Kaiming Liu

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EDUCATION

Sept 2017 – Jul 2023 (expected) **Xi'an Jiaotong University** (XJTU) | Xi'an, P.R.China

Sept 2017 – Jul 2019 *Pre-university education*

Honors Youth Program, School of Gifted Young

Sept 2019 – Jul 2023 (expected) *Bachelor of Science in Physics*

Honors Science Program (Physics), School of Physics

GPA: 3.89 / 4.3 (90.46 / 100) | Ranking: 2nd/200 (School of Physics)

Core Courses:

Optics (95/100) Contemporary Physics Experiment (98/100)

Calculus-2 (95/100) Methods of Mathematical Physics (91/100)

Atomic Physics (97/100) Basic Physical Experiment (98/100)

Thermal Physics (98/100) Probability Theory (96/100)

Aug 2021 – Dec 2021 **The University of California, Berkeley** (UCB) | CA, US

Exchange Student of BPIE program GPA: 4.0 / 4.0 | Grade Level: A

Core Courses:

Quantum Mechanics (A+)

Introduction to Statistical and Thermal Physics (A)

Introduction to Computational Techniques in Physics (A)

SCHOLARSHIP & AWARDS

2019 China Undergraduate Physics Tournament Northwest Division (*The First Prize*)

2019 China Undergraduate Physics Tournament Finals (*Grand Price, Top four teams of China*)

2020 Mathematical Contest in Modeling in China, Shannxi Division (*The First Prize, **1% of 500 teams***)

2020 Xi'an Jiaotong Academic Scholarship (*Awarded to undergraduates with great performance in research*)

2021 Mathematical Contest in Modeling (*Meritorious Winner, Top 7% of **20,000 teams** worldwide*)

2020, 2021 Everest Scholarship, Xi'an Jiaotong University (*Highest Honor in the School of Physics, **top 1%***)

2021 National Scholarship (*Highest scholarship awarded by the Chinese government, **Top 20 students out of 16000 undergraduates***)

PUBLICATIONS & MANUSCRIPTS

1 **Kaiming Liu**, Yajie Zhou, Shumin Zhao, Hongli Wang. Fluid suspension and its stability[J]. *Physics Experimentation*, 2021, 41(03): 46-53+58. DOI:10.19655/j.cnki.1005-4642.2021.03.010

2 Peter H. Jacobse, Michael C. Daugherty, Kristiāns Čerņevičs, Ziyi Wang, Ryan D. McCurdy, Reis Dorit, **Kaiming Liu**, Jiaming Lu, Oleg V. Yazyev, Felix R. Fischer, Michael F. Crommie. Decoupling localized modes in nanographenes. Manuscript in preparation.

LANGUAGE SKILLS

TOEFL iBT 108/120 (Reading 28, Listening 26, Speaking 25, Writing 29)

RESEARCH EXPERIENCE

Aug 2018 – Aug 2019 **Xi'an Jiaotong University** | Xi'an, P.R.China
Contestant of the China Undergraduate Physics Tournament
Advisor: Prof. Shumin Zhao & Prof. Hongli Wang

Project: Fluid Suspension and its stability

Description: A light cylinder will start to spin while being suspended near the edge of a water jet.

- I used the Navier-Stokes equation and boundary layer theory to build a theoretical model and proved that this effect is caused by the pressure difference.
- Working with another undergraduate student, I completed a numerical simulation of this model to solve for the velocity field around the suspended cylinder.
- I designed and built the experimental device independently, successfully suspended cylinders and spheres of different sizes, and measured their stability.

Oct 2021 – Dec 2021 **The University of California, Berkeley** | CA, U.S
Research Assistant of Prof. Crommie's Group
Advisor: Prof. Michael F. Crommie, Department of Physics

Project 1: "Daisy Chain" on Au(111) surface

Description: Studied the behavior of the magnetic ground state of dibenzoquateranthene (DBQA) on a gold surface with scanning tunneling microscopy (STM).

- I learned to use Matrix-Assisted Direct (MAD) Transfer and Bottom-Up Approach to achieve an on-surface synthesis of poly-DBQA from precursor iodophenyl-bromobianthryl (PBA).
- I mastered many experimental skills of Scanning Probe Measurements, such as annealing, sputtering, transferring samples, and refilling liquid Helium and Liquid Nitrogen. etc.
- I learned to use software to control STM to get topographic images of poly-DBQA chains. ("Daisy Chain")

Project 2: Five-fold structure on Au(111) surface

Description: Proposed a method for synthesizing five-fold structures on a gold surface.

- I used the Bottom-Up approach to synthesize five-fold structures from five-membered ring molecules.
- I collaborated with my colleagues to get topographic images of five-point star structures by STM.

Project 3: Single strands of deoxyribonucleic acid (DNA) on Au(111) surface

Description: Studied the behavior and structure of single strands of DNA on a gold surface with STM.

- After the training on the first two projects, I mastered a lot of experimental skills. Therefore, in this project, I finished MAD Transfer independently to achieve the on-surface synthesis of single strands of DNA.
- I collaborated with my colleagues to get topographic images of single strands of DNA by STM.

Mar 2022 – Now **Xi'an Jiaotong University** | Xi'an, P.R.China
Research Assistant of Quantum Many-body Physics and Quantum Information in Cold Atoms Group
Advisors: Prof. Yongchang Zhang, School of Physics

Project: Rydberg atomic system and quantum nonlinear optics

Description Couple Rydberg atoms and photons to create interactions between coupled systems. Therefore, we can use this property to realize the function of a qubit gate.

- I reproduced the derivation of the Hamiltonian matrix of the Rydberg atomic system. Additionally, I developed a deeper understanding of the physical nature behind the Rydberg atoms.
- My colleagues and I designed and co-proposed the realization of qubit gates through the interaction of Rydberg atomic systems coupled with photons.
- I used MATLAB to conduct numerical simulations of the Rydberg atomic system, such as the energy distance relationship and time evolution of dark-state polariton. I developed a better understanding of photon-mediated atomic interactions from numerical simulation.