Ruishi Qi

Curriculum Vitae

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Research Areas

- Strongly correlated quantum matter
- Excitonic insulators and condensates
- Two-dimensional materials
- Low-temperature optics and transport

Academic Appointments

2026 – **Stanford Science Fellow**, Stanford University
Incoming fellow starting July 2026 Faculty host: Prof. Tony F. Heinz

Education

2020 – 2026 **Ph.D. in physics**, University of California, Berkeley
Advisor: Prof. Feng Wang
Thesis: Correlated exciton physics in van der Waals electron-hole bilayers

2020 – 2022 **M.A. in physics**, University of California, Berkeley

2016 – 2020 **B.S. in physics**, Peking University (PKU)
GPA: 3.9/4; Rank: $1/200^{+}$
Graduation honors: Weiming Scholar; Outstanding Graduate in Peking University; Outstanding Graduate of Beijing

Publications

30^{+} peer-reviewed articles; 1000^{+} citations. Full publication record: Google Scholar.

†: equal contribution; ‡: corresponding author.

Selected first- and corresponding-author publications

1. **R. Qi**†‡, Q. Li†, J. Nie, ..., F. Wang‡. Two-component exciton condensates in an electron-hole bilayer. ***Nature*** accepted. arXiv:2603.15443 (2026).

2. **R. Qi**†‡, Q. Li†, Z. Zhang, ..., F. Wang‡. Gate-tunable biexcitons in electron-hole-electron trilayers. Under revision at ***Science***.

3. **R. Qi**†, Q. Li†, H. Kim, ..., F. Wang‡. An exciton crystal in a moiré excitonic insulator. ***Nature Physics*** 22, 514-520 (2026).
Featured in *Nature Physics* News & Views; *Nature Reviews Materials* Research Highlight

4. **R. Qi**†, Q. Li†, Z. Zhang, ..., F. Wang‡. Competition between excitonic insulators and quantum Hall states in correlated electron-hole bilayers. ***Nature Materials*** 25, 35-41 (2026).

5. Z. Zhang†‡, **R. Qi**†, J. Xie, ..., F. Wang‡. Orbital dependent Coulomb drag in electron-hole bilayer graphene heterostructures. ***Physical Review Letters*** 136, 126303 (2026).
Featured in *Physical Review Letters* Editor's suggestion

6. Z. Lu†‡, **R. Qi**†, R. Dutta†, ..., F. Wang‡. Nature of emergent moiré excitations in

$MoSe_2/WS_2$ moiré superlattices. ***Nano Letters*** 26 (12), 4096-4102 (2026).

7. **R. Qi**, Q. Li, Z. Zhang, ..., F. Wang‡. Electrically controlled interlayer trion fluid in electron-hole bilayers. ***Science*** 390 (6770), 299-303 (2025).
   Featured in *Science* Perspective

8. **R. Qi**†, A. Joe†‡, Z. Zhang, ..., F. Wang‡. Perfect Coulomb drag and exciton transport in an excitonic insulator. ***Science*** 388 (6744), 278-283 (2025).
   Featured in *Journal Club for Condensed Matter Physics*

9. **R. Qi**†, A. Joe†‡, Z. Zhang, ..., F. Wang‡. Thermodynamic behavior of correlated electron-hole fluids in van der Waals heterostructures. ***Nature Communications*** 14, 8264 (2023).

10. **R. Qi**†, R. Shi†, Y. Li, ..., P. Gao‡. Measuring phonon dispersion at an interface. ***Nature*** 599, 399-403 (2021).

11. **R. Qi**†, N. Li†, J. Du, ..., P. Gao‡. Four-dimensional vibrational spectroscopy for nanoscale mapping of phonon dispersion in BN nanotubes. ***Nature Communications*** 12, 1179 (2021).

12. **R. Qi**†, R. Wang†, Y. Li, ..., P. Gao‡. Probing far-infrared surface phonon polaritons in semiconductor nanostructures at nanoscale. ***Nano Letters*** 19 (8), 5070-5076 (2019).

Honors and Fellowships

2026 – 2029 Stanford Science Fellow, Stanford University

2023 – 2024 Kavli ENSI Graduate Student Fellow, Kavli Energy NanoScience Institute

2018, 2019 National Scholarship (China)

Research Experience

2021 – 2026 **Graduate Student Researcher**, Department of Physics, UC Berkeley

Ultrafast nano-optics group (PI: Prof. Feng Wang)

- Established electrically tunable van der Waals electron-hole bilayers as a platform for correlated exciton phases, including interlayer excitons, trions, biexcitons, exciton condensates, and exciton crystals.
- Developed optical spectroscopy approaches for measuring compressibility, Coulomb drag, and transport properties in strongly interacting two-dimensional systems.
- Designed and performed low-temperature, high-magnetic-field optical and transport experiments down to 10 mK and up to 12 T.

2018 – 2021 **Undergraduate Research Assistant**, Peking University

Electron microscopy laboratory (PI: Prof. Peng Gao)

- Developed electron energy-loss spectroscopy techniques combining nanometer spatial resolution, high momentum resolution, and milli-electron-volt energy resolution.
- Investigated local lattice dynamics at heterointerfaces and nanostructures.

Teaching and Mentoring

2020 – 2021 **Graduate Student Instructor**, Department of Physics, UC Berkeley

Physics 7A: Physics for Scientists and Engineers (Fall 2020, Spring 2021)

Led discussion and laboratory sections; graded homework and exams; held office hours.

2023 – 2024 **Undergraduate Research Mentor**, Berkeley Physics Innovators Initiative (Pi^2)
Mentored Berkeley undergraduate researchers (selective funded research program).

2022, 2025 **Undergraduate Research Mentor**, Berkeley Physics International Education (BPIE)
Mentored visiting undergraduate researchers.

Talks and Presentations

2026 "Correlated exciton physics in strongly coupled electron-hole bilayers", APS March Meeting, Denver

2026 "Excitonic insulators and condensates in electron-hole bilayers" (Poster), New Frontiers in Nanoscale Materials 2026 Symposium

2025 "Interlayer excitons and trions in electron-hole bilayers", Berkeley Condensed Matter Seminar

2024 "Perfect Coulomb drag and exciton transport in an excitonic insulator", APS March Meeting, Minneapolis

2024 "Correlated interlayer excitons and trions in electron-hole bilayers" (Poster), Kavli ENSI 10th Anniversary Symposium