

# CHEN HUANG

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## EDUCATION

- **Imperial College London** London, UK  
*M.Sc. in Physics with Extended Research, advised by Dr. John Michniewicz* *Sep. 2023 – Jun. 2025 (Expected)*
  - **Relevant Coursework:** Quantum Information, Quantum Optics, Quantum Theory of Matter
- **Huazhong University of Science and Technology (HUST)** Wuhan, CN  
*B.S. in Physics, advised by Prof. Jianming Cai* *GPA: 89.5/100 (top 5%)* *Sep. 2018 – Jun. 2022*

## RESEARCH EXPERIENCE

- **Quantum Optics and Laser Science (QOLS) Group, Imperial College London** London, UK  
*Graduate Researcher, advised by Dr. John Michniewicz* *Jun. 2024 – Present*
  - Charge Noise in Semiconductor Spin Qubits for Quantum Computing**
    - Conducted wire bonding to connect quantum devices to chip holders for cryogenic characterization.
    - Characterized charge transport in semiconductor quantum dots using dilution refrigerators.
    - Developed a Python package standardizing experimental device communication, improving efficiency.
- **Quantum Operating System Group, Beijing Academy of Quantum Information Sciences (BAQIS)** Beijing, CN  
*Research Intern (Remote), advised by Dr. Jingbo Wang* *May 2024 – Present*
  - Compilation for Neutral Atom Quantum Computing**
    - Designed a novel zoned architecture for neutral atom quantum platforms, enhancing scalability and enabling parallelism.
    - Developed a Python-based compiler optimizing qubit placement and routing, utilizing ASAP scheduling and simulated annealing.
    - Achieved a 5.4x improvement in quantum circuit fidelity for 100-qubit systems compared to existing implementations.
- **Institute for Quantum Computing, Baidu, Inc.** Beijing, CN  
*Research Intern, advised by Dr. Jingbo Wang* *Mar. 2023 – Sep. 2023*
  - Automated Calibration of Experimental Parameters in Trapped-Ion Quantum Computer**
    - Designed a calibration framework for trapped-ion systems, enabling precise measurement of phonon frequencies and Lamb-Dicke parameters.
    - Developed automated Python-based calibration tools, reducing manual intervention and improving parameter accuracy.
    - Contributed to three patents on improved calibration techniques for trapped-ion quantum computing.
- **International Joint Lab on Quantum Sensing and Quantum Metrology, HUST** Wuhan, CN  
*Undergraduate Researcher, advised by Prof. Jianming Cai* *Apr. 2019 – Dec. 2022*
  - Nanoscale Detection of Ions Using a Spin Quantum Sensor (Final Year Project)**
    - Solved the Poisson-Nernst-Planck (PNP) equation using MATLAB to model electrostatic potential and ion distribution.
    - Developed a 2D axisymmetric model of a Surface Forces Apparatus cavity and conducted finite element analysis in COMSOL.
    - Investigated ion dynamics under AC voltage in a simplified 1D SFA model, establishing correlations between AC voltage and NV-based sensing.
  - Measurements of Entangled Qubits**
    - Conducted experiments on photon polarization-entangled qubits generated via SPDC in nonlinear BBO crystals, achieving high concurrence (0.825) verified through quantum state tomography.
    - Reconstructed density matrices of entangled photon pairs, demonstrating Bell inequality violation.
    - Applied QuTiP to compute entanglement measures and visualize quantum states.

## PUBLICATIONS

- **C. Huang**, X. Zhao, H. Xu, W. Zhuang, M.-J. Hu, D. E. Liu, and J. Wang, “ZAP: Zoned Architecture and Parallelizable Compiler for Field Programmable Atom Array,” *arXiv preprint arXiv:2411.14037*, 2024.

## PATENTS

- J. Wang and **C. Huang**, “Ion trap chip parameter determining method and device, electronic equipment and medium,” *Chinese Patent CN117371547*, Granted 2024.
- J. Wang and **C. Huang**, “Ion trap chip parameter calibration method and device, electronic equipment and medium,” *Chinese Patent CN117494829*, Granted 2024.
- **C. Huang** and J. Wang, “Ion trap chip parameter correction method and device, electronic equipment and medium,” *Chinese Patent CN117454997*, 2023.

## SKILLS

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- **Quantum Computing:** Qiskit, QuTiP, Quantum Circuit Compilation (Trapped-Ion & Neutral Atom), Automated Calibration of Experimental Systems
- **Experimental:** Dilution Refrigerators, Wire Bonding, Quantum Device Characterization, Scanning Tunneling Microscope (STM), Raman Spectrometer
- **Programming and Software:** Python (Scientific Computing, Package Development, Automation for Experimental Control), MATLAB,  $\text{\LaTeX}$ , Mathematica

## AWARDS AND HONORS

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- **China National Scholarship**, Ministry of Education of P.R. China, 2019 (*The highest honor for university students in China*)
- **Outstanding Undergraduate in Term of Academic Performance**, HUST, 2019 (*The greatest honor for undergraduates at HUST, top 1%*)
- **Yan Ji-Ci Scholarship**, Institute of Physics, Chinese Academy of Sciences, 2020
- **UCAS Scholarship**, University of Chinese Academy of Sciences, 2020
- **Outstanding Graduate**, HUST, 2022
- **Outstanding Intern**, Institute for Quantum Computing, Baidu, Inc., 2023

## LEADERSHIP

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- **Innovative Base of Physics Experiments (IBPE), HUST**

*Chairperson*

**Wuhan, CN**

*May 2019 – Jul. 2020*

- Led IBPE's annual academic meetings and organized seminars on advanced topics, including *Advanced Algebra*, *Quantum Mechanics*, and *Quantum Computing*.
- Mentored first-year student reading groups on *The Feynman Lectures on Physics*, guiding theoretical derivations, experimental design, and computational simulations.
- Established *IBPE Review Letters* to document and disseminate members' research contributions.