Noah Fan Qi Yuan

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**ACADEMIC POSITION**

Massachusetts Institute of Technology

• Postdoctoral Associate (2017-2020), advisor: Liang Fu

Harbin Institute of Technology (Shenzhen)

• Associate Professor (2021-)

**EDUCATION**

The Hong Kong University of Science and Technology, Hong Kong, China

• Doctor of Philosophy, Department of Physics (2012-2017), advisor: Kam Tuen Law

Wuhan University, Wuhan, China

• Bachelor of Science, Department of Physics (2008-2012)

**AWARDS AND HONORS**

The George K. Lee Foundation Scholarship, The George K. Lee Foundation, 2014.

The Research Excellence Award, School of Science, The Hong Kong University of Science and Technology, 2014.

**RESEARCH INTERESTS**

I’m mainly interested in unconventional superconductivity and two-dimensional materials. During my Ph. D. research, I studied topological superconductivity, Ising superconductivity and transition metal dichalcogenides. During my postdoctoral period, I focused on gapless superconductivity and moiré superlattices. Recently I’m interested in critical fields and critical currents of unconventional superconductors, finite-momentum Cooper pairs and two-dimensional superconductivity. Material wise, I’m interested in transition metal dichalcogenides and graphene systems.

**PUBLICATIONS**

**Selected Publications** (\* equal contribution, # co-corresponding author)

1. Banabir Pal, Anirban Chakraborty, Pranava K. Sivakumar, Margarita Davydova, Ajesh K. Gopi, Avanindra K. Pandeya, Jonas A. Krieger, Yang Zhang, Mihir Date, Sailong Ju, **Noah F. Q. Yuan**, Niels B.M. Schröter, Liang Fu, Stuart S.P. Parkin, *Josephson diode effect from Cooper pair momentum in a topological semimetal*, Nat. Phys. (2022). https://doi.org/10.1038/s41567-022-01699-5.
2. **Noah F. Q. Yuan#**, Liang Fu, *Supercurrent diode effect and finite momentum superconductivity*, Proceedings of the National Academy of Sciences **119** (15), e2119548119 (2022).
3. Taige Wang, **Noah F. Q. Yuan#**, and Liang Fu*,* *Moiré surface states and enhanced superconductivity in topological insulators*,Phys. Rev. X **11**, 021024 (2021).
4. Yuan Cao, Daniel Rodan-Legrain, Jeong Min Park, **Noah F. Q. Yuan**, Kenji Watanabe, Takashi Taniguchi, Rafael M. Fernandes, Liang Fu, Pablo Jarillo-Herrero, *Nematicity and Competing Orders in Superconducting Magic-Angle Graphene*, Science **372**, 264 (2021).
5. **Noah F. Q. Yuan\*#**, Liang Fu\*, *Topological metals and finite-momentum superconductors*, Proceedings of the National Academy of Sciences **118** (3), e2019063118 (2021).
6. L. Z. Deng, H. C. Wu, A. P. Litvinchuk, **Noah F. Q. Yuan**, J. J. Lee, R. Dahal, H. Berger, H. D. Yang, C. W. Chu, *Evidence for room-temperature skyrmion phase in Cu2OSeO3 driven by high pressure*, Proceedings of the National Academy of Sciences **117** (16), 8783 (2020).
