Zhao-Qing Lin

Msc. Physics and Astronomy, Theory track
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Zhao-Qing Lin
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Research Interests

Precision measurement; data analysis; gravitational waves; dark-matter detection; cosmology; beyond standard model physics; quantum field theory; sensor development

Education

2021–2023 & 2024-2025 **M.Sc. in Theoretical Physics, University of Amsterdam, & Vrije University Amsterdam, Amsterdam, Netherlands**

- Supervisor: Dr. Conor Mow-Lowry
- Thesis: Building Position Sensing System for the Reference Mass of OmniSens – a Potential Technology for Einstein Telescope at Low Frequency Science
- Designed, modeled, and bench-tested capacitive position-sensor (CPS) electronics, validated transfer functions and noise to $7 \times 10^{-8}\,\mathrm{m}/\sqrt{\mathrm{Hz}}$ at 0.1 Hz
- Integrated and calibrated CPS with interferometric readout for inertial isolation inspired by the Laser Interferometer Space Antenna (LISA) test mass.

2017–2021 **B.Sc. in Physics, University of Chinese Academy of Sciences (UCAS), Beijing, China**

- Supervisor: Prof. Yun-Song Piao
- Thesis: Research on the Hubble Tension Based on Early Dark Energy Models
- Simulated Early Dark Energy model with an AdS–-ϕ^4 potential; incorporated a dark-fluid–like Λ term and assessed its impact on the Hubble-constant tension.

Research Experience

Jun. 2024 **Visiting Student, Key laboratory of Microscale Magnetic Resonance, Chinese Academy of Sciences, Anhui, China**

- Supervisor: Dr. Min Jiang
- Reproduced the intensity-interferometry analysis for ultralight bosonic dark matter from *Phys. Rev. D 108, 015003.*

Mar. 2024 –Jun. 2024 **Research Intern, Center for Gravitational Experiments, Wuhan, China**

- Supervisor: Prof. Peng-Shun Luo
- Analyzed data, refactored code for atomic-force-microscope (AFM) search for exotic spin–spin interactions.
- Delivered a seminar deriving the 16-potential in the fifth force search from quantum field theory.

Sep. 2020 –Mar. 2021 **Research Intern, Laboratory of Atomic and Molecular Photonics, UCAS, Beijing, China**

- Supervisor: Dr. Feng-Dong Jia
- Theoretical analysis of two experiments aimed at extension of quantum sensors based on Rydberg atoms for precision microwave measurements.

Jun. 2019 **Summer School Student, Beijing Spectrometer III, Institute of High Energy, Beijing, China**

- Supervisor: Prof. Xiao-Rui Lyu
- Identified Charmonium decay of $\psi(3686) \to e^+e^-\chi_{cJ}\,(J = 0, 1, 2)$, $\chi_{cJ} \to e^+e^-J/\psi$.

Publications

2021 [1] F.-D. Jia, H.-Y. Zhang, X.-B. Liu, *et al.*, "Transfer phase of microwave to beat amplitude in a Rydberg atom-based mixer by Zeeman modulation," J. Phys. B: At., Mol. Opt. Phys. 54(16), 165501 (2021).

2021 [2] F.-D. Jia, X.-B. Liu, J. Mei, *et al.*, "Span shift and extension of quantum microwave electrometry with Rydberg atoms dressed by an auxiliary microwave field," Phys. Rev. A 103(6), 063113 (2021).

Non-Academic Activities & Outreach

JAN. 2025 **Individual Project, Nationaal Instituut voor Subatomaire Fysica (Nikhef), Amsterdam, Netherlands**

- Led a team to design and produce a customized board game based on interferometer, representing the Nikhef Gravitational Waves group as a retirement gift for Prof. Frank Linde.

JAN. 2024 **Intern, Wei Ming School, Remote**

- Built an AI agent for an English-exam question bank using `LangChain`.

SEP. 2021 –JUN. 2022 **Social Media Operator, Institute of Theoretical Physics Amsterdam (ITFA), Amsterdam, Netherlands**

- Promoted ITFA seminars, events, and research breakthroughs across social media channels.
- Link to ITFA social media on: Linktree

SEP. 2017 –JUN. 2021 **Designer, PIN Student Design Club, Beijing, China**

- Designed cross-media assets and souvenirs that blend scientific and campus themes.

Honors

2020 **The 5th International Symposium for College Students**
3rd Award, Beijing Parallel Session

2018 **University Scholarship**
3rd Award

2017 **FLTRP Cup Preliminaries, Foreign Language Teaching and Research Press**
1st in Reading, 2nd in Debate

Skills

Programming

Python; C; GWpy, virgotool, ACL (gravitational waves data analysis and DAQ system); CLASS (cosmology simulation system); LTspice (electronic circuit simulator)

Other

Graphic Design; Video Editing; Social Media Operation; Mandarin (native); English (fluent)