

# Xumin Wei

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## Abstract

Energetic and creative researcher with strong hands-on ability and rapid execution.

- Successfully built **high-throughput ultrafast optical and magnetic characterization systems**.
- Hands-on experience in assembling and aligning pump-probe optical setups.
- Microfabrication Experience.
- Well-trained in scientific research, with a **first-author publication** in *Applied Physics Letters* (Nature Index). Passionate about exploring physical mechanisms.
- Skilled in **high-throughput fabrication** of gradient-component thin film.
- Skilled in **coding**(C++, python, Qt...), developed automation software with **LabVIEW**.

## Education

Sep 2021 – Jun 2024     **Southern University of Science and Technology** - Shenzhen, China     GPA: 3.74/4.00

**M.Sc. in Electronic Science and Technology** (Recommended Admission)

Sep 2017 – Jun 2021     **Shanghai Maritime University** - Shanghai, China     GPA: 3.75/4.00 (1/54)

**B.Eng. in Materials Science and Engineering**

Sep 2014 – Jun 2017     **Chengdu No.7 High School** - Chengdu, China

**Top-ranked secondary school in Sichuan Province**

## Research Experience

<b>Shenzhen Major Science Infrastructure Project (Sub-project)</b>	<i>High-throughput Ultrafast Optical &amp; Magnetic Characterization System</i>	<b>Project Leader</b>
03/2022-06/2024		

**Project Background:** Although high-throughput synthesis has expanded material options for integrated optoelectronics, the lack of corresponding high-throughput characterization techniques remains a critical bottleneck;

### [System Design & Construction]

- Designed and built **high-throughput second-harmonic generation (SHG)** and **time-resolved magneto-optical Kerr effect systems**. Developed custom sample stages (**SolidWorks + 3D printing**), **pump-probe optical setups** and **LabVIEW**-based automated acquisition software.
- Achieved 1.7 K–300 K temperature control,  $\pm 7$  T magnetic field modulation, 36.42  $\mu\text{m}$  spatial resolution, and fs-level time resolution. Validated by **Shenzhen Development and Reform Commission**.
- Demonstrated broadband SHG measurements (210–2100 nm Polarization-resolved).

### [Demonstration Case: Study on Ultrafast Light–Matter Interaction Mechanism]

- Explored nonlinear optical responses in integrated optoelectronic materials, using SHG to probe strong nonlinearity and phase-matching challenges for high-speed signal transmission.
- Selected ENZ material ITO. Fabricated gradient-composition ITO thin films via magnetron sputtering. Verified film quality with XRD, EDS, AFM, and Raman spectroscopy; Conducted SHG characterization cross-validated with ellipsometry dielectric spectra;
- Investigated nonlinear optical response mechanisms of ITO; reconciled discrepancies with prior work through dielectric model simulations (Matlab);
- Published as **first author** in **Applied Physics Letters**;

**Project Background:** Built a data-driven prediction model to accelerate material discovery by addressing performance anomalies in high-entropy alloys, enabling more efficient design beyond conventional trial-and-error methods;

- Compiled and cleaned 1,000 high-quality datasets (theoretical and experimental);
- Generated 8 feature descriptors (e.g., composition, electronegativity difference).
- Trained ANN model with physics-informed constraints, achieving  $R^2=0.93$  on test sets.

**Project Background:** Developed flexible electromagnetic metamaterials with real-time and precise tunability, addressing the mechanical limitations of conventional rigid structures for wearable and flexible electronic applications;

- Fabricated polyurethane/silver nanowire composites using immersion method;
- Investigated dielectric properties under mechanical strain; identified optimal nanowire loading ranges;
- Improved accuracy of EM response tuning via optimized processing parameters.

Publications

- **Wei X**, Gu C\*, Xiang X-D. Applied Physics Letters, 2023, 123(18): 2201. **(First author, Nature Index)**
- Sun K, Li Y, Feng S, Gao Q, Wang Z, **Wei X**, Ju L\*, Fan R. Journal of Electronic Materials, 2021, 50: 1467-1473.
- Li Y, Sun K\*, **Wei X**, Yuan W, Tian J, Gao Q, Li G, Ju L\*, Fan R. Journal of Materials Science: Materials in Electronics, 2020, 31:22905-22911.(Second author)

Work Experience

07/2024-Present	China National Petroleum Corporation (CNPC)	Marine Navigation & AI Lab	Software Engineer
<ul style="list-style-type: none"><li>• <b>Solved Dolphin system’s 32% data packet loss issue in mixed-source operations:</b> designed Redis-based high-concurrency middleware (C/C++), boosting throughput by 215% (2,800 → 8,820 QPS) with &gt;1000 concurrent request support; deployed in ADNOC project.</li><li>• <b>Database Interaction Module Development:</b> Developed Qt-SQL Server interface</li><li>• <b>Built enterprise AI infrastructure:</b> deployed DeepSeek-70B locally (Ubuntu/Docker), optimized GPU allocation, and customized Dify platform for secure LAN access. Improved document knowledge base accuracy by 40%.</li><li>• <b>Exploration on Hardware Design:</b> designed casing (3D printing), selected chips, developed circuit boards (SMT), antenna signal acquisition, and PC/Android software.</li></ul>			

Skills

Mechanical	<ul style="list-style-type: none"><li>• SolidWorks, CAD, FDM 3D printing</li></ul>
Electronics	<ul style="list-style-type: none"><li>• STM32/Keil, STM32CubeMX, Oscilloscopes, Vector Network Analyzers</li></ul>
Coding	<ul style="list-style-type: none"><li>• C++, Python, Qt, LabVIEW, Visual Studio, Android Studio;</li><li>• Redis, SQL Server, Linux (AI model deployment with Dify/LLMs)</li></ul>
Optical Measurement	<ul style="list-style-type: none"><li>• Ellipsometry (M2000, IR), fs Lasers, Fabry–Pérot Interferometer, Horiba Spectrometer, Semiconductor Test Analyzer, Lock-in Amplifier, Thorlabs Components;</li></ul>
Materials Fabrication and characterization	<ul style="list-style-type: none"><li>• E-beam Evaporation, Thermal Evaporation, Magnetron Sputtering, Tube Furnace, Muffle Furnace; EDS, XRD, AFM, Raman (Confocal)</li></ul>

Honors

06/2024	<b>Excellent Graduate</b> (Top 5% university-wide honor)
06/2021	<b>Excellent Graduate of Shanghai</b> (Top 5% city-wide honor)
12/2019	<b>National Scholarship</b> (highest undergraduate honor, Ministry of Education, China)