Binbin LIU

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liu-binbin

Educations

2023–2024 **Ph. D.**, *National University of Singapore*, Singapore.

2020–2023 **M. S. in Physics**, *Beijing University of Aeronautics and Astronautics,* Beijing, China.
Major GPA: 3.96/4, ranking **1/20**.

2016–2020 **B. S. in Applied Physics**, *Beijing University of Aeronautics and Astronautics,* Beijing, China.
Major GPA: 3.91/4, ranking **top 3**%.

Honors and Awards

05.2023 Presidential PhD Scholarship Award. Imperial College London. *30/600*

05.2023 First Prize in the academic poster competition. Beihang U. ***3***%

09.2022 National Scholarship. Ministry of Education, China. ***1***%

05.2019 "Yuanhang" Global Study Summer Research Scholarship Award. Beihang U. ***1.5***%

2018–2022 First Prize in the Learning Excellence Scholarship×4. Beihang U. ***3***%

Publications

[1] **Binbin Liu** et al., *Second-order and real Chern topological insulator in twisted bilayer α-graphyne*, Phys. Rev. B 106, 035153 (2022). [PDF]

[2] Wang Yang*, **Binbin Liu***, et al., *Large bilinear magnetoresistance from Rashba spin-splitting on the surface of a topological insulator*, Phys. Rev. B 106, L241401 (2022), (Letter). [PDF]

[3] Xu-Tao Zeng, **Binbin Liu**, et al., *Three-dimensional real Chern insulator in bulk γ-graphyne*, Phys. Rev. B 108, 075159 (2023). [PDF]

[4] **Binbin Liu**†, Zeying Zhang, Xian-Lei Sheng†, Yuxin Zhao and Shengyuan A. Yang, *Projective Symmetry Enriched Berry Curvature Effects in Space and Time Invariant Crystals*. (To be submitted to PRL.)

[5] Xu-Tao Zeng, Ziyu Chen, Cong Chen, **Binbin Liu**, et al., *Topological hinge modes in Dirac semimetals*, Front. Phys. 18, 13308 (2023). [PDF]

(* equal contributions, † correspondence)

Quant Projects

[Code] Built a Python script for analyzing and visualizing Bitcoin (BTC) trading data. Created an advanced candlestick chart with volume, moving averages, and buy/sell signals using 'mplfinance'.

[Code] Built a quantitative trading analysis tool in python. Used the golden fork and dead fork as indicators for the buy/sell signals (can also be easily changed to other indicators).

[Code] Developed a dynamic asset allocation strategy between large and small cap stocks, based on the momentum indicator with transaction costs incorporated.

Skills

Coding Matlab, Mathematica, Python, Linux, Latex, Markdown, C, Fortran.

Miscellaneous **Problem-solving**, project leadership, team collaboration, rapid learning.

Research

2023–2024 **Moiré-induced threefold relativistic particles in 2D $FeCl_2$/Bi(111)**

Advisors Dr. Frank Schindler, Imperial College London, Prof. Titus Neupert, U. of Zurich, and Prof. Niels Schroeter, MPI

2022–2023 **Projective Symmetry Enriched Berry Curvature Effects in Space and Time Invariant Crystals.**, Nanjing U, Nanjing, China

Advisors Prof. Shengyuan A. Yang, Singapore U. of Technology and Design, Prof. Yuxin Zhao, HKU., and Prof. Xian-Lei Sheng, Beihang U.

2021–2022 **Higher-order Topology in Graphyne Families**, Beihang U, Beijing, China

Advisors Prof. Xian-Lei Sheng, Beihang U. and Prof. Shengyuan A. Yang, Singapore U. of Technology and Design.

2021–2022 **Large Bilinear Magnetoresistance (BMR) from Rashba Spin-Splitting on the Surface of a Topological Insulator**, Online

Advisors Prof. John Q. Xiao, U. of Delaware, Prof. Xian-Lei Sheng, Beihang U. and Prof. Shengyuan A. Yang, Singapore U. of Technology and Design.

2019–2022 **Anatomy of Nucleon Self-energy from Equal-time to Light-front**, NC, USA

Advisors Prof. Chueng Ji, APS fellow, North Carolina State U.

Extracurricular Activities

2020–2021 Student President of Academic Associations, Department of Physics, Beihang University.

2012– Pianist (Bach, Beethoven, Chopin, Mozart).

2017– Membership in the Opera House, World Genius Directory.