

Zhaoyu Lou

Call: +86-150-6709-1602; E-mail: zhaoyulou@outlook.com

Add: Dorm 1, FengYuan, Faculty of Sciences, Wuhan University, No. 299 Bayi Road, Wuhan, 430072, China

EDUCATION

Wuhan University, School of Physics and Technology
Bachelor of Science in **Physics**

Wuhan, China
09/2021-06/2025

- Cumulative GPA: **3.94/4.00** (93/100)
- Scholarship & Awards: **China National Scholarship**, Chasing Dreams Scholarship (0.5%), First-class Scholarship, Second-class Scholarship, Second Prize (provincial) in The Chinese Mathematics Competitions, Excellent Award in the China Undergraduate Physics Tournament, Excellent Student

PUBLICATION

Zhizhen Luo, Xueliang Zhu, Hengcheng Li, **Zhaoyu Lou**, Yanyan Li, Yalun Xu, Ruiming Li, Zhenglin Jia, Zhiping Wang*, Qianqian Lin*, Evaluation of the underwater stability of encapsulated perovskite solar cells[J], *Solar Energy Materials and Solar Cells*

Zhaoyu Lou, Zhiping Wang*, The potential of perovskite solar cell-thermoelectric tandem devices[J], *Sustainable Energy & Fuels* (under revision)

Sheng Li, **Zhaoyu Lou**, Mubai Li, Hao Li, Siyang Cheng, Zhiping Wang*, Tunnel junction electric field regulation enable efficient all-perovskite tandem cells[J], *Nature Energy* (under submission)

INVITED VISIT

LINDAU NOBEL LAUREATE MEETINGS

Germany
06/22/2024-07/07/2024

- Chosen as one of the only 8 domestic undergraduate students by Sino-German Center for Research Promotion to attend the Lindau Nobel Laureate Meetings in Germany.
- Invited to visit University of Bonn, DFG (Deutsche Forschungsgemeinschaft), Kaiserslautern University of Technology, University of Tübingen, Ludwig Maximilian University of Munich in Germany, and attended 73rd Lindau Nobel Laureate Meeting (Physics) in Lindau, gaining insights into cutting-edge international research and expanding networks for global collaboration.

RESEARCH EXPERIENCE

Research on the Transparent Electrodes and Coupling Layers in Efficient and Stable Four-terminal Perovskite Tandem Solar Cells

Wuhan, China

Project Principal, Funded by National Natural Science Foundation of China (623B1006), ¥100,000

06/2023-present

- Investigated the research progress in the field of optical management in perovskite tandem solar cells.
- Analyzed the optical losses of the devices and proposed optimization methods for future research projects.
- Developed a simulation model to calculate the EQE of the device and the optical processes within planar construction device.
- Fabricate efficient perovskite solar cells with minimize optical loss.

Decouple the Mobile Ions Induced Loss and Shallow Traps Induced Loss during the degradation of Perovskite Solar Cells

Hong Kong, China

Research Assistant at CUHK under the guidance of Prof. Martin Stollerfoht

07/2024-09/2024

- Simulated device performance with SCAPS and SETFOS, fitting the results to experimental data.
- Learned carrier extraction characterization methods to measure ion density and mobility in perovskite solar cells.
- Attempt to decouple efficiency loss introduced by mobile ions and shallow traps during the degradation of perovskite solar cells.

Simulation on the EQE and Efficiency Limit of all-Perovskite Tandem Devices and Contribute to Fabricate Perovskite Tandems with High Efficiency

Wuhan, China

01/2023-02/2023 & 05/2024

- Analyzed and compared the impact of device structure on short-circuit current density and EQE of device using the generalized matrix method.
- Calculated the theoretical efficiency limit of perovskites with a further discussion on the principles of detailed balance.
- Independently operated magnetron sputtering to deposit ITO on glass, characterized by analyzing the transmitted spectrum and measuring sheet resistance.
- Adjusted magnetron sputtering parameters for ITO based on the characterization date.
- Contributed to finishing a paper entitled *Tunnel junction electric field regulation enable efficient all-perovskite tandem cells*.

Simulation and Discussion of Working Performance of Perovskite Thermoelectric Tandem Devices under Real World Condition

Wuhan, China

09/2023-04/2024

- Conducted in-depth research into the working mechanisms of devices and employed MATLAB to build a simulation model for perovskite-thermoelectric tandem devices.
- Used a model based on energy dissipation equations, the generalized matrix method, and non-ideal diode equations to simulate and analyze the device performance, including steady-state temperature, energy distribution, power conversion efficiency, current density, and operation under extreme environments.
- Discussed the significant potential of the application of perovskite thermoelectric tandem devices in specific situations, highlighting their unique advantages over pure optoelectrical solar cells.
- Completed the research paper entitled *The potential of perovskite solar cell-thermoelectric tandem devices*.

Evaluation of the Underwater Stability of Encapsulated Perovskite Solar Cells

Wuhan, China

03/2023-05/2023

- Assisted with fabricating devices for aging experiments and acquired skills in creating efficient and stable perovskite single-junction solar cells.
- Contributed to finishing a paper entitled *Evaluation of the Underwater Stability of Encapsulated Perovskite Solar Cells*.

Explanation for the Phenomenon of Colored Lines Appearing on the Surface of a Disc under White Light Illumination and Exploration of the Influencing Factors

Wuhan, China

Team leader, China Undergraduate Physics Tournament

03/2023-04/2023

- Reproduced experimental phenomena and coordinated team members in reviewing literature, doing experiments, and presenting findings.
- Applied the optical diffraction grating interference model to explain the appearance of colored lines on the surface of a disc under white light illumination.
- Sorted out the results, delivered a presentation, and won an excellent award.

Blade-Coating Large-Area Perovskite Solar Cells

Wuhan, China

06/2022-12/2022

- Consulted literature on perovskite solar cell industry with a focus on large-area coating, gaining a comprehensive understanding of the current technologies and advancements in perovskite solar cells.
- Executed several fabrication methods, including blade coating, slit die coating, spin coating, annealing, dissolution, ultraviolet ozone treatment, and vacuum deposition, under the guidance of the senior fellow, and assisting in determining the Fourier-transform infrared spectroscopy.

TECHNICAL PROFICIENCY

- Computer programming: Matlab, C, Python, Mathematica
- Packages: SCAPS, SETFOS, Origin, LaTeX, Markdown, Microsoft Office suits