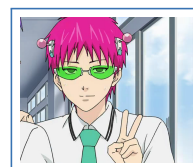


Liu Xiang

Curriculum Vitae

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Objective

Seeking a Ph.D. position in Condensed Matter Physics, with a focus on theoretical and numerical studies of the low-dimensional nanostructures, 2D materials, strongly correlated electron systems, quantum many-body physics and quantum optics.

Education

2022 – present **M. S. in Theoretical Physics**, *Central South University (ARWU 94)*, Changsha, China, **GPA: 3.83/4**.

Research Focus: Strong correlated electrons, Low-dimensional nanostructures, Quantum optics model, 2D materials.

2018 – 2022 **B. Sc in Applied Physics**, *Xi'an Polytechnic University*, Xi'an, China. **GPA: 86.8/100 Rank: 2/47**.

Bachelor Thesis: Study of Critical Exponents in the Transverse-Field Ising Model.

Publications

- 2024 **Xiang Liu**, Zheng Tao, Wenchen Luo, and Tapash Chakraborty.
Interlayer excitons in double-layer transition metal dichalcogenides quantum dots.
Phys. Rev. B 111, 085424.
- 2024 Wenchen Luo, Muaath Abdulwahab, **Xiang Liu** and Hao Wang.
 $\frac{5}{2}$ fractional quantum Hall state in GaAs with Landau level mixing.
Phys. Rev. B 110, 085428.
- 2024 Wenna Zhang, Yutao Hu, Hongyi Zhang, **Xiang Liu**, Georgios Veronis, Yuecheng Shen, Yin Huang, and Wenchen Luo.
Skin effect in Non-Hermitian systems with spin. **arXiv:2408.07406.**
Submitted to Phys. Rev. B, Status: With referee.
- 2025 **Xiang Liu** and Wenchen Luo.
Effects of Quantum Confinement and Coulomb Interactions in TMD Quantum Dots. **Invited Review Article, Physica E, In preparation.**

Research Interests

- Quantum Dot** Investigated the electronic states of QD, from single-electron to many-electron systems, with a focus on the spin-orbit coupling, impurities, etc.
- Strongly Correlated Systems** Explored Coulomb interactions in few-body systems within low-dimensional nanostructures. Experienced in quantum many-body spin systems, focusing on phase transitions and critical phenomena in models like the Ising model.
- 2D Materials** Explored electronic transport and valley physics, particularly exciton in TMDs, focusing on twist angles and the unique properties of bilayer systems.
- Quantum Optics Model** Investigation of quantum Rabi models, JC models, and Dicke models, focusing on their unique physical properties and light-matter interactions within quantum solid-state nanostructures systems.
- Numerical Techniques** Implemented efficient numerical methods across multiple programming languages, utilizing a 700-core CPU cluster for parallel computing and exploring GPU-based techniques to optimize performance.

Awards and Honors

- 2022 – 2024
 - Graduate Study Scholarship, CSU (Three times)
- Sep 2022
 - China Recommended Exemption Graduate Students Scholarship
- Jul 2022
 - Excellent Undergraduate Graduate Award
- Dec 2020
 - The Chinese Mathematics Competitions of Shaanxi Province, First Prize
- 2018 – 2022
 - Outstanding Student Scholarship, XPU (Three times)

Talks and Conference Participation

- Jul 2024 *Interlayer excitons in double-layer transition metal dichalcogenides quantum dots. Hunan Province Symposium on the frontiers of Physics Hengyang, China. **Invited Talk.***
- Dec 2023 *Hunan Province Annual Physics Conference, Xiangtan, China.*
- Aug 2023 *Chinese Physical Society Fall Meeting, Yinchuan, China.*
- May 2023 *The 2rd Symposium on Fractional Quantum Hall Effect, Chongqing, China.*

Computer Skills

Keen on programming and optimizing computational efficiency across various languages.

- Matlab, Fortran, Mathematica, Python, Bash
- Linux, COMSOL, \LaTeX
- Notion, Adobe Illustrator, Microsoft Windows, Origin

Languages

- Chinese: Native language
- English: TOEFL iBT 73 (Retaking soon).

Hobbies

- Musics
- Coding
- Movie
- Badminton