Zhao, Yuxin

Name: Zhao, Yuxin (趙宇心)
Present Position: Associate Professor
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Academic Positions

2023—present	Associate Professor, Department of Physics, The University of Hong Kong, Hong Kong
2017—2023	Professor, School of Physics, Nanjing University, China
2016—2017	Research Assistant Professor, Department of Physics, The University of Hong Kong, Hong Kong
2015—2016	Postdoctoral Fellow, Max Planck Institute for Solid State Research, Stuttgart, Germany
2014—2015	Postdoctoral Fellow, Department of Physics, The University of Hong Kong, Hong Kong

Academic Qualifications

2014 Ph.D. in Physics, The University of Hong Kong, Hong Kong
2010 B.S. in Physics, Peking University, Beijing, China

Prizes and Awards

2016 1000-Talent Program for Young Scientists, Organization Department of CCP, China
2010 Hong Kong PhD Fellowship, University Grants Committee, Hong Kong

Postgraduate Supervision

Ph.D. candidates under my supervision: 8
Ph.D. awarded under my supervision: 4

Research Interests

The application of algebra and topology in condensed matter
Currently, my research is focused on the projective representation of space groups and its applications in the field of topological insulators and semimetals.

Selected Publications

General theory of momentum-space nonsymmorphic symmetry,
Chen Zhang, Z. Y. Chen, Zheng Zhang, **Y. X. Zhao***,
Phys. Rev. Lett. Accepted (2023)

Stiefel-Whitney topological charges in a three-dimensional acoustic nodal-line crystal,
H. R. Xue, Z. Y. Chen, Z. Cheng, J. X. Dai, Y. Long, **Y. X. Zhao***, B. L. Zhang*,
Nat. Comm. accepted (2023)

Classification of time-reversal-invariant crystals with gauge structures,
Z. Y. Chen, Zheng Zhang, S. A. Yang, **Y. X. Zhao***,
Nat. Comm. 14, 743 (2023)

Brillouin Klein bottle from artificial gauge fields,
Z. Y. Chen, S. A. Yang, **Y. X. Zhao***,
Nat. Comm. 13, 2215 (2022)

Projectively enriched symmetry and topology in acoustic crystals,
H. Xue, Z. Wang, ..., **Y. X. Zhao***, S. A Yang*, B. Zhang*,
Phys. Rev. Lett. 128, 116802 (2022)

The gauge-field extended k.p method and novel topological phases,
L. B. Shao[#], Q. Liu[#], R. Xiao, S. A. Yang, **Y. X. Zhao***,
Phys. Rev. Lett. 127, 076401 (2021)

Switching spinless and spinful topological phases with projective PT symmetry,
Y. X. Zhao*, C. Chen, X. L. Sheng, S. A. Yang,
Phys. Rev. Lett. 126, 196402 (2021)

Index theorem on chiral Landau bands for topological fermions,
Y. X. Zhao* and S. A. Yang,
Phys. Rev. Lett. 126, 046401 (2021)

Boundary criticality of -invariant topology and second-order nodal-line semimetals,
K. Wang, J. X. Dai, L. B. Shao*, S. A. Yang, **Y. X. Zhao***,
Phys. Rev. Lett. 125, 126403 (2020), Editors' suggestion, Featured in Physics.

Two-dimensional second-order topological insulator in graphdiyne,
X. L. Sheng[#*], C. Chen[#], H. Liu, Z. Chen, Z. M. Yu*, **Y. X. Zhao***, S. A. Yang
Phys. Rev. Lett. 123, 256402 (2019)

PT Symmetric Real Dirac Fermions and Semimetals,
Y. X. Zhao*, Y. Lu*,
Phys. Rev. Lett. 118, 056401 (2017), Editors' suggestion

Unified Theory of PT and CP Invariant Topological Metals and Nodal Superconductors,
Y. X. Zhao*, A. P. Schnyder* and Z. D. Wang*,
Phys. Rev. Lett. 116, 156402 (2016)

Novel Z_2 Topological Metals and Semimetals,
Y. X. Zhao* and Z. D. Wang*,
Phys. Rev. Lett. 116, 016401 (2016)

Disordered Weyl Semimetals and Their Topological Family,
Y. X. Zhao* and Z. D. Wang*,
Phys. Rev. Lett. 114, 206602 (2015)

Topological Classification and Stability of Fermi Surfaces,
Y. X. Zhao* and Z. D. Wang*,
Phys. Rev. Lett. 110, 240404 (2013)

Second-Order Real Nodal-Line Semimetal in Three-Dimensional Graphdiyne,
C. Chen, X. T. Zeng, Z. Chen, **Y. X. Zhao**, X. L. Sheng, S. A. Yang
Phys. Rev. Lett. 128, 026405 (2022)

Emergent Kondo behavior from gauge fluctuations in spin liquids,
R. Wang*, Y. Wang, **Y. X. Zhao**, B. Wang*,
Phys. Rev. Lett. 127 (23), 237202 (2021)

Simulation and Manipulation of Tunable Weyl-Semimetal Bands Using Superconducting Quantum Circuits,
X. Tan, **Y. X. Zhao**, Q. Liu, G. Xue, H. Yu, Z. D. Wang, Y. Yu,
Phys. Rev. Lett. 122, 010501 (2019).

