

## Curriculum Vitae

### Experience

2018 – Now	<b>Peking University:</b>	<i>Assistant Professor</i>
2015 – 2018	<b>Stanford University:</b>	<i>GLAM Post-doctoral Research Fellow</i>
2008 – 2015	<b>Princeton University:</b>	<i>Ph. D in &amp; Post-doctoral Research Associate</i>
2002 – 2008	<b>Tsinghua University:</b>	<i>B. E. &amp; M. E. in</i>

### Teaching

I have completed a total of 662 credit hours of teaching, including: *General physics lab*, *Frontier physics lab*, *Two-dimensional electrons and many-body quantum phases*, *Advanced semiconductor physics* and *Literature reading*.

A total of 8 graduate students and 2 undergraduate students have been studying in our group. My first student, Zhao Lili, graduated in 2023, and 3 other students will graduate in 2024. The two undergraduate students have started their Ph. D studies at Peking university.

### Research Interest

Our group studies the many-body states arising from the strong electron-electron interaction seen in Ultra-clean two-dimensional (2D) carrier systems in Modulation-doped GaAs/AlGaAs hetero-structures. Examples include the fractional quantum Hall liquid, the Wigner solid, striped (nematic) and bubble phases, etc. In our studies, we focus on the morphing of quantum phases when an external field is applied, and combines different high-sensitive techniques, including:

- sub-fF capacitance measurement at mK-temperature.
- sub-pW surface acoustic wave measurement at mK-temperature with 0.1-ppm resolution.
- $\mu$ rad-resolution MOKE measurement with in-situ scan-imaging capability at mK-temperature.
- pm-level-resolution mechanical deformation using optical interferometer.

Beside the support from Peking university and the Recruitment Program of Global Youth Experts, I have received funding for 4 research projects from the National Natural Science Foundation of China (Grant No. 92065104, 12074010), the National Basic Research Program of China (2019YFA0308403), and the National Key Research and Development Program of China (2021YFA401900). The support by ICQM is 7,500,000 CNY (about 1,030,000 USD) and the total external support is about 5,600,000 CNY (about 770,000 USD).

### Publications since 2018

1. Wenlu Lin, Xing Fan, Lili Zhao, Yoon Jang Chung, Adbhut Gupta, K. W. Baldwin, L. N. Pfeiffer, Hong Lu, **Yang Liu\***, "Metastable Charge Distribution Between Degenerate Landau Levels", to be published in *Phy. Rev. B*, arXiv:2309.04166 (2023).
2. Lili Zhao, Wenlu Lin, Y. J. Chung, Adbhut Gupta, K. W. Baldwin, L. N. Pfeiffer, **Yang Liu\***, "Dynamic response of Wigner Crystals", *Phys. Rev. Lett.* 130, 246401 (2023).
3. Jiaojie Yan, Yijia Wu, Shuai Yuan, Xiao Liu, L. N. Pfeiffer, K. W. West, **Yang Liu**, Hailong Fu, X. C. Xie, Xi Lin\*, "Anomalous quantized plateaus in two-dimensional electron gas with gate confinement", *Nature Communications* 14, 1758 (2023).
4. Huimin Sun, Yizhou Liu, Daiqiang Huang, Yu Fu, Yu Huang, Mengyun He, Xuming Luo, Wenjie Song, **Yang Liu\***, Guoqiang Yu, Qing Lin He\*, "Nonvolatile zero-field magnetization switching in a single-layer magnetic topological insulator", *Communication Physics* 6, 222 (2023).

