Zong-Qi Shen

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Education Background

Department of Physics, Fudan University Shanghai, China
Bachelor of Science in Physics Sep.2018-Present

- Overall GPA: **3.8**/4, Rank: top 5% in the department of physics
- Graduate Course: Advanced QM, Many-body Physics, Solid State Theory, Superconductivity
- Standard Tests: TOEFL 106 (Speaking 24)
- National Scholarship 2020 (highest honor for undergraduates)

Research Interest

Combine experiment with theory to explore exotic quantum materials and emergent phases

- Interplay among spin, orbital, charge and lattice especially on the interface
- Unconventional superconductors and topological superconductivity
- Majorana zero mode and its potential application to quantum computing
- Transport properties of nanoscale systems

Publication

1. Tianzhong Yuan*, Da Jiang*, Huanyi Xue*, **Zongqi Shen**, Lijie Wang, Muyuan Zou, Junwei Ma, Guanqun Zhang, Gang Mu, Wei Peng, Xinyuan Wei, Shiwei Wu, Zhenghua An, Yan Chen and Wei Li "**Time-reversal and rotational symmetries breaking in a spinel superconductor**" submitted to *Nature*
2. **Zongqi Shen**, Junwei Ma and Wei Li "**The Andreev reflection of high Chern number topological superconductors**" *in preparation*

Research Experience

Research on time-reversal and rotational symmetry breaking in superconductors Sep.2020-Dec.2020
Supervised by Prof. Wei Li, Artificial Interface Lab, Fudan University

- Used group theory to analyze the pairing symmetry in our sample and help explain the coexistence of ferromagnetism and superconductivity
- Proposed a topological origin of the two-fold symmetry in transverse resistance, which provided a new explanation of similar results reported in *Nature* 547, 432–435 (2017)
- Gained rich experience in combining experiments with theories to better understand interplay between magnetism and superconductivity

Research on 2D materials and device fabrication Nov.2018-June.2019
Supervised by Prof. Faxian Xiu, Nanodevice Lab, Fudan University

- Synthesized high quality Bi_2SeO_3 sample using chemical vapor deposition method (CVD)
- Peeled off single-layered graphene for heterostructure fabrication
- Helped establish a platform for stacking layers of 2D materials controlled by LabView
- Received technical training in device fabrication and transport measurement

Research on fingerprints of Majorana zero mode in topological superconductors June.2019-Present
Supervised by Prof. Wei Li, Artificial Interface Lab, Fudan University

- Used nonequilibrium Green's function method (NEGF) and analytical methods to calculate the transport properties of p+ip and d+id superconductors
- Proposed that transport measurements can be utilized to identify the existence of Majorana zero mode in p+ip and d+id superconductors
- Received systematic training in the theory of superconductivity

Skills

Computational:

- Programming: band structure calculation, python, C, Mathematica
- Simulation: Kwant, Comsol

Laboratory:

- Material growth and nanofabrication
- Transport measurement at low temperature
- LabView programming
- Ultra-high vacuum equipment operation