020).

6. “*Highly Tunable Nonlinear Hall Effects Induced by Spin-Orbit Couplings in Strained Polar Transition-Metal Dichalcogenides*”
Benjamin T. Zhou, Cheng-Ping Zhang, and **K.T. Law*,** Phys. Rev. Applied **13**, 024053 (2020).

7. “Magnetoelectric effects in gyrotropic superconductors”
Wenyu He and **K.T. Law***, Physical Review Research **2**, 012073 (2020).

8. “Strongly enlarged topological regime and enhanced superconducting gap in nanowires coupled to Ising superconductors”
Y Xie, Benjamin T Zhou, T. K Ng and **K.T. Law***, Physical Review Research **2**, 013026 (2020).

Publications (2019)

1. "*Pair Density Wave in the Doped t-J Model with Ring Exchange on a Triangular Lattice*" Xiao Yan Xu*, **K. T. Law***, Patrick A. Lee*, Phys. Rev. Lett. **122**, 167001 (2019).

2. "*Spin-orbit coupling induced valley Hall effects in transition-metal dichalcogenides*" Benjamin T. Zhou, Katsuhisa Taguchi, Yuki Kawaguchi, Yukio Tanaka, **K. T. Law***, Communications Physics, 2: 26 (2019).

3. "*Transport evidence of asymmetric spin-orbit coupling in few−layer superconducting 1Td−MoTe*"
J. Cui, P. Li, J. Zhou, W.Y. He, X. Huang, J. Yi, J. Fan, Z. Ji, X. Jing, F. Qu, Z. Cheng, C. Yang, L. Lu, K. Suenaga, J. Liu, **K. T. Law**, J. Lin, Z. Liu, G. Liu*, Nature Communications 10: 2044 (2019).

4. "*Proximity-induced surface superconductivity in Dirac semimetal Cd3As2*"
C. Huang, Benjamin T. Zhou, H. Zhang, B. Yang, R. Liu, H. Wang, Y. Wan, K.Huang, Z. Liao, E. Zhang, S. Liu, Q. Deng, Y. Chen, X. Han, J. Zou, X. Lin, Z. Han , Y. Wang, **K. T. Law** & Faxian Xiu*, Nature Communications **10:** 2217 (2019).

5. *"Intrinsic valley Hall transport in atomically thin MoS2"*
Zefei Wu, Benjamin T. Zhou, Gui-Bin Liu, Jiangxiazi Lin, Tianyi Han, Liheng An, Yuanwei Wang, Shuigang Xu, Gen Long, Chun Cheng, ***K. T. Law***, Fan Zhang, Ning Wang*, Nature Communications, **10**: 611 (2019).

6. *"Disorder induced multifractal superconductivity in monolayer niobium dichalcogenides"*
K. Zhao, H. Lin, X. Xiao, W. Huang, W. Yao, M. Yan, Y. Xing, Q. Zhang, Z. Li, S. Hoshino, J. Wang, S. Zhou, L. Gu, M. Bahramy, H. Yao, N. Nagaosa, Q. K. Xue, **K. T. Law**, X. Chen*, S.H. Ji*, Nature Physics **15**, 904 (2019) (Selected as the cover page).

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1. "*An unusual continuous paramagnetic-limited superconducting phase transition in 2D NbSe2"*
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3. "*Magnetic Field Driven Nodal Topological Superconductivity in Monolayer Transition Metal Dichalcogenides*"
Wen-Yu He, Benjamin T. Zhou, James J. He, Noah F. Q. Yuan, Ting Zhang, ***K. T. Law****, Communications Physics, 1, 40 (2018).

4. *"Topological transitions induced by antiferromagnetism in a thin-film topological insulator"*

Q. L. He, G. Yin, L. Yu, A. Grutter, L. Pan, C. Chen, X. Che, G. Yu, B. Zhang, Q. Shao, A. Stern, B. Casas, J. Xia, X. Han, B. J. Kirby, R. Lake, ***K. T. Law***, and Kang L. Wang*, Phys. Rev. Lett. **121**, 096802 (2018).

5.*"Kekulé valence bond order in an extended Hubbard model on the honeycomb lattice with possible applications to twisted bilayer graphene"*
Xiao Yan Xu, ***K. T. Law***, and Patrick A. Lee*, Phys. Rev. B **98**, 121406 Rapid Communications and Editors' Suggestion (2018).

6.*"Asymmetric Josephson effect in inversion symmetry breaking topological materials"*
Chui-Zhen Chen, James J. He, Mazhar N Ali, Gil-Ho Lee, Kin Chung Fong and ***K. T. Law****, Phys. Rev. B **98**, 075430 (2018).

7. *"From nodal-ring topological superfluids to spiral Majorana modes in cold atomic systems"*
Wen-Yu He, Dong-Hui Xu, Benjamin T. Zhou, Q. Zhou and ***K. T. Law****, Phys. Rev. A **97**, 043618. (2018).

