ZIJIA CHENG

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EDUCATION

Princeton University, Princeton, NJ 2018 - expected 2024
Phd student of Science in Physics
Courses: Financial Econometrics, Machine Learn & Pattern Recognition, Statistical Foundations of Data Science, Quantitative Data Analysis in Finance. Game theory.

Tsinghua University, Bejing, China. 2014 - 2018
Bachelor of Science in Physics (Tsinghua Xuetang Talents Program)
Overall GPA: 92/100. Major GPA: 94/100

RESEARCH

Laboratory for Topological Quantum Matter and Advanced Spectroscopy 2018 - Present
Research Assistant
Princeton, NJ

- Adopted state-of-the-art **angular-resolved photoemission spectroscopy** (ARPES) and **scanning tunneling spectroscopy** (STM) techniques to discover novel strong-correlated topological materials, including Weyl line/loop state and high order fermions, and characterize their electronic structures.
- Constructed the **tight binding** and **mean field models** for analyzing materials' band structure. Developed **Python-based numerical framework** for simulating spectrum function and calculating response functions based on the Hamiltonian.
- Developed and maintained **Python-based data acquisition and analysis tools**, significantly improving the work efficiency of the group members and coworkers.
- Published over 15 peer-reviewed papers in high-profile journals, with ~ 1000 citations (Link).

The State Key Laboratory of Low-Dimensional Quantum Physics. 2015 - 2018
Undergraduate Research Assistant
Beijing, CN

- Adopted machine learning method (SVM and neural network) and self-developed instrument control software to develop an automatic workflow for calibrating the tip of the STM without supervision. Related patent: Link .
- Analyzed the universal scaling behavior of quantum anomalous hall systems using nonlinear fitting and Bootstrap method. (Link)

SELECTED PUBLICATIONS

(Co-) First Author:

- Magnetization-Direction-Tunable Kagome Weyl Line. *Adv. Mat.* **2022**, 35 (3), 2205927.
- Observation of a Linked-Loop Quantum State in a Topological Magnet. *Nature* **2022**, 604 (7907), 647–652.

- Signatures of Weyl Fermion Annihilation in a Correlated Kagome Magnet. *Phys. Rev. Lett.* **2021**, 127 (25).
- Visualizing the Out-of-Plane Electronic Dispersions in an Intercalated Transition Metal Dichalcogenide. *Phys. Rev. B* **2022**, 105 (12).

Contributing author:

- Helicoid-Arc van Hove Singularities in Topological Chiral Crystals. *Nat. Phy.* **2023**
- A Fermi Arc Quantum Ladder. *Phys. Rev. Let.* **2023**, in press
- Room-Temperature Quantum Spin Hall Edge State in a Higher-Order Topological Insulator Bi_4Br_4. *Nat. Mater.* **2022**. 21,1111-1115.
- Unconventional Chiral Charge Order in Kagome Superconductor KV_3Sb_5. *Nat. Mater.* **2021**. 20,1353–1357.
- Rare Earth Engineering in RMn_6Sn_6 (R = Gd − Tm , Lu) Topological Kagome Magnets. *Phys. Rev. Lett.* **2021**, 126 (24), 246602.
- Quantum-Limit Chern Topological Magnetism in TbMn6Sn6. *Nature* **2020**, 583 (7817), 533–536.

COMPUTER SKILLS

Programming: Python/Igor Pro/Mathematica/C/LabView/R/Latex. GitHub: (Link)
Packages: NumPy, Pandas, Matplotlib, SciPy, Sklearn, Numba, Pytorch

HONORS AND AWARDS

- Tsinghua Xuetang Talents Program Scholarship 2014-2018
- Hengda Scholarship for the top students in Department of Physics 2016-2017
- Academic Excellence Scholarship 2015-2016

TEACHING EXPERIENCE

Princeton University, Princeton, NJ
Teaching Assistant, Department of Physics

- General Physics II Spring 2022, 2023
- General Physics I Fall 2019

ACADEMIC ACTIVITIES

- Three conference talks (Link) and session chair of 2022 APS march meeting.
- Journal referee for Physics Review B, Physics Review Materials, Advanced Materials.