YIZHUO ZHANG

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EDUCATION

Imperial College London (ICL) *August 2024*
Bachelor of Science
Department of Physics
Relevant Courses: Linear Algebra, Computational Physics, Quantum Physics, Algorithm Design

EXPERIENCE

BSc Project Jan 2024 - Jun 2024
Supervisor: Prof. Richard Thompson ICL

- Designed an active compensation signal generation system to mitigate background magnetic field fluctuations for an ion trap experiment.
- Built electrical components on a prototype board, including amplifiers and a Bessel filter.
- Implemented a feedback loop using a Red Pitaya as a PID controller.

Summer Research Intern at EBIT Laboratory, Shanghai Jun 2023 - Sep 2023

- Contributed to the SMILETRAP experiment group by identifying optical lines and determining precise wavelengths for ionic transitions.
- Conducted lifetime measurements for metastable levels to advance atomic structure studies.

Bright Network Internship Experience (UK) Jun 2022 - Jul 2022

- Developed an optimal path finding algorithm for self-driving delivery vehicles, based on A* search algorithm.

Second-Year Computing Project Nov 2022 - Dec 2022

- Developed a simulation of non-ideal gaseous atoms in a circular container using Object-Oriented Programming (OOP).
- Simulated the behavior of molecular systems under various thermodynamic conditions, assuming negligible interaction forces.

GirlsWhoML at Imperial College London Sep 2022 - Jan 2023

- Participated in a machine learning course for women at Imperial College, covering concepts like linear regression, logistic regression, and supervised learning.

Star Detection Method Development Project Jun 2022 - Sep 2022

- Co-developed a novel star detection method by refining lightcurve and polar oscillator techniques.
- Automated the process with a loop requiring only two manually input parameters to identify celestial categories accurately.

Higgs Boson Signal Analysis Project Oct 2023 - Dec 2023

- Conducted a computational analysis to simulate the discovery process of the Higgs boson via its decay into photon pairs ($H \rightarrow \gamma\gamma$).

· Developed and optimized numerical algorithms for Higgs boson signal extraction using ODE solvers (Explicit/Implicit Euler), MC4 (4th-order Monte Carlo), RB4 (4th-order Romberg), and numerical integration techniques (Riemann Sum, Trapezoidal Rule). Implemented Newton's Method for optimization, refining statistical significance calculations, and applied Poisson/Gaussian models for hypothesis testing. Achieved optimal integration accuracy while balancing computational efficiency.
· Implemented a Gaussian function integrator and utilized 2D optimization techniques to determine optimal mass selection cuts for maximizing signal significance.(Used 3D color Map to visualize the optimazation).

First-Year Summer Project Mar 2021 - Jul 2021

· Led the experimental design and implementation to measure the speed of light using electromagnetic resonance in conducting cavity (Maxwell's Equations)
· Collaborated with a team to produce a final report, video presentation, and scientific poster summarizing the methodology and results.

Galaxy Number-Magnitude Relation Analysis Nov 2023-Dec 2023

· Analyzed galaxy counts vs magnitudes using SWIRE survey r-band images.
· Applied a Laplacian of Gaussian algorithm for source detection and performed photometric analysis.
· Identified deviations from theoretical models and proposed potential improvements.

Student Audio-Visual Assistant - Faculty of Natural Science Oct 2022 - Jun 2024

· Provided technical support for AV equipment during lectures and events, ensuring smooth operations.
· Managed and operated Crestron AV systems and Panopto lecture capture devices.
· Resolved technical issues promptly to minimize disruptions.

PUBLICATIONS

[1] Niu, B., **Zhang, Yizhuo.**, et al. "Optical lines of Xe^{9+} and Xe^{10+} ions measured at a low-energy electron beam ion trap." *Canadian Journal of Physics*, 17 November 2023.

- Conducted advanced computational analysis of spectroscopic data, developing and implementing algorithms to extract precise insights from complex datasets. Enhanced the accuracy and reliability of the research, such as applying curve-fitting techniques to quantify uncertainties in the findings.

[2] Qian, Y., Zhang, C., **Zhang, Yizhuo.**, et al. "The $3d^2D_{5/2}$-$2D_{3/2}$ magnetic dipole transition in potassium-like ions." *Journal of Physics B: Atomic, Molecular and Optical Physics*, 57(9), 095002, 5 April 2024.

- Conducted detailed analysis and interpretation of the data.
- Co-Writing and editing the manuscript.
- Contributed to data collection.

[3] Niu, B., Chen, J., Li, B., **Zhang, Yizhuo.**, et al. "Investigation of optical spectroscopy in W^{13+} ions." *Canadian Journal of Physics*, 17 April 2024.

- Data Collection and Analysis
- Assisted in the preparation and editing of the manuscript.

[4] Xu, P., Qian, Y., Liu, J., Jiang, Z., Jia, F., **Zhang, Yizhuo.**, et al. "Magnetic dipole lines of Sc-like Kr^{15+} and Br^{14+} ions." *Modern Physics Letters B*, January 14, 2024.

HONOURS AND ACTIVITIES

- Bpho Top Gold 2020

- Physics Bowl Silver 2020
- UKChO Silver (2020)
- Outstanding Debater at NHSDLC Shanghai Tournament
- 5 years of volunteering experience, contributing 179 hours of service with the Qingdao West Coast New Area Women's Federation. My work focused on raising funds to support the education of young women, including both participation in events and personal donations.

SKILLS/HOBBIES

Programming Languages/Tools	Python, HTML/CSS, C++ , Latex
Machine Learning Tools	Scikit-learn, Matplotlib, Pandas, NumPy, OpenCV etc
Graphics/Visualization	OpenGL, Shaders
Hobbies	Hiking, debating, horse riding and swimming