8. *"Quasi-one-dimensional quantum anomalous Hall systems as new platforms for scalable topological quantum computation"*
Chui-Zhen Chen, Ying-Ming Xie, Jie Liu, P. A. Lee, and ***K. T. Law****, Phys. Rev. B **97**, 104504. (2018).

9. *"Inducing Strong Superconductivity in WTe_2 by Proximity Effect"*
C Huang, N. Awadhesh, E. Zhang, Y. Liu, X. Yan, J. Wang, C. Zhang, W. Wang, Benjemin T. Zhou, C. Yi, S. Liu, J. Ling, H. Zhang, R. Liu, S. Raman, F. Chou, Y. Wang, Y. Shi, ***K. T. Law***, S. S., P. Zhou, Z. Han, Faxian Xiu*. ACS Nano. **12** 7185 (2018).

10. *"Valley Edelstein effect in monolayer transition-metal dichalcogenides"*
K. Taguchi, Benjamin T. Zhou, Y. Kawaguchi, Y. Tanaka, and ***K. T. Law***, Phys. Rev. B **98** 035435. (2018).

Publications (2017)

1. "*1T-TaS2 as a quantum spin liquid*"
K. T. Law and Patrick Lee*, PNAS, 114 6996-7000 (2017).

2. *"Weyl points and topological nodal superfluids in a face-centered-cubic optical lattice"*
L. J. Lang, S. L. Zhang, ***K. T. Law*** and Q. Zhou, Phys. Rev. B **96**, 035145. (2017).

3. *"Magnetoconductivity in Weyl semimetals: Effect of chemical potential and* temperature"
X. Xiao, ***K. T. Law*** and P. A. Lee*, Phy. Rev. B **96**, 165101. (2017).

4. *"Generating giant spin currents using nodal topological superconductors"*

Noah F. Q. Yuan, Y. Lu, James J. He and ***K. T. Law****, Phys. Rev. B **95**, 195102. (2017).

5. *"Origin of bias-independent conductance plateaus and zero-bias conductance peaks in $Bi_2Se_3/NbSe_2$ hybrid structures"*
H. Li, Benjemin T. Zhou, James J. He, H.W. Wang, H. Zhang, H.C. Liu, Y. Yi, C. Wu, ***K. T. Law****, H. He*, and J. Wang*, Phys. Rev. B **96**, 075107. (2017).

6. *"Nematic topological superconducting phase in Nb-doped Bi_2Se_3"*
Junying Shen, Wen-Yu He, Noah Fan Qi Yuan, Zengle Huang, Chang-woo Cho, Seng Huat Lee, Yew San Hor, ***K. T. Law*** and Rolf Lortz*, npj Quantum Materials, 2(1), 59. (2017).

7. *"Superconductivity-induced ferromagnetism and Weyl superconductivity in Nb-doped Bi_2Se_3"*
Noah F. Q. Yuan, Wen-Yu He, and ***K. T. Law****, Phys. Rev. B **95**, 201109. (2017).

8. *"Effects of domain walls in quantum anomalous Hall insulator/superconductor heterostructures"*
Chui-Zhen. Chen, James J. He, D. H. Xu, and ***K. T. Law****, Phys Rev B **96**, 041118. (2017).

Publications (2016)

1. "*Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides*"
Benjamin T. Zhou, Noah F.Q. Yuan, Hong-Liang Jiang, ***K. T. Law****
Phys. Rev. B **93**, 180501 (2016), Rapid Communications and Editors' Suggestions.

2. "*Evidence of Ising Pairing in Superconducting Monolayer NbSe2*"
X. Xi, Z. Wang, W. Zhou, J. Park, ***K. T. Law***, H. Berger, L. Forró, J. Shan, and K. F. Mak*, Nature Physics **12**, 139 (2016).

3. *"Pseudogap and proximity effect in the $Bi_2Te_3/Fe_{1+y}Te$ interfacial superconductor"*
M. Q. He, J. Y. Shen, A. P. Petrović, Q. L. He, H. C. Liu, Y. Zheng, C. H. Wong, Q. H. Chen, J. N. Wang, ***K. T. Law***. and I. K. Sou*, Scientific reports, 6, 32508. (2016).

4. *"Photovoltaic anomalous Hall effect in line-node semimetals"*
Katsuhisa Taguchi, Dong-Hui Xu, Ai Yamakage and ***K. T. Law***, Phys. Rev. B **94**, 155206 (2016).

5. *"Chiral Topological Orders in an Optical Raman Lattice"*
Xiong-Jun Liu*, Zheng-Xin Liu, ***K. T. Law***, W. Vincent Liu, T. K. Ng, New J. Phys. **18**, 035004 (2016).

