Xiaomeng Liu

PCCM postdoctoral fellow, Princeton University
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Education:

Ph.D., Harvard University (Physics) 2019   Adviser: Philip Kim
Thesis: "Correlated Electron States in Coupled Graphene Double-layer Heterostructures"

M.S., Columbia University (Applied Physics) 2013

B.S., Peking University (Physics) 2012

Honors:

PCCM postdoctoral fellowship, Princeton University (2019)

Publications:

[†]Corresponding author; [*]equal contribution

1. **X. Liu**[*], J.I.A Li[*], K. Watanabe, T. Taniguchi, J. Hone, B. I. Halperin, C. R. Dean & P. Kim[†]. "Crossover between strongly-coupled and weakly-coupled exciton superfluids." *arXiv:2012.05916.*

2. Y. Jia, P. Wang, C. Chiu, Z. Song, G. Yu, B. Jäck, S. Lei, S. Klemenz, F. A. Cevallos, M. Onyszczak, N. Fishchenko, **X. Liu**, G. Farahi, F. Xie, Y. Xu, K. Watanabe, T. Taniguchi, B. A. Bernevig, R. J. Cava, L. M. Schoop, A. Yazdani, S. Wu. "Evidence for a Monolayer Excitonic Insulator.", *arXiv:2010.05390.*

3. **X. Liu**[*], J.I.A Li[*], K. Watanabe, T. Taniguchi, C. R. Dean & P. Kim[†]. "Exciton insulator in electron-hole graphene double-layer." *in preparation.*

4. **X. Liu**[*], C. Chiu[*], J. Y. Lee, G. Farahi, K. Watanabe, T. Taniguchi, A. Vishwanath, A. Yazdani[†]. "Spectroscopy of a Tunable Moiré System with a Correlated and Topological Flat Band." *Nature Communications 12, 2732* (2021).

5. **X. Liu**[*†], Z. Hao[*], E. Khalaf, J. Y. Lee, Y. Ronen, H. Yoo, D. H. Najafabadi, K. Watanabe, T. Taniguchi, A. Vishwanath, P. Kim[†]. "Tunable spin-polarized correlated states in twisted double bilayer graphene." *Nature, 583, 221-225* (2020).

6. M. C. Diamantini, A. Yu. Mironov, S. V. Postolova, **X. Liu**, Z. Hao, D. M. Silevitch, Ya. Kopelevich, P. Kim, C. A. Trugenberger, V. M. Vinokur. "Bosonic topological insulator intermediate state in the superconductor-insulator transition." *Physical Review A, 384, 126570* (2020).

7. Y. Xie, B. Lian, B. Jack, **X. Liu**, C. Chiu, K. Watanabe, T. Taniguchi, B.A. Bernevig, A. Yazdani[†]. "Spectroscopic signatures of many-body correlations in magic-angle twisted bilayer graphene." *Nature 572, 101–105* (2019).

8. J. Y. Lee, E. Khalaf, S. Liu, **X. Liu**, Z. Hao, P. Kim, A. Vishwanath[†]. "Theory of correlated insulating behaviour and spin-triplet superconductivity in twisted double bilayer graphene." *Nature Communications 10,5333* (2019).

9. **X. Liu**, Z. Hao, K. Watanabe, T. Taniguchi, B. Halperin, P. Kim[†]. "Interlayer fractional quantum Hall effect in a coupled graphene double-layer." *Nature Physics 15, 893–897* (2019).

10. B. Jiang, G. Ni, Z. Addison, J. Shi, **X. Liu**, S. Zhao, P. Kim, E. Mele, D. Basov & M. Fogler[†]. "Plasmon reflections by topological electronic boundaries in bilayer graphene." *Nano letters 17 (11), 7080-7085* (2017).

11. **X. Liu**, K. Watanabe, T. Taniguchi, B. I. Halperin & P. Kim[†]. "Quantum Hall drag of exciton superfluid in graphene." *Nature Physics 13, 746-750* (2017).

