Ningxu Zhu

+86 18082835881 ningxuzhu1217@gmail.com

Education

University of Science and Technology of China (USTC) **Sep. 2021 – Present**
Bachelor of Science in Physics **Expected in Jun. 2025**
Major: Photoelectric Information Science and Engineering
Overall GPA: 3.76/4.30 Ranking: 7/37

Research Interests

Atomic, Molecular, and Optical Physics (AMO)

- *Cavity quantum electrodynamics (cavity QED)*: How can we precisely control the quantum states? How does the coupling between atoms (or molecules) and photons provide insights into some unsolvable many-body Hamiltonians?
- *Spectroscopy*: Various spectroscopy techniques, including infrared, photoluminescence, and terahertz spectroscopy, to explore the potential applications of quantum behaviors in materials.

Research Experience

Terahertz time-domain spectroscopy studies of cavity QED systems **Jul. 2024 – Present**
Advisor: Prof. Junichiro Kono, Rice University

- Extracted the complex optical conductivity of a superconducting film embedded in free space or in a one-dimensional photonic crystal cavity from transmittence spectra as a function of temperature and magnetic field.
- Applied the Mattis-Bardeen model to analyze changes in superconducting gap (2Δ) or transition temperature (T_c), identifying a potential decrease in T_c induced by the quantum vacuum electromagnetic fields.

Ultrastable cavity for improving laser's frequency stability **Oct. 2023 – Jan. 2024**
Advisor: Prof. Jian Wang, USTC

- Designed a vacuum chamber ($10^{-7}mbar$) and temperature control solution to stabilize the length of an ultrastable cavity, enabling effective use of Pound–Drever–Hall (PDH) method to improve laser frequency stability ($\frac{\delta\nu}{\nu} \approx 10^{-12}$).
- Assembled electronic components into a PDH circuit to generate the error signal, enabling modulation of the laser frequency to achieve resonance with an ultrastable cavity.

Time sequence control in AMO experiment **May 2023 – Sep. 2023**
Advisor: Prof. Jian Wang, USTC

- Developed a LabVIEW program to synchronize voltage outputs across 16 channels and ensured successful interaction with Field-Programmable Gate Array, enabling atoms to load into an optical dipole trap.

Honors

Outstanding Student Cadre of the School of Physical Sciences **Dec. 2023**
Endeavour Scholarship **Nov. 2023**
Outstanding Student Scholarship **Nov. 2022**

Skills

Computer Skills: C, Python, MATLAB, LabVIEW, LaTeX
TOEFL: 99 (Reading: 25; Listening: 26, Writing: 25, Speaking: 23)

Teaching Experience

Teaching Assistant for Electrodynamic (90 undergraduate students) **Spring 2024**

Extracurricular Activities

Class president **Sep. 2021 – Present**
Science popularization to rural primary school students **Sichuan, Aug. 2023**
A tour guide at technology events **USTC, Nov. 2022**