6. "*A New Platform for Engineering Topological Superconductors: Superlattices on Rashba Superconductors*"

Yao Lu, Wen-Yu He, Dong-Hui Xu, Nian Lin and ***K. T. Law****, Phys. Rev. B **94**, 024507 (2016).

7. *"Ising Superconductivity in Transition Metal Dichalcogenides"*
Noah F.Q. Yuan, Benjamin T. Zhou, Wen-Yu He and ***K. T. Law****, invited paper at Association of Asia Pacific Physical Societies Bulletin, June 2016.

8. "*The Realization and Dectection of Weyl Semimetals in Cold Atomic Systems*"
Wen-Yu He, Shizhong Zhang, ***K. T. Law****, Phys. Rev. A **94**, 013606 (2016).

Publications (2015)

1. "*Two Dimensional Ising Superconductivity in Gated MoS2*"
J. M. Lu, O. Zeliuk, I. Leermarker, Noah F. Q. Yuan, U. Zeitler, ***K. T. Law*** and J. T. Ye*, Science **350**, 1353 (2015).

Publications (2014)

1. "*Possible Topological Superconducting Phases of MoS_2*"
Noah F. Q. Yuan, Kin Fai Mak, ***K. T. Law****, Phys. Rev. Lett.**113**, 097001 (2014).

2. "*Majorana induced Selective Equal Spin Andreev Reflections*"
James Jun He, T. K. Ng, Patrick A Lee and ***K. T. Law****, Phys. Rev. Lett.**112** 037001(2014).

3. "*Correlated spin currents generated by resonant-crossed Andreev reflections in topological superconductors*"
James Jun He, Jiansheng Wu, Ting-Pong Choy, Xiong-Jun Liu, Y. Tanaka, ***K. T. Law****, Nature Communications **5**:3232 (2014).
[Some of our predictions have been verified experimentally by Rolf Lortz's group at HKUST.]

4. "*Non-Abelian Majorana Doublets in Time-Reversal Invariant Topological Superconductor*"
Xiong-Jun Liu*, Chris L. M. Wong and ***K. T. Law****, Phys. Rev. X **4**, 021018 (2014).

5. "*Realization of 2D Spin-orbit Interaction and Exotic Topological Orders in Cold Atoms*"
Xiong-Jun Liu, ***K. T. Law***, T. K. Ng, Phys. Rev. Lett. **112**, 086401 (2014).

6. "*Two-dimensional superconductivity at the interface of a Bi2Te3/FeTe heterostructure*"
Q. He, H. Liu, M. He, Y. Lai, H. He, G. Wang, ***K. T. Law***, R. Lortz, J. Wang, I. K.Sou, Nature Communications **5**:4247 (2014).

7. "*Majorana Zero Modes Protected by Lattice Symmetry*"
Xiong-Jun Liu*, James J. He and ***K. T. Law,*** Phys. Rev. B **90**, 235141 (2014).

8. "*Spontaneous vortex dynamics in superconducting FeTe thin films*"
H. He, G. Wang, H. Liu, T. Zhang, ***K. T. Law***, I. K. Sou, and J.N. Wang, Solid State Communications, **195** 35 (2014).

Publications (2013)

1. "*Detecting Topological Orders in Cold Atoms*"
Xiong-Jun Liu, ***K. T. Law***, T. K. Ng and Patrick A. Lee, Phys. Rev. Lett. **111** 120402 (2013).

2. "*Majorana Flat Bands and Uni-directional Majorana Edge States in Gapless Topological Superconductors*"
Chris L. M. Wong, Jie Liu, ***K. T. Law****, P. A. Lee*, Phys. Rev. B **88**, 060504 (Rapid Communication) (2013).

3. "*Majorana Fermion Induced Non-local Current Correlations in Spin-orbit Coupled Superconducting Wires*"
Jie Liu, F-C Zhang and ***K. T. Law****, Phy.Rev. B **88** 064509 (2013).

4. "*Probing Majorana Flat Bands in Nodal $ d_ {x^ 2-y^ 2} $-wave Superconductors with Rashba Spin-Orbit Coupling*"
Noah F. Q. Yuan, Chris L. M. Wong and ***K. T. Law****, Invited article at Physica E **55** 30-36, (2013).

5. "*Thermal coherence properties of topological insulator slabs in time-reversal symmetry breaking fields*"
X. Xiao, S. Li, ***K.T. Law***, B. Hou, C.T. Chan and W. Wen, Phys. Rev. B **87** 205424 (2013).

6. "*Negative Quantum Capacitance Induced by Midgap States in Single-layer Graphene*"
L. Wang, Y. Wang, X. Chen, W. Zhu, C. Zhu, Z. Wu, Y. Han, M. Zhang, W. Li, Y. He, W. Xiong, ***K. T. Law***, D. Su and Ning Wang*, Scientific Report **3**, article number 2041, (2013).

