

Tianyi ZHANG

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EDUCATION

Southern University of Science and Technology (SUSTech)

Shenzhen, China

Bachelor of Science in *Physics*

Expected graduation date: 06/2026

- **Cumulative GPA:** 3.50/4.0 | **Major GPA:** 3.6/4.0
- **Honor:** First-class Scholarship for Excellent Freshman, Top 10%, 10/2022

RESEARCH EXPERIENCE

SUSTech High-Pressure Physics Lab | College Students' Innovative Entrepreneurial Training Plan Program Shenzhen, China

Undergraduate Researcher, Advisor: Prof. Shanmin WANG

03/2024 - Present

Project: Cerium Doping with Rare Earth Metals

- Investigated the effects of rare earth doping (e.g., Yb, La) on cerium, employing high-temperature and high-pressure synthesis to modulate phase transition pressures and explore the stabilization of high-pressure phases at ambient conditions.
- Conducted synthesis experiments with various high-pressure assemblies under different power and pressure conditions; prepared bulk samples by removing impurities and polishing them inside a glovebox to minimize oxidation.
- Performed X-ray diffraction (XRD) analysis to evaluate doping efficiency, sample purity, and oxidation state by comparing results with reference spectra for alpha-Ce and gamma-Ce phases; used GSAS software to refine lattice constants and validate structural changes.
- Characterized phase transition behaviors and the electrical/magnetic properties of doped samples using diamond anvil cell (DAC) techniques under variable pressure conditions.
- **Contribution:** Successfully synthesized cerium-doped samples and currently are refining purification protocols to enhance experimental reproducibility and accuracy.

SUSTech Thin Film Physics Lab

Shenzhen, China

Undergraduate Researcher, Advisor: Prof. Gan WANG

11/2024 - 12/2024

Project: Study on Impurities in Thermally Evaporated Aluminum Films

- Explored the deposition of aluminum thin films on GaAs substrates via thermal evaporation, emphasizing impurity control, microstructural properties (grain size, roughness), and electrical transport properties.
- Independently designed the experimental workflow and optimized deposition parameters such as thickness (10-150 nm), vacuum levels (0.1-1 mPa), and deposition rates (0.05-0.12 nm/s).
- Applied quartz crystal microbalance (QCM) techniques for real-time monitoring of film thickness.
- Used EDS to measure oxygen content, AFM to analyze surface morphology, RHEED to characterize crystal structure, and a four-probe method to measure electrical conductivity.
- Addressed inaccuracies in traditional four-probe methods for ultra-thin films by reviewing literature and adopting a revised formula tailored to thin-film models, improving resistivity data accuracy.
- **Contribution:** Innovatively integrated multi-technique analysis (EDS/AFM/RHEED/four-probe) to elucidate the oxidation mechanisms and transport properties of aluminum films.

OTHER EXPERIENCE

China Undergraduate Mathematical Contest in Modeling (CUMCM)

Shenzhen, China

Team Member

09/2024

- Conducted research on physical modeling, developed a program to simulate geometric figures and dynamic movements, and solved key technical challenges in the assigned problem.
- Undertook coding and paper writing: utilized Python for simulations, implemented computational physics algorithms (e.g., equation solving and differential equations) to improve accuracy and efficiency, and wrote the final paper in LaTeX.
- **Honor:** Won the Second Prize in Guangdong Province.

SKILLS

- **Programming:** Proficient in Java, Python, C++, and Mathematica.
- **Technical Writing:** Experienced in using LaTeX for academic and technical documentation.
- **Language Proficiency:** IELTS 7.0 (Reading: 8.0, Listening: 8.0, Speaking: 6.0, Writing: 6.5).