

Zehao Dong

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Profile

Ph.D. candidate in Physics at Tsinghua University working at the intersection of strongly correlated quantum materials, 4D-STEM, and computational imaging. I develop GPU-accelerated multislice electron ptychography methods for three-dimensional, atomic-scale imaging of defects and dopants in quantum materials.

Research Interests

- Strongly correlated quantum materials, including cuprate and nickelate superconductors
- Atomic-resolution scanning transmission electron microscopy and 4D-STEM
- Multislice electron ptychography, computational imaging, and GPU-accelerated phase retrieval

Education

- **Tsinghua University**, Ph.D. in Physics; Advisors: Yayu Wang and Zhen Chen 2022 – present
- **Peking University**, B.S. in Physics 2018 – 2022

Selected Publications

- **Interstitial oxygen order and its competition with superconductivity in $\text{La}_2\text{PrNi}_2\text{O}_{7+\delta}$** 2025
Dong, Z.[†], Wang, G.[†], Wang, N.[†], Dong, W.[†] *et al. Nature Materials* **24**, 1927–1934.
- **Sub-nanometer depth resolution and single dopant visualization achieved by tilt-coupled multislice electron ptychography** 2025
Dong, Z., Zhang, Y., Chiu, C.-C., *et al. Nature Communications* **16**, 1219.
- **Visualization of oxygen vacancies and self-doped ligand holes in $\text{La}_3\text{Ni}_2\text{O}_{7-\delta}$** 2024
Dong, Z.[†], Huo, M.[†], Li, J.[†], *et al. Nature* **630**, 847–852.

A complete and up-to-date publication list is available on Google Scholar.

Selected Funding & Awards

- **Gold Medalist**, 49th International Physics Olympiad (IPhO) 2018
- **Best Oral Presentation Award**, 20th International Microscopy Congress 2023
- **NSFC's Fund for Graduate Students** (Grant No. 124B2068) 2025 – 2026

Conference Oral Presentations

- **Materials & Mechanisms of Superconductivity (M2S) Conference, Stuttgart, Germany** 2026
Visualizing oxygen vacancies and interstitials in bilayer nickelates via electron ptychography
- **Chinese Physical Society Fall Meeting, Haikou, China** 2024
Visualization of oxygen vacancies and self-doped ligand holes in $\text{La}_3\text{Ni}_2\text{O}_{7-\delta}$
- **20th International Microscopy Congress, Busan, South Korea** 2023
Improving depth resolution using tilt-series coupled multislice electron ptychography

Technical Skills

- **Experimental:** STEM/4D-STEM, electron ptychography, EELS; Transport and tunnelling measurements
- **Programming:** MATLAB, Python; GPU computing
- **Languages:** Chinese (Native), English (Fluent)