7. "*Surface Reactivity Enhancement on a Pd/Bi2Te3 Heterostructure through Robust Topological Surface States*"
Q. L. He, Y. H. Lai, Yao Lu, ***K. T. Law*** and I. K. Sou*, Scientific Report **3**, article number 2497 (2013).

Publications (2012)

1. "*Zero-bias peaks in spin-orbit coupled superconducting wires with and without Majorana end-states*"

Jie Liu, A.C. Potter, ***K. T. Law*** and P.A. Lee*, Phys. Rev. Lett. **109**, 267002 (2012).

2. "*Majorana Kramers Doublets in $d_{x^2-y^2}$-wave Superconductors with Rashba Spin-Orbit Coupling*"
Chris L. M. Wong and ***K. T. Law****, Phys. Rev. B **86**, 184516 (2012).

Publications (2011)

1. "*Robustness of fractional Josephson effect in multi-channel superconducting wires*"
K. T. Law and P.A. Lee, Phys. Rev. B (Rapid Communication) **84**, 081304 (2011).

Publications (2010)

2. "*Quantum Dot in a Two-dimensional Topological Insulator: The Two-channel Kondo Fixed Point*"
K. T. Law, C. Y. Seng, P. A. Lee, and T. K. Ng, Phys. Rev. B (Rapid Communications) **81**, 041305 (2010).

Publications (2009)

1. "*Majorana Fermion Induced Resonant Andreev Reflection*"
K. T. Law, Patrick A. Lee, and T. K. Ng, Phys. Rev. Lett.**103**, 237001 (2009).

Publications (2008)

1. "*Quantum Phase Transition Between a Luttinger Liquid and a Gas of Cold Molecules*"
K. T. Law and D. E. Feldman, Phys. Rev. Lett. **101**, 096401 (2008).

2. "*Probing Non-Abelian Statistics in v=12/5 Quantum Hall State*"
K. T. Law*, Phys. Rev. B **77**, 205310 (2008).

Publications (2007)

1. "*Shot Noise in an Anyonic Mach-ZehnderInterferometer*"
D. E. Feldman, Y. Gefen, A. Kitaev, ***K. T. Law***, and A. Stern, Phys. Rev. B **76**, 085333 (2007).

Publications (2006)

1. "*Electronic Mach-ZehnderInterferometer as a Tool to Probe Fractional Statistics*"
K. T. Law, D. E. Feldman, and Y. Gefen, Phys. Rev. B **74**, 045319 (2006).

<u>Research grants received as Principal Investigator (PI) or Principle Coordinator (PC) for collaborative grants:</u>

PI of eleven Early Career Scheme and General Research Fund projects (*Total: HK$7,645,685****):***

2012-2017	"*Search for DIII class Topological Superconductors and Majorana Fermions*" Hong Kong RGC **Early Career Scheme** *No. 605512* (HK$1,000,833).
2013-2016	"*Majorana Flat Bands in Nodal Topological Superconductors"* Hong Kong RGC **GRF** Grant *No. 602813* (HK$592,987).
2014-2017	"*Spintronic Applications of Gapped and Nodal Topological Phases*" Hong Kong RGC **GRF** Grant *No.16303014* (HK$614,810).
2016-2019	"*Study of Ising Superconductivity in Transition Metal Dichalcogenides*" Hong Kong RGC **GRF** Grant *No.16324216* (HK$488,501).
2018-2020	"*Majorana Fermions and Unconventional Superconductivity in Multilayer Transition Metal Dichalcogenides*" Hong Kong RGC **GRF** Grant *No. 16307117* (HK$314,900).
2019-2021	"*Novel Phases in 2H and 1T-structure Monolayer Transition Metal Dichalcogenides*" Hong Kong RGC **GRF** Grant *No.16309718* (HK$456,452).
2020-2022	"*Superconductivity and Nonlinear Hall Effects in Transition Metal Dichalcogenides"* Hong Kong RGC **GRF** Grant *No. 16310219* (HK$502,444.00).
2021-2023	"*Magnetoelectric effects of graphene and transition metal dichalcogenides based Moire superlattices"* Hong Kong RGC **GRF** Grant *No. 16310520* (HK$811,577).
2022-2023	"*The study of superconductor/correlated insulator junctions in moiré materials"* Hong Kong RGC **GRF** Grant *No.* 16307622 (HK$783,000).
2023-2024	"*Josephson diode effect and other novel superconducting phenomena in two-dimensional superconductors"* Hong Kong RGC **GRF** Grant *No.* 16309223 (HK$1,169,439).
2024-2025	"The study of quantum metric effects on flat band superconductors" Hong Kong RGC **GRF** Grant *No.* 16311424 (HK$910,742).