5. Lili Zhao, Wenlu Lin, Xing Fan, Yuanjun Song, Hong Lu\*, **Yang Liu\***, “High Precision, Low Excitation Capacitance Measurement Methods from 10 mK- to Room-Temperature”, *Review of Scientific Instruments* 93, 053910 (2022).
6. Lili Zhao, Wenlu Lin, Y. J. Chung, K. W. Baldwin, L. N. Pfeiffer, **Yang Liu\***, “Finite Capacitive Response at the Quantum Hall Plateau”, *Chinese Physics Letters* 39, 097301 (2022).
7. Yoon Jang Chung, S. Yuan, **Yang Liu\***, K. W. Baldwin, K. W. West, M. Shayegan, L. N. Pfeiffer\*, “Heterostructure design for high-quality, high-density, GaAs two-dimensional electron systems at large hydrostatic pressures”, *Appl. Phys. Lett.* 117, 022102 (2020).
8. Ke Huang, Pengjie Wang, L. N. Pfeiffer, K. W. West, K. W. Baldwin, **Yang Liu\***, and Xi Lin\*, “Resymmetrizing Broken Symmetry with Hydraulic Pressure”, *Phys. Rev. Lett.* 123, 206602 (2019).

### Manuscript Under Submission or Preparation

1. Mengmeng Wu, Xiao Liu, Renfei Wang, Yoon Jang Chung, Adhuth Gupta, K. W. Baldwin, L. N. Pfeiffer, Xi Lin\*, **Yang Liu\***, “Morphing of Quantum Phases When Hosting Current”, submitted to *Phys. Rev. Lett.*, arXiv: 2307.02045 (2023).
2. Mengmeng Wu, Xiao Liu, Renfei Wang, Xi Lin\*, and **Yang Liu\***, “A high-speed, high-resolution thermometer using surface acoustic wave delay-line”, submitted to *Rev. Sci. Instr.*, arXiv: 2311.01718 (2023).
3. Shuai Yuan, Jiaojie Yan, Ke Huang, Zhimou Chen, Haoran Fan, L. N. Pfeiffer, K. W. West, **Yang Liu\***, Xi Lin\*, “Pseudospin Polarization of Composite Fermions under Uniaxial Strain”, submitted to *Phys. Rev. Lett.*
4. Xin Qin, Xingyu Wang, Wenshan Hong, Yuan Li, Huiqian Luo, Shiliang Li\*, and **Yang Liu\***, “Electronic Phase Propagation Speed in BaFe<sub>2</sub>As<sub>2</sub> Revealed by Dilatometry”, submitted to *Phys. Rev. Lett.*, arXiv:2311.18442 (2023).
5. Xin Qin, Guoxin Cao, Xingyu Wang, Wenshan Hong, Yuan Li, Huiqian Luo, Shiliang Li, and **Yang Liu\***, “An ultra-high-resolution AC dilatometry using fiber-interferometer”, submitted to *Rev. Sci. Instr.*, arXiv:2311.16641 (2023).
6. Renfei Wang, Xiao Liu, Mengmeng Wu, Adhuth Gupta, K. W. Baldwin, L. N. Pfeiffer, M. Shayegan, **Yang Liu\***, “Phonon drag of quasiparticles of quantum Hall liquid”, manuscript in prepare.
7. Wenlu Lin, Wenxuan Wang, Shimin Cao, Miao Liang, Jinhua Gao, Jianhao Chen\*, Xiaobo Lu\*, **Yang Liu\***, “Interaction induced gap in twisted graphene”, manuscript in prepare.
8. Daiqiang Huang, Xinghao Wang, R. R. Du and **Yang Liu\***, “Diamagnetism oscillation of 2D electrons detected by MOKE”, manuscript in prepare.
9. *Many others (>5) will be prepared/ finished in the next few months.*

### Conferences (since 2018)

- The workshop on fractional quantum Hall beyond Chern-Simons theory (2019)
- The joint PKU-OSU workshop on topological and quantum materials (2019)
- The 8<sup>th</sup> international workshop on emergent phenomena in quantum Hall systems (2021)
- The 17<sup>th</sup> (Chinese) conference on low temperature physics (2021)
- The 24<sup>th</sup> international conference on electronic properties of two-dimensional systems (2023)
- The international workshop on “quantum phenomena in 2D matter” (2023)
- The (Chinese) conference of condensed matter physics (2023)

### Academic and Departmental Services

- Local organizer for the 7<sup>th</sup> International workshop on Emergent Phenomena in Quantum Hall Systems
- Experimental faculty search committee member, 2022-2023
- Student committee member, 2021-2023
- Cleanroom operation committee member, 2021-2023; committee chair, 2022-2023