Ryan L. Lee

rllee@princeton.edu

Education

Princeton University
Ph.D. Physics, 2nd Year — *Fall 2020 – Present*
GPA: 4.0

University of California, Berkeley
B.A. Physics (Honors), Mathematics — *Fall 2016 – Fall 2019*
Physics GPA: 3.868

Work Experience

Prof. Ali Yazdani Group — **Princeton University**
Graduate Student Researcher — *August 2020 – Present*
Performed scanning tunneling microscopy of 2D materials at millikelvein temperatures and magnetic fields up to 9 T with a focus on graphene systems. Developing microscope for simultaneous atomic force microscopy, scanning tunneling microscopy, and transport. Collaborating with Princeton Plasma Physics Laboratory on a high-temperature superconductor magnet for condensed matter and nuclear fusion research.

Prof. Michael F. Crommie Group — **University of California, Berkeley**
Researcher — *October 2017 – August 2020*
Performed low-temperature scanning tunneling microscopy and atomic force microscopy of strongly correlated 2D materials, especially single-layer 1T-$TaSe_2$. Also performed x-ray magnetic circular dichroism measurements at Argonne National Laboratory to study magnetic properties of materials.

Princeton Physics Ambassadors — **Princeton University**
Secretary — *February, 2021–Present*
Performed outreach and recruiting of undergraduate students from underrepresented minorities for graduate school. Ran webinars and the Physics Prospective Ph.D. Preview (P4) program.

Dr. Adam Z. Weber Group — **Lawrence Berkeley National Laboratory**
Researcher — *March, 2017–January 2018*
Performed theoretical and experimental research of molecular dynamics in fuel cell membranes. Studied permeability of water and ions in hydrogen fuel cell polymer membranes through transport experiments and theoretical simulation using Python.

JoVE — **Cambridge, Massachusetts**
Author — *July 2018–July 2019*
Designed classroom laboratory experiments and filmed demonstration videos for the JoVE physics education program. Experiments and demonstrations designed for undergraduates and advanced high schoolers.

Publications

- K. P. Nuckolls*, **R. L. Lee***, M. Oh*, D. Wong*, T. Soejima*, J. P. Hong, D. Călugăru, J. Herzog-Arbeitman, B. Andrei Bernevig, K. Watanabe, T. Taniguchi, N. Regnault, M. P. Zaletel, A. Yazdani, "Quantum textures of the many-body wavefunctions in magic-angle graphene," Preprint at ***arXiv link***
- M. Oh*, K. P. Nuckolls*, D. Wong*, **R. L. Lee**, X. Liu, K. Watanabe, T. Taniguchi, A. Yazdani, "Evidence for unconventional superconductivity in twisted bilayer graphene," *Nature* (2021).
- Y. Chen, W. Ruan, M. Wu, S. Tang, H. Ryu, H.-Z. Tsai, **R. Lee** *et. al.*, "Strong Correlations and Orbital Texture in Single-Layer 1T-$TaSe_2$," *Nature Physics* **16**, 218–224 (2020).
- W. Ruan, Y. Chen, S. Tang, J. Hwang, H.-Z. Tsai, **R. Lee** *et. al.*, "Evidence for quantum spin liquid behavior in single-layer 1T-$TaSe_2$ from scanning tunnelling microscopy," *Nature Physics* (2021).

Awards

Summer Undergraduate Research Fellowship (SURF) **University of California, Berkeley**
Research fellowship *Summer 2019*
Awarded fellowship for proposed research on temperature dependence of Mott insulating behavior in 1T-$TaSe_2$ using scanning tunneling microscopy. Research presented at SURF conference at end of fellowship.

Summer Undergraduate Research Fellowship (SURF) **University of California, Berkeley**
Research fellowship *Summer 2018*
Awarded fellowship for research on electronic structure of 1T-$TaSe_2$ using scanning tunneling microscopy. Research presented at SURF poster session at end of fellowship.

Skills and Abilities

Research Skills

- Scanning tunneling microscopy
- 2D device fabrication
- Millikelvin cryogenics
- Machining (lathe, mill, drilling)
- SolidWorks
- Atomic force microscopy
- X-ray magnetic circular dichroism
- LabVIEW
- AutoCAD

Computing Skills

- Python
- Mathematica
- GUI Programming (wxWidgets)
- C++
- MATLAB