

Lin Wu

Address: College of Materials Science and Engineering, Chongqing University, Chongqing, 400044

E-mail: wulin@cqu.edu.cn

Education

Nanjing University

Ph.D. in Condensed Matter Physics

Nanjing, China

Sep. 2018 – Dec. 2024

Dalian University of Technology

B.S. in Applied Physics

Dalian, China

Sep. 2014 – Jun. 2018

Research Interests

- Phase transition mechanisms
 - Symmetries in topological materials
 - Numerical calculation of correlated electronic systems
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Research Experience

Pairing Symmetry in Unconventional Superconductors

2024 – Present

- Constructed effective models for new unconventional superconductors.
- Utilized the random phase approximation (RPA) and the fluctuation exchange (FLEX) approximation methods, solved the Eliashberg equation for different pairing symmetries.
- Completed the theoretical derivation and implemented related python programs, and performed numerical calculations on materials to enhance understanding of unconventional superconductivity mechanisms.

Electron-Correlation-Induced Charge Density Wave in FeGe

2022 – 2023

- Constructed a tight-binding model in a local coordinate using Wannier90.
- Developed python program to obtain the Fermi surface nesting function and the distribution of the eigenstate components on the Fermi surface.
- The research findings summarized that the electron correlation plays a key role in the charge density wave phase transition in FeGe.
- Authored one paper and published in Chinese Physics Letters.

Exhaustive Search for Special Topological Band Crossings

2019 – 2021

- Investigated various lattice symmetry-enforced topological band structures and proposed the conditions under which compatibility relations follow in these structures.
 - Obtained the compatibility relations in 230 space groups using a crawler program.
 - Developed python programs based on the above conditions to perform an exhaustive search.
 - Identified over 100 materials with novel topological structures using first-principles calculation, which provides a catalog of candidates for experimental study.
 - Authored two papers, both of which were published in Physical Review B.
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Skills

- **Software:** Wien2k, VASP, Origin, Mathematica, Matlab, Materials Studio
 - **Programming Language:** Python, C/C++, Matlab
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Publications

1. **Lin Wu**, Feng Tang, and Xiangang Wan. "Exhaustive list of topological hourglass band crossings in 230 space groups." Phys. Rev. B 102, 035106 (2020). DOI: [10.1103/PhysRevB.102.035106](https://doi.org/10.1103/PhysRevB.102.035106)
2. **Lin Wu**, Feng Tang, and Xiangang Wan. "Symmetry-enforced band nodes in 230 space groups." Phys. Rev. B 104, 045107 (2021). DOI: [10.1103/PhysRevB.104.045107](https://doi.org/10.1103/PhysRevB.104.045107)
3. **Lin Wu**, Yating Hu, Dongze Fan, Di Wang, and Xiangang Wan. "Electron-Correlation-Induced Charge Density Wave in FeGe." Chin. Phys. Lett. 40, 117103 (2023). DOI: [10.1088/0256-307X/40/11/117103](https://doi.org/10.1088/0256-307X/40/11/117103)
4. Jihai Yu, **Lin Wu**, Di Wang, Qingfang Li, Weifeng Zhang, Xiangang Wan, and Jian Zhou. "Covalent states and spin-orbit coupling in electronic and magnetic properties of Ba₆Y₂Rh₂Ti₂O₁₇." Phys. Rev. B 104, 075123 (2021). DOI: [10.1103/PhysRevB.104.075123](https://doi.org/10.1103/PhysRevB.104.075123)
5. Jiayu Li, Qiushi Yao, **Lin Wu**, Zongxiang Hu, Boya Gao, Xiangang Wan, and Qihang Liu. "Designing light-element materials with large effective spin-orbit coupling." Nat. Commun. 13, 919 (2022). DOI: [10.1038/s41467-022-28534-y](https://doi.org/10.1038/s41467-022-28534-y)