Project Coordinator (PC) of four Collaborative Research Fund Projects (*Total:HK$26,155,352****) :***

2014-2017	"*New Topological States in Cold Atom and Condensed Matter Physics Systems*" **Collaborative Research Fund** CRF3/HKUST/13G (Principle Coordinator of the project. Total amount of HK$ 6,722,200).
2017-2020	"*Study of Topological Phases in Condensed Matter and Cold Atom Systems*" **Collaborative Research Fund** C6026-16W (Principle Coordinator of the project, total funding amount: HKD $6,053,400).
2020-2023	"*Study of topological and unconventional superconductors"* **Collaborative Research Fund** C6025-19G (Principle Coordinator of the project, total funding amount: HKD $5,946,472).
2024-2027	"*Study of Topological and Strongly Correlated Materials"* **Collaborative Research Fund** C6053-23G (Principle Coordinator of the project, total funding amount: HKD $7,433,280).

Awards and Fellowships (*Total: HK$8,105,380****):***

2015-2020	"*Study of Topological Matter*" **Croucher Innovation Award** (HK$2,500,000).
2015-2020	"*Conference Series on Condensed Matter and Cold Atom Physics*" **Croucher Innovation Award** (HK$ 450,000).
2021-2025	"*Study of Quantum Materials"* **Hong Kong RGC Research Fellowship** (HK$5,155,380).

Summary: The total external funding acquired as a PI/PC is **HK$41,906,417** (approximately US$5.37M).

Other major grants acquired as Co-PI (Total: HK$6,282,698**)**

2020-2025	"*Research on exotic properties of twisted graphene and other Moire super-lattice materials"* **Ministry of Science and Technology Grant**, MOST20SC04 (HK$1,881,682.09).
2021-2029	"*2D Materials Research: Fundamentals Towards Emerging Technologies*"

Area of Excellence AoE/P-701/20-2 (HK$2,533,600).

2022-2026 "*Applications, Control and Design of Topological Magnetic Materials"*
Guangdong Science and Technology Grant GDST23SC02 (HK$567,415.95).

2024-2028 "Localized Electronic Structure in Hybrid Quantum Anomalous Hall Insulator Nanostructure/Superconductor Devices"
Ministry of Science and Technology Grant, MOST23SC01 (HK$1,300,000).

PhD students trained or being trained:

PhD students graduated (13 in total):

09/2012-2017 James Jun HE
After graduation, James joined RIKEN, Japan and worked with Prof. Naoto Nagaosa as a postdoc fellow. He is now a special researcher at the University of Science and Technology, China.

09/2012-2017 Noah Fan Qi YUAN
After graduation, Noah joined MIT and worked with Prof. Liang Fu as a postdoc fellow. He is now a professor at the TD Lee Institute of Shanghai Jiaotong University.

07/2013-2018 Yao LU
After graduation, Yao joined the University of Jyvaskyla, Finland and worked with Prof. Heikkila.

09/2013-2018 Benjamin Tong ZHOU
After graduation, Benjamin stayed in my group until 2020. He was awarded the Hong Kong RGC postdoc fellowhip, the Postdoc Fellowship of the Quantum Institute of the University of British Columbia (UBC), and the Croucher Postdoc Fellowship. He is now a Croucher Postdoc Fellow at UBC.

09/2013-2018 Wen-Yu HE
After graduation, Wenyu stayed in my group until 2020. He moved to MIT and worked with Prof. Patrick Lee as a postdoctoral fellow. He is now a Professor at Shanghai Tech University.

06/2014-2018 Zewei CHEN (Co-advise with Prof. Tai Kai Ng)

After graduation, Zewei joined Huawei.

06/2014-2018 Xiaohui LI (Co-advise with Prof. Tai Kai Ng)

After graduation, Xiaohui joined Huawei.

06/2014-2018 Wai Pang SZE (Co-advise with Prof. Tai Kai Ng)

After graduation, Wai Pang joined a high-tech start-up company.

09/2016-2021 Yingming XIE
After graduation, Yingming was awarded the highly selective Hong Kong RGG postdoctoral fellowship. He is also awarded the prestigious "Special Postdoctoral Researchers" Fellowship from RIKEN, Japan. He is now working with Prof. Naoto Nagaosa.

09/2016-2021 Jason Zheshen GAO
After graduation, Jason moved to Germany.

09/2017-2022 Chengping ZHANG
After graduation, Chengping stayed in my group as a postdoc.

09/2017-2022 Xuejian GAO
After graduation, Xuejian moved to Huawei.

01/2019-2023 Jinxin Hu
After graduation, Jinxin moved to Nanyang University of Technology as a postdoc.

