Ziyu He

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RESEARCH INTERESTS

Waveguide QED, Circuit QED, Quantum Computation, Quantum Simulation, Quantum Optics

EDUCATION

Sun Yat-sen University, Guangzhou, China — 9.2021 — 6.2025(Expected)
Bachelor's Degree in Physics — **GPA: 4.0/4.0, Ranking: 4/95**

ACADEMIC EXPERIENCE

Numerical Study of Quantum Pulse Interaction with Localized Quantum Systems — 12.2023 — Present
Supervisor: Prof Zeliang Xiang

- Starting a research initiative using the numerical method developed by Prof.K.Mølmer's group in Phys. Rev. Lett. 123, 123604, focusing on the dynamics between incident light in varied quantum states and localized quantum systems within a waveguide.
- Aim to contribute to the advancement of quantum communication by encoding information into temporal modes.
- Applying the QuTiP library within Python to simulate the dynamical evolution of light-quantum system interactions.

Tunable Giant Atom in a Dual-Rail Quantum Network — 11.2022 — 12.2023
Supervisor: Prof Zeliang Xiang

- Contributed to a project that theoretically designed a giant atom configuration within dual-rail waveguides, setting a new approach in quantum routing and photon manipulation.
- Conducted calculations of the scattering properties of incident photons by giant atom, enabling a suite of applications, including quantum router, circulator, and teleportation by manipulation of parameters.
- Currently collaborating in the preparation of our research findings for publication, underscoring the potential implications of our work in advancing the quantum networks.

PROJECTS

China Undergraduate Physics Tournament — 11.2021 — 10.2022
Working as a Team Captain, Faculty Advisor: Prof Jian Tang

- Led a team through a challenging physics contest, navigating through seventeen intricate problems that demanded a blend of theoretical modeling, experimental design, and data interpretation, culminating in the development and defense of a comprehensive report.
- Took charge of the "Droplet Explosion" project, conducting an in-depth investigation into the wetting dynamics of water-ethanol solutions and the Rayleigh-Plateau instability at a three-phase contact line.
- Our concerted efforts were recognized with top honors, securing first place in the South Central Regional Competition and fifth place in the National Competition. My standout performance in the "Droplet Explosion" project earned me the prestigious 'Best Player' award.

PUBLICATIONS

- Rui-Yang Gong, Zi-Yu He, Ge-Fei Zhang, Ze-Liang Xiang*, "Tunable Giant Atom in a Dual-Rail Quantum Network" (In-Progress for npj quantum information)

SELECTED COURSES

Theoretical Physics Courses

- Theoretical Mechanics: 96.4
- Electrodynamics: 95
- Thermodynamics and Statistical Physics: 98
- Quantum Mechanics: 97
- Solid State Physics: 95
- Methods of Mathematical Physics: 94
- Group Theory in Physics: 96

Numerical & Experimental Physics Courses

- Numerical Calculations: 98
- Analysis of circuits: 97
- Electronic Technology: Analog Electronics: 92
- Electronic Technology: Digital Circuit: 92
- Experiments in Electronic Technology: 93
- Basic Designed Physics Experiment: 90
- Advanced Laboratory I: 89

AWARDS

First Prize of SYSU Outstanding Student Scholarship 10.2023 & 10.2022
Top 5% in Physics major, Sun Yat-sen University

The 13th China Undergraduate Physics Tournament(Team) 10.2022
First prize, ranked fifth nationwide, working as a team captain

National Undergraduate Mathematical Contest in Modelling 9.2022
First Prize in Guangdong Province Division, China Society for Industrial and Applied Mathematics

The 13th China Undergraduate Physics Tournament (Central South Division)(Team) 5.2022
First prize, ranked first in the division, working as a team captain

The Best Player in the 13th China Undergraduate Physics Tournament (Central South Division) 5.2022
The top one in the Central South Division

OTHER EXPERIENCES

Society of Physics Students Guangzhou, China
Vice President 9.2022 — 7.2023

- Spearheaded the organization of academic seminars, enhancing the scholarly community by facilitating knowledge exchange and fostering academic discussions among students.
- Played a pivotal role in enriching the academic environment by inviting esteemed professors to deliver insightful reports on cutting-edge physics research and developments.
- Initiated and coordinated sessions led by senior students to share valuable scientific research skills, techniques, and experiences, contributing to the professional growth of peers.

ENGLISH TESTS

TOEFL: 104
Listening: 29 — Reading: 29 — Speaking: 23 — Writing: 23
Test date: 10.2023

SKILLS

- **Advanced Theoretical Study:** Quantum Field Theory, Quantum Optics, Quantum Many-Body Theory
- **Programming:** Mathematica MATLAB Python(QuTiP) C++

REFERENCES

Prof. Zeliang Xiang
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Google Scholar