7. **Noah F. Q. Yuan**, H. Isobe, and Liang Fu, *Magic of high-order van Hove singularity*, Nat. Commun. **10**, 5769 (2019).
8. Zhen Bi, **Noah F. Q. Yuan**, and Liang Fu, *Designing flat bands by strain*, Phys. Rev. B **100**, 035448 (2019), Editors' Suggestion.
9. **Noah F. Q. Yuan** and Liang Fu, *Model for the metal-insulator transition in graphene superlattices and beyond*, Phys. Rev. B **98**, 045103 (2018). Editors’ Suggestion & Featured in Physics.
10. M. Koshino, **Noah F. Q. Yuan**, T. Koretsune, M. Ochi, K. Kuroki, L. Fu, *Maximally-localized Wannier orbitals and the extended Hubbard model for the twisted bilayer graphene*, Phys. Rev. X **8**, 031087 (2018).
11. H. Isobe, **Noah F. Q. Yuan**, L. Fu, *Superconductivity and Charge Density Wave in Twisted Bilayer Graphene,* Phys. Rev. X **8**, 041041 (2018).
12. Tianyi Han, Junying Shen, **Noah F. Q. Yuan**, Jiangxiazi Lin, Zefei Wu, Yingying Wu, Shuigang Xu, Liheng An, Gen Long, Yuanwei Wang, Rolf Lortz, Ning Wang, *Investigation of the two-gap superconductivity in a few-layer NbSe2-graphene heterojunction*, Phys. Rev. B **97**,060505(R) (2018).
13. Chang-woo Cho, Jonathan Haiwei Yang, **Noah F. Q. Yuan**, Junying Shen, Thomas Wolf, and Rolf Lortz, *Thermodynamic Evidence for the Fulde-Ferrell-Larkin-Ovchinnikov State in the KFe2As2 Superconductor*, Phys. Rev. Lett*.* **119**, 217002 (2017).
14. **Noah F. Q. Yuan**, Wen-Yu He, K. T. Law, *Superconductivity-Induced Ferromagnetism and Weyl Superconductivity in Nb-doped Bi2Se3*, Phys. Rev. B**95**, 201109(R) (2017).
15. Benjamin T. Zhou, **Noah F. Q. Yuan**, Hong-Liang Jiang, and K. T. Law, *Ising Superconductivity and Majorana Fermions in Transition Metal Dichalcogenides*, Phys. Rev. B**93**, 180501(R) (2016). Editors’ Suggestion.
16. [J. M. Lu](http://arxiv.org/find/cond-mat/1/au:+Lu_J/0/1/0/all/0/1), [O. Zeliuk](http://arxiv.org/find/cond-mat/1/au:+Zeliuk_O/0/1/0/all/0/1), [I. Leermakers](http://arxiv.org/find/cond-mat/1/au:+Leermakers_I/0/1/0/all/0/1), [Noah F. Q. Yuan](http://arxiv.org/find/cond-mat/1/au:+Yuan_N/0/1/0/all/0/1), [U. Zeitler](http://arxiv.org/find/cond-mat/1/au:+Zeitler_U/0/1/0/all/0/1), [K. T. Law](http://arxiv.org/find/cond-mat/1/au:+Law_K/0/1/0/all/0/1), [J. T. Ye](http://arxiv.org/find/cond-mat/1/au:+Ye_J/0/1/0/all/0/1), *Evidence for two-dimensional Ising superconductivity in gated MoS2*, Science**350**, 1353 (2015).
17. [Noah F. Q. Yuan](http://arxiv.org/find/cond-mat/1/au:+Yuan_N/0/1/0/all/0/1), [Kin Fai Mak](http://arxiv.org/find/cond-mat/1/au:+Mak_K/0/1/0/all/0/1), and [K. T. Law](http://arxiv.org/find/cond-mat/1/au:+Law_K/0/1/0/all/0/1),*Possible Topological Superconducting Phases of MoS2*, Phys. Rev. Lett. **113**, 097001 (2014).