PhD students being trained (9 in total):

08/2020-present Ziting Sun
08/2020-present Ruopeng Yu
08/2022-present Zhong-Changfei Li
08/2022-present Xingyao Guo
08/2022-present Xinglei Ma
08/2022-present Yuxian Duan
08/2022-present Zehan Chen (co-supervise with Prof. Qiming Shao)
01/2024-present Zixuan Yang
01/2024-present Tian Xiang

Training of postdocs:

Dr. Jie Liu
Currently a faculty member of Xi'an Jiaotong University

Dr. Jiansheng Wu
Currently a faculty member of South University of Science and Technology

Dr. Xiongjun Liu

Currently a faculty member of Peking University

Dr. Xiao Xiao
Currently a postdoc at North Carolina State University

Dr. Donghui Xu
Currently a faculty member of Chongqing University

Dr. Chui-Zhen Chen
Currently a faculty member of SooChow University

Dr. Xiaoyuan Xu
Currently a faculty member at the Shanghai Jiaotong University.

Dr. Yan-Bin Yang
Currently a postdoc fellow at Tsinghua University.

Dr. Shuai Chen
2021- present

Dr. Xilin Feng
2023- present

Dr. Xuzhe Ying
2023 - present

International Conferences/Workshops organized at HKUST:

1. Local Organizing Committee Member of IAS workshop on "Topological Materials and Strong Correlated Electronic Systems", HKUST, Hong Kong December 2, 2012 to January 31, 2013.

http://iasprogram.ust.hk/201301/index.html

2. Co-chair of "IAS Workshop on Topological matter, superconductivity and Majorana", HKUST, Hong Kong, January 2014.

http://iasprogram.ust.hk/201401/tmsm/

3. Co-chair of "Croucher Conference and IAS Program on Topological Phases in Condensed Matter and Cold Atomic Systems", HKUST, Hong Kong, December 2015.

http://iasprogram.ust.hk/201512cmcas/

4. Vice Chair of "Gordon Research Conference on Topological and Correlated Matters", HKUST, Hong Kong, June 2017.

https://www.grc.org/topological-and-correlated-matter-conference/2017/

5. Co-Chair of "Croucher Conference and IAS Program on Topological Phases and Topological Quantum Computation", HKUST, Hong Kong, December 2017.

http://ias.ust.hk/events/201712topo/

6. Co-Chair of "Gordon Research Conference on Topological and Correlated Matters", HKUST, Hong Kong, June 2019.

https://www.grc.org/topological-and-correlated-matter-conference/2019/

Invited talks and invited lectures at international conferences or workshops:

1. "*Robustness of Majorana Fermion induced Fractional Josephson Effect*" "Quantum Condensation 2011 (QC11) Workshop & Summer School", Hong Kong University of Science and Technology, Hong Kong, June, 2011.

2. Invited lectures on "*Majorana Fermions in Topological Superconductors*", National Center of Theoretical Sciences, Taiwan, December, 2011.

3. "*Realizing DIII class Topological Superconductors using d-wave superconductors*", RIKEN-APW-APCTP Joint Workshop, "Recent Trends in Condensed Matter Physics", RIKEN, Japan, January, 2012.

4. "*Majorana Fermions in DIII class Topological Superconductors"*, "Hangzhou Workshop on Quantum Matter", Zhejiang University, Zhejiang China, April 2012.

5. "*Majorana Flat Bands in Nodal Topological Superconductors*", "Beijing Forum", Xi'an, China, June 2012.

6. "*Majorana Fermions in Gapped and Gapless Topological Superconductors*", "Confirmation Workshop Majorana Fermions in Condensed Matter", Leiden University, Leiden, Netherlands, July 2012.

7. "*Majorana Flat Bands in Nodal Topological Superconductors*", "Quantum Condensation 2012 (QC12) Workshop & Summer School", Pohang, South Korea. August 2012.

8. "*Majorana Fermion induced Crossed Andreev reflections*", "IAS-Asia Pacific Workshop", HKUST, Hong Kong, December 2012.

9. "*Majorana Fermions in Gapped and Nodal Topological Superconductors*", "Majoranas in Solid State Workshop", ICQM, Beijing University, Beijing, China, June 2013.

10. "*BDI Class Topological Superconductors as Cooper pair splitters*", "12th International Conference on Condensed Matter Theory and Computational Materials Science" Guangzhou, China, August, 2013.

11. "*BDI Class Topological Superconductors as Cooper pair splitters*", National Center of Theoretical Sciences, Taiwan, August, 2013.

12. Invited lecture: "*BDI Class Topological Superconductors as Cooper pair splitters*", "International Workshop for Young Researchers on Topological Quantum Phenomena", Okinawa, Japan, October 2013.

13. "*Spintronic applications of Majorana Fermions*", RIKEN-APW-APCTP Joint Workshop, RIKEN, Japan, January, 2014.

14. "*Majorana fermion induced Selective Equal Spin Andreev Reflections*", The 8th Joint Meeting of Chinese Physicists Worldwide (OCPA8), Singapore, June, 2014.

15. "*The search of new topological superconductors*", **Toyota Seminar of Nagoya University**, Nagoya, Japan, December, 2014.

16. **Four Invited Lectures** on "*The search for Majorana fermions in condensed matter systems*", POSTECH, Pohang, South Korea, February, 2015.

