

# Xiuhong Xu

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## EDUCATION

**University of Science and Technology of China(USTC), Hefei, China**

July 2023

**BSc in Physics**

GPA: 3.28/4.3

*Honor & Awards:* Scholarship for Outstanding Students in Zhao Zhongyao Applied Physical Science and Technology Elite Class of 2021 (Oct. 2021), Merit Scholarship (Bronze Award) Dec. 2020, Merit Scholarship (Bronze Award) Dec. 2019, A member of Zhao Zhongyao Applied Physical Science and Technology Elite Class of USTC

**Brown University, Providence, RI**

Expected May 2025

**Master of science in Physics**

GPA: 4/4

## SKILLS

**Languages:** Mandarin (Native); English (Fluent)

**Programming Languages:** C, Python. Experience with Mathematica, Jupyter Notebook.

**Applications:**  $\text{\LaTeX}$ , fluency with the Dedalus PDE solver.

## RESEARCH EXPERIENCE

### Simulation of Topological Gaseous Plasmon Polaritons at the Large Plasma Device

Advisor: John Marston

February 2024 - Current

- Developed 3D simulations for cold plasma in the Large Plasma Device (LAPD) using the Dedalus package, applying an external magnetic field to break time-reversal symmetry and generate field data.
- Conducted simulations at fixed densities to identify the one-directional wave behavior of Gaseous Plasmon Polaritons (GPP) as predicted by bulk-boundary correspondence.
- Based on time-scale separation, as the density varies one million times slower than the wave, conducted simulations at different densities to generate wave data more closely aligned with LAPD experimental conditions.
- Analyzed power data collected in the far field and compared results with experiments data from LAPD.
- Analyzed the correlation of the y-component of the electric field between two planes in the device over a time period and compared results with experiments data from LAPD.
- **GitHub Repository:** <https://github.com/HarryGX0331/GPP-LAPD>

### Negative Compressibility in Spring Networks of Amorphous Solids

Advisor: Ning Xu

October 2022 - June 2023

- Conducted a molecular dynamics simulation in C program to create a jammed-state using the FIRE(Fast Inertial Relaxation Engine) minimization.
- Introduced disorder through lattice site position variations and obtained the stress-strain curve.
- Analyzed the stress-strain curve to identify the point of negative compressibility.
- Independently applied local coordination number (nearest-neighbor count) disorder and spring constant disorder to generate separate stress-strain curves.
- Analyzed and compared the resulting patterns, demonstrating that these disorders lead to two distinct effects on the jammed state: one disorder alters the topological structure, while the other two do not, enabling the realization of negative compressibility within the jammed state.

### Validation of Spin-dependent Displacement in the Spin Hall Effect of Light

Advisor: Wei Zhao

September 2021 - December 2021

- Selected the research topic, planned the experiment, built optical circuits and processed experimental data.
- Explored the displacement in the spin Hall effect of light via in-depth study on the paper Observation of the Spin Hall Effect of Light via Weak Measurements.
- Validated the spin-dependent displacement of photons at an air-glass interface, namely the spin Hall effect of photons.
- Regarded the spin-dependent displacement as the weak measurements of spin projection of photons in this experiment, used Gran prism in spin state preparation, improved the accuracy of displacement measurement, extended displacement extrapolation formula, simplified the measurement process, measured the displacement of light passing through a triangular prism at any angle.
- Adopted a traditional triangular prism to replace the variable angle prism mentioned in paper, manually calculated the angle of incident light and emergent light through measurement of refractive index so as to obtain emergent lights at any determined angle.
- Strengthened the ability to build optical circuits and flexibly utilize instruments such as CCD.

#### **Laboratory Practice in Quantum Computing Laboratory of USTC**

Advisor: Chaoyang Lu

July 2021 - September 2021

- Participated in group meetings, listened to reports and read professional literatures, supplemented the basics for experiments and knew about front directions of current experiments.
- Assisted in purchasing experimental instruments, tested optical fiber performance, built basic optical circuits for transmitting and receiving lights, submitted weekly work report to the supervisor.
- Disassembled an old instrument to figure out functions of all its parts and their influence on beam directions and focusing, then reassembled the instrument correctly to ensure normal beam directions and focus adjustment.
- Enhanced my English reading ability, literature exploring capacity, hands-on skills and independent thinking ability.

#### **A Research Experimental Project of Freshman Seminar:**

Advisor: Xisheng Luo

#### **Exploration of Influencing Factors on Throwing Paper Airplanes**

September 2019 - May 2021

- Determined and designed experimental plan after reviewing and collating literature about influencing factors on throwing paper airplanes, studied multiple independent variables such as launch angle of attack and aspect ratio so as to find out the best approach to making and launching paper airplanes.
- Used experimental tools including a variety of paper airplanes, meter scale, mobile phone and computer (using Tracker).
- Folded paper airplanes, established the experimental model and processed experimental data via Origin.

### **SELECTED TALKS**

”Simulation of Topological Gaseous Plasmon Polaritons at the Large Plasma Device”, talk presented at **Annual Meeting of the APS Division of Plasma Physics 2024**, Atlanta, Georgia

Speaker, 10/2024

### **TEACHING**

**Grader**, Brown University, RI

- PHYSICS 1170/2170 – Introduction to Nuclear and High Energy Physics

Spring 2024