Yaowu Liu

EDUCATION

Tsinghua University, *Beijing, China* *Sept.2017-Jun.2023*

Ph.D. in Condensed Matter Physics

Advisor: Prof. Qi-Kun Xue

Fudan University, *Shanghai, China* *Sept.2013-Jun.2017*

Bachelor of Engineering in Applied physics

- GPA: 3.78/4.0; *Summa cum laude*.

RESEARCH

***In situ* transport and spectroscopic studies of superconductivity in monolayer FeSe/STO**

- Synthesize high quality monolayer FeSe on insulating $SrTiO_3$
- Perform *in situ* electric transport on monolayer FeSe/STO system
- Perform variable temperature STM/S characterization of monolayer FeSe/STO system
- Perform variable temperature point contact spectroscopy (PCS) studies of monolayer FeSe/STO system
- Reveal the superconducting transition process in monolayer FeSe/STO system

Molecular beam epitaxy of monolayer $FeTe_{1-x}Se_x$

- Synthesize monolayer $FeTe_{1-x}Se_x$ on Nb doped $SrTiO_3$ with various Se content
- Realize superconductivity in as-grown $FeTe_{1-x}Se_x$ films
- Analyze the fluctuation of superconducting gap in $FeTe_{1-x}Se_x$ films

In-plane Heterostructure based on $FeTe_{1-x}Se_x$

- Synthesize in plane heterostructures of monolayer FeTe-$FeTe_{1-x}Se_x$
- Perform STM/STS studies of FeTe-$FeTe_{1-x}Se_x$ in plane heterostructures

Atomic scale transport by scanning tunneling potentiometry

- Perform atomic scale transport across single impurities in epitaxial bilayer graphene
- Analyze the effects of single impurities scattering on atomic scale
- Perform atomic scale transport across the stacking faults in multilayer graphene
- Observe substantial scattering effects induced by stacking faults

RESEARCH INTERESTS

Superconductivity

- Synthesis of superconducting materials using MBE, furnace tube *etc*.
- Researches on the electronic structures of superconductors
- Exploration of the pairing mechanism for superconducting materials

Topological quantum matters

- Synthesis of topological quantum materials
- Characterization of topological quantum materials

Novel Scanning probes

- ESR-STM
- Scanning single electron transistor
- NanoSQUID

HONOR

- Distinguished undergraduate of Fudan University
- College academic scholarships

PROGRAMMING LANGUAGE

- Matlab, Python, Labview, C, C++

PUBLICATION

- Si, R., Zhang, C. Y., **Liu, Y. W.**, et al. Extensive and accurate energy levels and transition rates for Al-like Zn XVIII. J. Quant. Spectrosc. Radiat. Transfer **189**, 249 (2017). [Link]

- Zhang, C. Y., Si, R., **Liu, Y. W.**, et al. Calculations for energies, transition rates, and lifetimes in Al-like Kr XXIV. At. Data Nucl. Data Tables **121**, 256 (2018). [Link]

- **Liu, Y. W** et al. Energy levels and transition rates for Al-like Cu XVII. At. Data Nucl. Data Tables **127,** 140 (2019). [Link]

- Li L, Zheng C, **Liu Y**, et al. Construction of molecular beam epitaxy and multi-probe scanning tunneling potentiometry combined system. Rev. Sci. Instrum. **90**, 093703 (2019). [Link]

- Zhu, Y., Liao, M., Zhang, Q., Xie, H. Y., Meng, F., **Liu, Y.**, et al. Presence of s-wave pairing in Josephson junctions made of twisted ultrathin $Bi_2Sr_2CaCu_2O_{8+x}$ flakes. Phys. Rev. X **11**, 031011 (2021). [Link]

- Yuguo Yin, Chao-sheng Lian, Fanqi Meng, **Yaowu Liu** et al. Quenched charge density wave and large in-plane upper critical field of self-intercalated bilayer $NbSe_2$. Phys. Rev. B **108**, L041405 (2023). [Link]

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- Dapeng Zhao*, Wenqiang Cui*, **Yaowu Liu*** et al. Electronic Inhomogeneity and phase fluctuation in one unit cell FeSe films ***Under review***
  (* Equal contribution)

- **Liu Yaowu** et al. Spatial Inhomogeneity of superconducting gap in epitaxial monolayer $FeTe_{1-x}Se_x$ films. ***Under review***

- **Liu Yaowu** et al. Direct visualizing current induced dipole of atomic impurities. arXiv:2309.01182. ***Under review***