**Other Publications**

1. C. J. Trimble, M. T. Wei, **N. F. Q. Yuan**, S. S. Kalantre, P. Liu, H.-J. Han, M.-G. Han, Y. Zhu, J. J. Cha, L. Fu & J. R. Williams, *Josephson detection of time-reversal symmetry broken superconductivity in SnTe nanowires*, npj Quantum Materials **6**, 61 (2021).
2. Daniel A. Rhodes#, Apoorv Jindal, **Noah F. Q. Yuan**, Younghun Jung, Abhinandan Antony, Hua Wang, Bumho Kim, Yu-che Chiu, Takashi Taniguchi, Kenji Watanabe, Katayun Barmak, Luis Balicas, Cory R. Dean, Xiaofeng Qian, Liang Fu, Abhay N. Pasupathy#, and James Hone#, *Enhanced Superconductivity in Monolayer Td-MoTe2*,Nano Lett. **21**, 6, 2505–2511 (2021).
3. Yang Zhang\*, **Noah F. Q. Yuan**\* and Liang Fu, *Moiré quantum chemistry: charge transfer in transition metal dichalcogenide superlattices*, Phys. Rev. B **102**, 201115(R) (2020).
4. **Noah F. Q. Yuan** and Liang Fu, *Classification of Critical Points in Energy Bands Based on Topology, Scaling and Symmetry*, Phys. Rev. B **101**, 125120 (2020).
5. B. Q. Lv, Z.-L. Feng, J.-Z. Zhao, Noah F. Q. Yuan, A. Zong, K. F. Luo, R. Yu, Y.-B. Huang, V. N. Strocov, A. Chikina, A. A. Soluyanov, N. Gedik, Y.-G. Shi, T. Qian, and H. Ding, *Observation of multiple types of topological fermions in PdBiSe*, Phys. Rev. B **99**, 241104(R) (2019).
6. **Noah F. Q. Yuan** and Liang Fu, *Zeeman-induced gapless superconductivity with a partial Fermi surface*, Phys. Rev. B **97**, 115139 (2018).
7. [Wen-Yu He](http://arxiv.org/find/cond-mat/1/au:+He_W/0/1/0/all/0/1), [Benjamin T. Zhou](http://arxiv.org/find/cond-mat/1/au:+Zhou_B/0/1/0/all/0/1), [James J. He](http://arxiv.org/find/cond-mat/1/au:+He_J/0/1/0/all/0/1), **Noah F. Q. Yuan**, [Ting Zhang](http://arxiv.org/find/cond-mat/1/au:+Zhang_T/0/1/0/all/0/1), [K. T. Law](http://arxiv.org/find/cond-mat/1/au:+Law_K/0/1/0/all/0/1), *Magnetic Field Driven Nodal Topological Superconductivity in Monolayer Transition Metal Dichalcogenides*, Communications Physics**1**, 40 (2018).
8. Junying Shen, Wen-Yu He, **Noah F. Q. Yuan**, Zengle Huang , Seng Huat Lee , Yew San Hor , Kam Tuen Law , Chang-woo Cho and Rolf Lortz, *Nematic topological superconducting phase in Nb-doped Bi2Se3*, npj Quantum Materials**2**, 59 (2017).
9. [Noah F. Q. Yuan](http://arxiv.org/find/cond-mat/1/au:+Yuan_N/0/1/0/all/0/1), [Yao Lu](http://arxiv.org/find/cond-mat/1/au:+Lu_Y/0/1/0/all/0/1), [James J. He](http://arxiv.org/find/cond-mat/1/au:+He_J/0/1/0/all/0/1), [K. T. Law](http://arxiv.org/find/cond-mat/1/au:+Law_K/0/1/0/all/0/1), *Generating Giant Spin Currents Using Nodal Topological Superconductors*, Phys. Rev. B **95**, 195102 (2017).
10. [Noah F. Q. Yuan](http://arxiv.org/find/cond-mat/1/au:+Yuan_N/0/1/0/all/0/1), [Chris L.M. Wong](http://arxiv.org/find/cond-mat/1/au:+Wong_C/0/1/0/all/0/1), [K. T. Law](http://arxiv.org/find/cond-mat/1/au:+Law_K/0/1/0/all/0/1), *Probing Majorana flat bands in nodal -wave superconductors with Rashba spin–orbit coupling*, Physica E**55** 30-36, (2013).

**INVITED TALKS**

*Supermetal: A Suggestive Way to Understand Moiré Materials and Beyond,* New Materials and Structures in Topological and Correlated Systems, Gordon Research Conference, Hong Kong (16-21, Jun-2019).

*Hubbard model, unconventional superconductivity and density waves in twisted bilayer graphene*, Materials and Mechanisms of Superconductivity (M2S) Conference, Beijing (23-Aug-2018).