

Xiangyu Luo

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📍 Building 13-2054, 77 Massachusetts Avenue, Cambridge, MA 02139

EDUCATION

- **Institute of Physics, Chinese Academy of Sciences** Beijing, China
Ph. D. in Condensed Matter Physics Sep. 2017-Sep. 2023
Advisor: Prof. X. J. Zhou
 - **University of Science and Technology of China** Hefei, China
B. S. in Materials Chemistry Sep. 2013-Sep. 2017
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CAREER

- **Massachusetts Institute of Technology (MIT)** MA, U. S.
Postdoctoral Associate in Department of Physics Jan. 2024- Present
Advisor: Prof. Riccardo Comin

RESEARCH EXPERIENCES

Investigation of High-Tc Cuprate Superconductors

- Synthesis of high quality $\text{HgBa}_2\text{CuO}_{4+d}$ (Hg1201) single crystal by flux method (the transition width of T_C is less than 2 K)
- Annealing and characterization of Hg1201 samples with different doping levels (UD45K to OD90K) and Bi2223 samples
- Electronic structure of Hg1201 studied by ARPES
- Measurement of the physical properties of the overdoped Bi2223 by ARPES (Observation of tri-layer splitting and novel intra- and interlayer hopping and pairing)

Instrument Development

- Maintenance of spin ARPES with mott detector and VUV 7eV

PUBLICATIONS

- **Xiangyu Luo**, Hao Chen, Yinghao Li, Qiang Gao, Chaohui Yin, Hongtao Yan, Taimin Miao, Hailan Luo, Yingjie Shu, Yiwen Chen, Chengtian Lin, Shenjin Zhang, Zhimin Wang, Fengfeng Zhang, Feng Yang, Qinjun Peng, Guodong Liu, Lin Zhao, Zuyan Xu, Tao Xiang and X. J. Zhou. "Electronic origin of high superconducting critical temperature in trilayer cuprates." *Nature Physics* **19**, 1841 (2023)

- Zechao Wang, Changwei Zou, Chengtian Lin, **Xiangyu Luo**, Hongtao Yan, Chaohui Yin, Yong Xu, Xingjiang Zhou, Yayu Wang and Jing Zhu, “Correlating the charge-transfer gap to the maximum transition temperature in $\text{Bi}_2\text{Sr}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+4+\delta}$.” *Science* **381**, 227 (2023)
- Hongtao Yan, Jin Mo Bok, Junfeng He, Wentao Zhang, Qiang Gao, **Xiangyu Luo**, Yongqing Cai, Yingying Peng, Jianqiao Meng, Cong Li, Hao Chen, Chunyao Song, Chaohui Yin, Taimin Miao, Yiwen Chen, Genda Gu, Chengtian Lin, Fengfeng Zhang, Feng Yang, Shenjin Zhang, Qinjun Peng, Guodong Liu, Lin Zhao, Han-Yong Cho, Zuyan Xu and X. J. Zhou, “Ubiquitous Coexisting Electron-Mode Couplings in High Temperature Cuprate Superconductors.” *PNAS* **120** (43), e2219491120 (2023)
- Changwei Zou, Zhenqi Hao, **Xiangyu Luo**, Shusen Ye, Qiang Gao, Miao Xu, Xintong Li, Peng Cai, Chengtian Lin, Xingjiang Zhou, Dung-Hai Lee and Yayu Wang, “Particle-hole asymmetric superconducting coherence peaks in overdoped cuprates.” *Nature Physics* **18**, 551 (2022)
- Hailan Luo, Qiang Gao, Hongxiong Liu, Yuhao Gu, Dingsong Wu, Changjiang Yi, Junjie Jia, Shilong Wu, **Xiangyu Luo**, Yu Xu, Lin Zhao, Qingyan Wang, Hanqing Mao, Guodong Liu, Zhihai Zhu, Youguo Shi, Kun Jiang, Jiangping Hu, Zuyan Xu and X. J. Zhou. “Electronic nature of charge density wave and electron-phonon coupling in kagome superconductor KV_3Sb_5 ”. *Nature Communications* **13**, 273 (2022)
- Zhenqi Hao, Changwei Zou, **Xiangyu Luo**, Yu Ji, Miao Xu, Shusen Ye, Xingjiang Zhou, Chengtian Lin, and Yayu Wang. “Anomalous Doping Evolution of Superconductivity and Quasiparticle Interference in $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10+\delta}$ Trilayer Cuprates”. *Physical Review Letter* **125**, 237005 (2020)
- Dingsong Wu, Wenshan Hong, Chenxiao Dong, Xianxin Wu, Qiangtao Sui, Jianwei Huang, Qiang Gao, Cong Li, Chunyao Song, Hailan Luo, Chaohui Yin, Yu Xu, **Xiangyu Luo**, Yongqing Cai, Junjie Jia, Qingyan Wang, Yuan Huang, Guodong Liu, Shenjin Zhang, Fengfeng Zhang, Feng Yang, Zhimin Wang, Qinjun Peng, Zuyan Xu, Xianggang Qiu, Shiliang Li, Huiqian Luo, Jiangping Hu, Lin Zhao, and X. J. Zhou. “Spectroscopic evidence of bilayer splitting and strong interlayer pairing in the superconductor $\text{KCa}_2\text{Fe}_4\text{As}_4\text{F}_2$ ”. *Physical Review B* **101**, 224508 (2020)
- Qiang Gao, Hongtao Yan, Jing Liu, Ping Ai, Yongqing Cai, Cong Li, **Xiangyu Luo**, Cheng Hu, Chunyao Song, Jianwei Huang, Hongtao Rong, Yuan Huang, Qingyan Wang, Guodong Liu, Genda Gu, Fengfeng Zhang, Feng Yang, Shenjin Zhang, Qinjun Peng, Zuyan Xu, Lin Zhao, Tao Xiang, and X. J. Zhou. “Selective hybridization between the main band and the superstructure band in the $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ superconductor”. *Physical Review B* **101**, 014513 (2020)

Scholarships and Awards

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| ➤ Excellence Award for the Director's Scholarship of the Institute of Physics | 2022 |
| ➤ Recognition Award for the Director's Scholarship of the Institute of Physics | 2021 |
| ➤ National Scholarship (Master) | 2020 |
| ➤ Bronze Award of Outstanding Student Scholarship of USTC | 2015&2016 |

PRESENTATIONS

- Electronic Origin of High-Tc Maximization and Persistence in Trilayer Cuprate Superconductors Oral presentation
2022 CPS Fall Meeting. November, 2022, Shenzhen, China
 - Electronic Origin of High-Tc Maximization and Persistence in Trilayer Cuprate Superconductors Oral presentation
The 10th International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy (CORPES 2023). September, 2023, Beijing, China
 - Electronic Origin of High-Tc Maximization and Persistence in Trilayer Cuprate Superconductors Oral presentation
International Conference on Frontier Materials 2023. October, 2023, Qingdao, China
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SKILLS

Spectroscopy

- Angle-resolved photoemission spectroscopy (ARPES)
- Raman spectroscopy

Ultra-high vacuum

- Construction and maintenance of ultra-high vacuum (UHV) system

Programming

- MATLAB / Solidworks / LabVIEW / Igor

Sample fabrication & Characterization

- Sample synthesis: flux and travel solvent floating zone method
 - Transport (PPMS, MPMS)
 - EDX & SEM
 - X-ray diffraction (XRD)
 - Laue
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