CV

Personal Information

Last Name	Huang	First Name	Longxiang
Birthplace	Shaanxi, China	Birth Date	06.03.2000
Gender	Male	Marital Status	Single
Nationality	Chinese	Mobile Phone	0086-15029268029
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Education Background

University of Science and Technology of China (USTC) Anhui, China

- Bachelor of Science in Physics (Atomic and Molecular Physics) 09.2018-06.2022
- GPA: 3.55/4.3; 85.67/100
- Honors: 01.2020 Excellent Student Scholarship-Bronze awarded by USTC
  12.2018 Excellent Student Scholarship-Silver awarded by USTC

Internship Experience

***Intern*, Shanghai Institute of Optics and Fine Mechanics, CAS** 07.2021-08.2021

- Researched the External Protection Circuit of the Atomic Chip and Fringe-free Absorption Images of Cold Atoms;
- Debugged and improved the external protection circuit of the atomic chip to prevent the continuous current from causing the wire on the chip surface to fuse;
- Developed programs based on Optimized Fringe Removal Algorithm to obtain absorption images of cold atoms without fringe;
- Participated in academic discussions with supervisor and graduate students on experiments in cold atomic physics.

Research & Project Experience

***Graduation Thesis,* Reduction of Qubits in Variational Quantum Eigensolver on Trapped Ions** 03.2022-06.2022

CAS Key Laboratory of Microscale Magnetic Resonance

- Learned the hybrid variational quantum eigensolver algorithms applied to solve problems in quantum chemistry, nuclear physics and condensed matter physics;
- Learned 'Strong Quantum Contextuality' that classifies non-contextual and contextual subspace of a given Hamiltonian, where reduced contextual Hamiltonian leads to reduction of qubits;
- Implemented 'Tapering Off' methods and contextual variational quantum eigensolver algorithm to calculate ground energy of the water molecular, where scale of Hamiltonian shrinks from original 14 qubits to 7 qubits;
- Designed the quantum circuit based on hardware-efficient ansatz and compared results simulated on Qiskit package in different scales and variational algorithms;
- Designed a quantum circuit applying variational quantum algorithm in 7 qubits on trapped ions, where the high-fidelity two-qubit gate is achieved in optimized pulse shape and simulated on Qutip package with 99.998% fidelity.

***Key Member,* Design of Multi-channel Lowpass Filters for Axial Trapping DC Signals** 12.2021-03.2022

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- Designed a paradigm PCB for the four-channel lowpass filtering circuit, welded the circuit board independently and measured by network analyzer with 478 kHz in -3 dB;
- Packaged 5 sets of electronic system that adds up to 60 channels, where two of them were already used in the low-temperature ion trap and one was used in the for the blade trap.

***Key Member,* Visualization of Position of Beam Based on 2D Lateral Effect PSD** 03.2020-08.2021

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- ✧ Learned 2D Lateral Effect PSD intended to report the specific position of the beam and assist in monitoring and stabilizing optical path in experiments;
- ✧ Designed a paradigm PCB for the double-channel dividing circuit using the operational amplifier and processed real displacement of the beam to the center of sensor by dividing output signals;
- ✧ Welded the circuit board independently and packaged the whole electronic system to realize signal division module, which was already used in doppler cooling system for trapping Ca;
- ✧ Designed and built a 405nm optical path with a 3-axis adjustable displacement platform for testing;
- ✧ Analyzed and compared processed output signals with real displacements, which is at least 99.8% linear relevant with 1.032 scale factor.

***Team Leader & Lecturer*, Experiment Based on Stimulated Raman Scattering of CVD-Diamond** 09.2020-01.2021

Physics Experiment Teaching Center, University of Science and Technology of China

- ✧ Explored the 532 nm laser frequency conversion technology based on the stimulated Raman effect of the diamond;
- ✧ Built an optical path for research using lasers and optical instruments, including an optical cavity that can select and amplify the output of a specific frequency;
- ✧ Used the stimulated Raman effect of diamond to transform the frequency of the incident laser and obtained a short and stable outgoing laser;
- ✧ Found the optical component of the frequency change (1st Stokes's effect in 573nm and 2nd Stokes's effect in 620nm) caused by diamond stimulated Raman effect after analyzing the frequency and intensity of the outgoing laser by a spectrum analyzer, which verified the existence of this effect;
- ✧ Calculated the photon conversion rate and energy conversion rate (1st stokes effect about 1% and 2nd stokes effect about 0.1%) of the laser through the whole device;
- ✧ Analyzed the undesired optical effects of unparallel surfaces of diamond and put forward improvement on the experiment;
- ✧ Won the second prize of the 16th (2020) University Physics Innovative Research Experimental Paper Competition.

***Key Member*, Study of Discrete Time Crystal Based on Trapping Ions** 09.2019-06.2020

CAS Key Laboratory of Microscale Magnetic Resonance

- ✧ Simulated the many-body system about 10 ions with Qutip and perfectly presented the results of the experiment by constructing a Hamiltonian similar to the experiment;
- ✧ Compared the simulation results with the results given in the article and proposed that the current decoherence was mainly caused by fluctuation of two far detuning Raman laser intensity and residual interaction in simulating Ising model;
- ✧ Presented on a journal club to introduce this work to my peers based on the research results and simulation results

Skill

Computer skills: C, Python (especially Qutip and Qiskit), Wolfram Mathematica, and MATLAB, *etc*.

Wet Laboratory: Circuit board (PCB) designing and drawing based on **Altium Designer**, Circuit board (PCB) wielding, Mechanical drawing and processing based on **Inventor**, Designing and Setting up simple optical path, and Simulation of multi-physical field coupling model based on **Comosol,** *etc.*