17. "*The search of new topological superconductors",* 2015 Winter SRC Workshop*,* Pohang, South Korea, February, 2015.

18. "*Possible Topological Superconducting Phases of MoS_2*", **APS March Meeting Invited Talk**, San Antonio, US, March, 2015.

19. "*Majorana Fermion induced Andreev Reflections*", University of Chicago Centre in Hong Kong Workshop, Hong Kong, China, March 2015.

20. "*Majorana Fermion induced Andreev Reflections*", Asia Pacific Workshop 2015, Hangzhou, China, April 2015.

21. "Topological superconductivity and Ising superconductivity in MoS2", Beijing Forum of High Temperature Superconductors, Chengdu, China, June 2015.

22. "Majorana Induced Equal Spin Andreev Reflections in Fully Gapped and Weyl Topological Superconductors", Gordon Research Conference, Hong Kong, China, July 2015.

23. "Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides", Asia-Pacific Workshop, RIKEN, Japan, January 2016.

24. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, KITPC/PKU Conference, Beijing, China, August 2016.

25. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Majorana Zero Modes in Nanowires, Maryland, US, October 2016.

26. “Domain Wall Effects in Quantum Anomalous Hall/Superconductor Heterostructures”, KITS 2017 Forum, Beijing, China, March, 2017.

27. “Ising Superconductivity and Quantum Spin Liquid in Transition Metal Dichalcogenides” **Keynote talk at OCPA9**, Overseas Chinese Physics Association, Beijing, China, July 2017.

28. “Quasi-1D Quantum Anomalous Hall Systems as New Platforms for Scalable Topological”, Yukawa Institute of Theoretical Physics, Kyoto University, Kyoto, Japan, October 2017.

29. “Quantum Anomalous Hall systems as new platforms for scalable quantum computation” CEMS-Tsinghua-APW Workshop, RIKEN, Japan, December 2017.

30. “Ising Superconductivity in Transition Metal Dichalcogenides”, **APS March Meeting invited talk**, Los Angeles, USA, March 2018.

31. “Giant Orbital Magneto-electric effect and Current-driven Magnetization Switching in Twisted Bilayer Graphene” CEMS-Tsinghua-APW Workshop, Tsinghua University, Beijing China, December 2019.

32. “Spectroscopic fingerprint of chiral Majorana modes at the edge of a quantum anomalous Hall insulator/superconductor heterostructure” Topological Quantum Computation Workshop, South University of Science and Technology, Shenzhen, China, December 2019.

33. “Theory of Current-induced Magnetization Switching in Twisted Bilayer Graphene” **APS March Meeting invited talk**. Denver Colorado, USA March 2020. [Conference Cancelled].

34. “Giant Orbital Magneto-electric effect and Current-driven Magnetization Switching in Twisted Bilayer Graphene” CEMS-Tsinghua-APW Workshop, RIKEN, Tokyo Japan, September 2020 (online workshop).

35. “Giant magneto-electric effects and current induced magnetic switching in twisted bilayer graphene, and spin-orbit-parity coupled superconductivity in 1T’-WTe2”, APCTP-KIAS Quantum Materials Symposium, Feb 2021, Korea (online).

36. “Superconductivity and topological phases in two-dimensional materials” **MRS Spring Meeting invited talk**, April 2021, US (online).

37. “Time-reversal symmetry breaking correlated phases in moiré materials”
Asia-Pacific Workshop 2021, Japan (online).

38. “Valley polarized topological correlated phases in moiré materials”
Youth Forum on Quantum Magnetism, January 2022, Mainland (online)

39. “Interaction-driven quantum anomalous Hall phases in moiré materials”
Center for Artificial Low Dimensional Electronic Systems, Institute for Basic Science (POSTECH Campus), May 2022, Korea (online).

40. “Interaction-driven quantum anomalous Hall phases in moiré materials”
Asia Pacific Physics Conference 15, July 2022, Korea (online)

41. “Interaction-driven quantum anomalous Hall states in moiré materials”
18th-Low-Temperature-Meeting July, 2022 (online).

42. “Interaction-driven quantum anomalous Hall states in moiré materials”
Keynote talk at Kavli Institute Workshop on Magnetism, Superconductivity, Topology, August 2022 Dongguan, China (online).

43. “Interaction-driven Quantum Anomalous Hall States and Unconventional Josephson Junctions in Moiré Materials”
Hong Kong Forum, December 2022, Hong Kong SAR, China.

44. “Interaction-driven quantum anomalous Hall state, Josephson diode effect and flat band superconductivity with quantum metric in moiré materials”
Quantum liquid crystal, August 2023, Sapporo, Japan.

45. “Josephson diode effect and flat band superconductivity with quantum metric in moiré materials”
KIAS-IBS-PCS-workshop, December 2023, Seoul, Korea.