4D spinless topological insulator in a periodic electric circuit,
R. Yu*, **Y. X. Zhao***, A. P. Schnyder,
Nat. Sci. Rev. 7, 1288 (2020)

Tensor theory for higher-dimensional Chern insulators with large Chern numbers
K. Wang, J. X. Dai, L. B. Shao, S. A. Yang, **Y. X. Zhao*,**
Phys. Rev. B 105, 085113 (2022)

Periodic Clifford symmetry algebras on flux lattices,
Y. X. Huang, Z. Y. Chen, X. Feng, S. A. Yang, and **Y. X. Zhao***,
Phys. Rev. B 106, 125102 (2022)

Periodic Clifford symmetry algebras on flux lattices,
Y. X. Huang, Z. Y. Chen, X. Feng, S. A. Yang, and **Y. X. Zhao*,**
Phys. Rev. B 106, 125102 (2022)

Z_2-projective translational symmetry protected topological phases,
Y. X. Zhao*, Y. X. Huang, S. A. Yang,
Phys. Rev. B 102, 161117(R) (2020)

Topology and exceptional points of massive Dirac models with generic non-Hermitian perturbations
W. B. Rui, **Y. X. Zhao***, A. P. Schnyder*,
Phys. Rev. B 99, 241110(R) (2019), Editors' suggestion

Circumventing the no-go theorem: A single Weyl point without surface Fermi arcs,
Z. M. Yu, W. Wu, **Y. X. Zhao***, S. A. Yang*,
Phys. Rev. B 100, 041118(R) (2019)

Quadratic and Cubic Nodal Lines Stabilized by Crystalline Symmetry,
Z. M. Yu, W. Wu, X. L. Sheng, **Y. X. Zhao***, S. A. Yang*,
Phys. Rev. B 99, 21106(R) (2019)

Topological quantum matter with cold atoms,
D. W. Zhang, Y. Q. Zhu, **Y. X. Zhao**, H. Yan, S. L. Zhu,
Adv. Phys. 67, 253 (2018)

Topological transport in Dirac nodal-line semimetals,
W. B. Rui, **Y. X. Zhao***, A. P. Schnyder*,
Phys. Rev. B 97, 161113(R) (2018).

Nodal line fermions in magnetic oxides,
R. Wang, J. Z. Zhao, Y. J. Jin, Y. P. Du, **Y.X. Zhao***, H. Xu*, S. Y. Tong*,
Phys. Rev. B 97, 241111 (R) (2018)

Nonsymmorphic symmetry-required band crossings in topological semimetals,
Y. X. Zhao, Andreas P. Schnyder,
Phys. Rev. B 94, 195109 (2016)

General response theory of topologically stable Fermi points and its implications for disordered cases,
Y. X. Zhao and Z. D. Wang,
Phys. Rev. B 92, 085143 (2015)

Exotic topological types of Majorana zero modes and their universal quantum manipulation,
Y. X. Zhao and Z. D. Wang,
Phys. Rev. B 90, 115158 (2014)

Topological connection between the stability of Fermi surfaces and topological insulators and superconductors,
Y. X. Zhao and Z. D. Wang,
Phys. Rev. B 89, 075111 (2014)

Effective Long-Range Pairing and Hopping in Topological Nanowires Weakly Coupled to s-Wave Superconductors,
H. Q. Wang, L. B. Shao*, **Y. X. Zhao***, L. Sheng, B. G. Wang, D. Y. Xing*,
Phys. Rev. B 98, 174512 (2018)

Nodal surface semimetals: Theory and material realization, Weikang Wu, Ying Liu,
Si Li, Chengyong Zhong, Zhi-Ming Yu, Xian-Lei Sheng*, **Y. X. Zhao***, Shengyuan A Yang,
Phys. Rev. B 97, 115125 (2018)

Quantum simulation of exotic PT-invariant topological nodal loop bands with ultracold atoms in an optical lattice,
D. W. Zhang, **Y. X. Zhao***, R. B. Liu, Z. Y. Xue, S. L. Zhu*, and Z. D. Wang*,
Phys. Rev. A 93, 043617 (2016)

Locking of symmetry breaking and topological phase in an interacting fermionic wire,
D. B. Zhang, Z. Zheng, **Y. X. Zhao***, Q. H. Wang*, Z. D. Wang*,
Phys. Rev. Res. 2, 013122 (2020)

Equivariant PT-symmetric real Chern insulators
Y. X. Zhao,
Frontiers of Physics 15, 13603 (2020)

Spin Direction-Controlled Electronic Band Structure in Two-Dimensional Ferromagnetic CrI3,
P. Jiang, L. Li, Z. Liao, **Y. X. Zhao**, Z. C. Zhong,
Nano Lett. 18, 3844 (2018)

Realizing and manipulating space-time inversion symmetric topological semimetal bands with superconducting quantum circuits, X. Tan, **Y. X. Zhao**, Q. Liu, G. Xue, H. Yu, Z. D. Wang, Y. Yu, NPJ Quan. Mater. 2, 60 (2017)

Realizing universal topological quantum gates in simulated time-reversal-invariant superconducting chains,
Yong Hu, **Y. X. Zhao**, Zheng-Yuan Xue, Z. D. Wang,
NPJ Quan. Infor. 3, 8 (2017)

Quadratic contact point semimetal: Theory and material realization,
Z. Zhu, Y. Liu, Z. M. Yu, S. S. Wang, **Y. X. Zhao**, Y. Feng, X. L. Sheng, S. A. Yang,
Phys. Rev. B 98, 125104 (2018)

Higher-order Dirac fermions in three dimensions,
W. Wu, Z. M. Yu, X. Zhou, **Y. X. Zhao,** S. A. Yang,
Phys. Rev. B 101, 205134 (2020)