12. **X. Liu**, L. Wang, K. C. Fong, Y. Gao, P. Maher, K. Watanabe, T. Taniguchi, J. Hone, C. R. Dean & P. Kim[†]. "Frictional magneto-Coulomb drag in graphene double-layer heterostructures." *Physical Review Letters, 119, 056802* (2017).

13. J. Crossno, J. K. Shi, K. Wang, **X. Liu**, A. Harzheim, A. Lucas, S. Sachdev, P. Kim, T. Taniguchi, K. Watanabe, T. A. Ohki & K. C. Fong[†]. "Observation of the Dirac fluid and the breakdown of the Wiedemann-Franz law in graphene." *Science 351, 1058–1061* (2016).

14. Y. Shimazaki, T. Yoshizawa, I. V. Borzenets, K. Wang, **X. Liu**, K. Watanabe, T. Taniguchi, P. Kim, M. Yamamoto & S. Tarucha[†]. "Landau level evolution driven by band hybridization in mirror symmetry broken ABA-stacked trilayer graphene." *arXiv: 1611.02395* (2016).

15. J. Crossno, **X. Liu**, T. A. Ohki, P. Kim & K. C. Fong[†]. "Development of high frequency and wide bandwidth Johnson noise thermometry." *Appl. Phys. Lett. 106, 23121* (2015).

Presentations:

"Scanning tunneling spectroscopy of quantum Hall ferromagnetic states in graphene." APS March Meeting, Mar. 2021

Invited: "Spin-polarized correlated insulator and superconductor in twisted double bilayer graphene." APS March Meeting, Mar. 2020 (cancelled)

Invited: "Emergent phenomena in graphene double-layers: from exciton condensation to interlayer fractional quantum Hall effect." EPQHS7, June 2019

"Spin-polarized correlated insulator and superconductor in twisted double bilayer graphene" APS March Meeting, Mar. 2019

KITP Workshop: Correlations in Moire Flat Bands, Jan. 2019

"Observation of interlayer anyon pairing through fractional quantum Hall drag" 23rd International Conference on High Magnetic Fields in Semiconductor Physics, June 2018

"BEC-BCS crossover of exciton condensation in graphene double-layer" GRC on Two Dimensional Electronics Beyond Graphene, June 2018

"BEC-BCS crossover of exciton condensation in graphene double-layer" APS March Meeting, Mar. 2018

"Quantum Hall drag of exciton condensation in bilayer graphene double layer" APS March Meeting, Mar. 2017

"Exciton superfluidity in graphene double layers" BACON+ Meeting, Sep. 2016

"Coulomb drag and exciton condensation in graphene quantum hall double layers" 33rd International Conference on the Physics of Semiconductors, Aug. 2016

"Anomalous Coulomb drag in bilayer graphene double layers" APS March Meeting, Mar. 2016

"Anomalous Coulomb drag in bilayer graphene double layers" Big Ideas in Quantum Material, Dec. 2015

"Coulomb drag in graphene quantum Hall bilayer systems" APS March Meeting, Mar. 2015

"Magneto and Hall drag in graphene double-layer" APS March Meeting, Mar. 2014

Expertise:

Graphene   *2D heterostructure stacking*   *Cryogenics (VTI, He3 and dilution-refrigerator)*

Nano-fabrication   *Quantum Hall effect*   *Low-noise electrical measurements*

Condensed Matter Physics   *Matlab*   *Electronics*

Scanning tunneling microscope (STM)   *Atomic force microscope (AFM)*

Skills:

Machining (CNC Mill, Lathe, laser cutter)   *2D&3D modelling (AutoCAD, Fusion360, Solidworks)*

C   Web designing (html, css, bootstrap, Wordpress)   Circuits design (EAGLE CAD)

Embedded system and programming (AVR microcontroller, AVR-C)   Illustrator &Photoshop