46. “Quantum Anomalous Hall Insulators as Majorana platforms”
International Conference of Topological Materials and Quantum Anomalous Hall State, December 2023, Shenzhen, China.

47. “From Ising superconductors to Spin-orbit-parity coupled superconductors in transition metal dichalcogenides”, International conference on transition metal dichalcogenides, May 20, 2024, Polytechnic University, Hong Kong, China.

48. “Flat band superconductors and Josephson diode effect”, PCS-IBS International Conference at Center for Theoretical Physics of Complex Systems, May 27, 2024, Daejeon, Korea.

49. “Quantum Metric Length in Flat band superconductors”, Workshop on Quantum Geometric Effects in Condensed Matter Physics, 26 June, 2024, Shenzhen, China.

50. “Flat band superconductors and Josephson diode effect”, **Plenary talk** at NCTS-RIKEN iTHEMS Workshop, Aug 26-29, National Taiwan University.

Invited talks and colloquiums at universities:

1. “*Majorana Fermions in Systems with Strong Spin-orbit Coupling*”, Hong Kong Chinese University, Hong Kong, September, 2011.

2. “*Majorana Flat Bands in Nodal Topological Superconductors*”, Renmin University, Beijing, China, May 2012.

3. “*Majorana Flat Bands in Nodal Topological Superconductors*”, Nagoya University, Nagoya, Japan, November 2012.

4. “*Majorana Fermions in Gapped and Nodal Topological Superconductors*”, Tsing-hua University, Beijing, China, May, 2013.

5. “*Majorana Fermions in Gapped and Nodal Topological Superconductors*”, Hong Kong Physics Society Annual Meeting, Hong Kong, China, July, 2013.

6. “*Majorana Fermion induced Equal Spin Andreev Reflections*”, ICQM, Peking University, Beijing, China, April 2014.

7. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Macau University, Macau, China, May 2016.

8. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Nagoya University, Nagoya, Japan, May 2016.

9. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, ICQM Peking University, Beijing, May 2016.

10. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Pennsylvania State University, College Station, June 2016.

11.“Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, UCLA, Los Angeles, US, July 2016.

12.“Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Donostia, Spain, September 2016 (contributed talk).

13. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Fudan University, Shanghai, China, October 2016.

14. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, MIT, Cambridge, Massachusetts, USA, November, 2016.

15. “Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides”, Brown University, Providence, Rhode Island, USA, November, 2016.

16. “Majorana fermions in transition metal dichalcogenides and QAH systems” **Colloquium**, Shanghai Jiaotong University, Shanghai, China, June 2017.

17. “Ising Superconductivity, Majorana Fermions and Spin Valley Hall Effects in Transition Metal Dichalcogenides” **Colloquium**, Tsinghua University, Beijing, January 2018.

18. “Current Induced Magnetization Switching in Twisted bilayer graphene and beyond” Kalvi Institute of Theoretical Sciences, Beijing, China, Online seminar. June 2018.

19. “Superconductivity and topological phases in two-dimensional materials”, St Andrews University, Scotland, August 2020 (online seminar).

20. “Time-reversal symmetry breaking correlated phases in moiré materials”, Renming University, July 2021 (online seminar).

21. “Flat band superconductors and Josephson diode effect”, **Colloquium** Peking University, May 15, 2024.

22. ““Flat band superconductors and Josephson diode effect”, Nanyang University of Technology, June 18, 2024.

Services:

A) Professional Services:

Referee for research journals. Some referee activities can be found at https://orcid.org/0000-0003-0501-6290 .

1. Nature,
2. Nature Physics,
3. Nature Materials
4. Nature Communications,
5. Nature Materials Reviews,
6. Nature Nanotechnologies
7. Science Advances,
8. Physical Review Letters,

9. Physical Review X,
10. Physical Review B,
11. European Physics Letters,
12. Physica E,
13. New Journal of Physics.

Referee for research funding agencies:
1. US Department of Energy,
2. US National Science Foundation Grant Proposals,
3. Israel Science Foundation,
4. Dutch Research Council,
5. Swiss National Science Foundation.
6. The French National Research Agency

B) Other Professional Services:
1. ***Founding President of the Hong Kong Young Academy of Sciences (YASHK).*** More information about YASHK and activities organized can be found at https://yashk.org.hk

2. ***Chairperson of the CDC-HKEAA Committee on Physics*** (to oversee the high school physics curriculum development of Hong Kong, appointed by the Education Bureau), 2023-2025.

3. Member of Committee on Innovation, Technology and Re-industrialisation of Hong Kong (Chaired by the Financial Secretary of Hong Kong Government), 2021-2022.

4. Member of the Expert Panel on Designation of Designated Local Research Institutions (invited by the Secretary for Innovation, Technology and Industry), 2023-2024.

5. Member of the Advising Committee for 1st and 2nd City I&T Grand Challenge Hong Kong (城市創科大挑戰). The committee is chaired by the ITC Commissioner.