Pisa, Italy
Scuola Normale Superiore

Lili Shi

BasicBackground

Education

Nanjing University The School of Electronic Science and Engineering

- **Electronic Science and Technology** **2018.09 – 2023.06**

Direct Ph.D Project: Superconducting quantum capacitance detectors

Courses:

- Electromagnetic Wave Theory and Technology
- Superconducting Electronics
- Artificial Electromagnetic Material
- High-frequency Physical Properties of Materials and Their Macroscopic Electromagnetic Theory

Tianjin University School of Precision Instrument and Opto-electronics Engineering

Measuring and Controlling Technologies and Instruments **2014.09 – 2018.06**

Courses:

- Basis of circuit
- Basic Electronic Technology
- Elementary technology of computer software
- Computer Aided Designing (CAD), Engineering Mechanics
- Mechanical engineering drawing
- Principle of Automatic Control
- Measuring and Controlling Circuits
- Design for Precision Machinery
- Engineering Optics
- foundation of Precision Measurements
- Signal and System, Digital Signal Processing
- Virtual Instrument
- Design of Measuring and Controlling System,Micro-nano Measuring Technology
- Micro Fabrication Process
- Operation and Management.

Scholar Experience

Undergraduate student of Tianjin University

Project: Micron-scale terahertz time-domain spectroscopy multilayer coating thickness measurement technology

Work Undertaken: Coating Thickness Measurement Model Research, Measurement, Moldel Verification and Algorithm Optimization 2017–2018

PhD Student of Nanjing University

Superconducting quantum capacitance detectors 2018–2023

Research Fellow at NEST,Scuola Normale Superiore

Quantum naonodetectors 2024–2025

Academic Conferences

- The Fifth National Terahertz Science and Technology Academic Annual Conference
  - Poster:Terahertz Time-Domain Spectroscopy for Measuring Micro-scale Coating Thickness
- The 15th National Symposium on Superconductivity
  - Poster:Superconducting Quantum Capacitance Detectors
- The 16th National Symposium on Superconducting Thin Films and Superconducting Electronic Devices
  - Poster:Superconducting Quantum Capacitance Detectors
- The 4th Infrared Technology and Its Application Conference
  - Oral Talk:Superconducting Quantum Capacitance Detectors

Publications

1. **SHI, LiLi**, et al. "Terahertz single photon detectors." Scientia Sinica Physica, Mechanica & Astronomica 51.5 (2021): 054203. (in Chinese);
2. **Shi L**, Guo T, Su R, et al. Tantalum microwave resonators with ultra-high intrinsic quality factors[J]. Applied Physics Letters, 2022, 121(24): 242601.
3. **Shi L**, Chi T, Su R, et al. Freestanding narrowband terahertz filters based on aluminum foil[J]. Optics Express, 2023, 31(11): 17547-17556.
4. Viti L, **Shi L**, Watanabe K, et al. Quantum Sensitive, Record Dynamic Range Terahertz Tunnel Field-Effect Transistor Detectors Exploiting Multilayer Graphene/hBN/Bilayer Graphene/hBN Heterostructures[J]. Nano Letters, 2025, 25(15): 6005-6012.
5. Chi T, **Shi L**, Su R, et al. Hybrid α-Ta/β-Ta lumped element kinetic inductance detectors with photon noise limited sensitivity and stability[J]. Applied Physics Letters, 2024, 125(20).
6. Guo T, Li Z, **Shi L**, et al. Superconducting Transmon Qubits with the Niobium-buffered α-Tantalum on the Sapphire Substrates[J]. 2025.
7. Li, Z., Guo, T., Xu, W., **Shi, L.**, Zhang, K., Zuo, Q., ... & Wu, P. (2025). Niobium-buffered tantalum for a superconducting fluxonium qubit. Materials Research Express.
8. Zhang, Hongzhen, **Lili Shi**, and Mingxia He. "Extension of terahertz time-domain spectroscopy: A micron-level thickness gauging technology." Optics Communications 506 (2022): 127597 (co-author).
9. Wang, C. G., Xu, W., Li, C., **Shi, L.**, Jiang, J., Guo, T., ... & Wu, P. (2024). Integrated and DC-powered superconducting microcomb. Nature Communications, 15(1), 4009.
10. Yang S, **Shi L**, Chen B, et al. Antireflection coatings based on PEDOT: PSS conductive polymer using d-sorbitol additives for terahertz spectroscopy and imaging[J]. ACS Applied Materials & Interfaces, 2023, 15(27): 32875-32884.
11. Su, R. F., Wang, H., **Shi, L. L.**, Wang, Y., Wu, J. B., Tu, X. C., ... & Wu, P. H. (2021). Performance improvements of a terahertz direct detector for imaging arrays. Superconductor Science and Technology, 34(8), 085009.

12. Hong-zhen, Z., Ming-xia, H., **Li-li, S.**, & Peng-fei, W. (2020). Terahertz Thickness Measurement Based on Stochastic Optimization Algorithm. SPECTROSCOPY AND SPECTRAL ANALYSIS, 40(10), 3066-3070.
13. Man-Jin, W., Bo-Zhi, Y., **Li-Li, S.**, Ben-Wen, C., Jing-Bo, W., Cai-Hong, Z., ... & Pei-Heng, W. (2022). Cryogenic blackbody calibration source for superconducting terahertz detectors. ACTA PHYSICA SINICA, 71(16).
14. Patent:A terahertz spectrum detection method for non-polar materials based on the Rourad method.CN110118745A.2019 (in Chinese);
15. Patent:A coating thickness measurement method based on terahertz pulse spectrum and optimization algorithm. CN109186475B. 2018(in Chinese);
16. Patent:A source of terahertz radiation.CN216624848U. 2021(in Chinese).

Awards

Scholarship

- 2018 Famous Teacher Program Scholarship
- 2015 The 7th National Undergraduate Mathematics Contest Finals First Prize

Other Rewards

Club Practice

the Head of the Club **2016.05 – 2017.03**

- Organize school-level mathematics competitions;
- Editing and typesetting various materials;
- Organize various activities and plans within the club;
- Community work has been well received by students and teachers in charge.

Work Experiences

Xiamen Yunmao Technology **2023.08 –**

- Process engineer: superconducting thin film deposition by magnetron sputter and electron beam evaporator;
- Vacuum design engineer: multi-cathode magnetron sputter (up to 8inch wafers), shadow evaporator (up to 6inch wafers);
- Technical adviser: superconducting quantum computing.

Qualification skills

Professional Skill

- Familiar with contact UV lithography systems, especially the working principle of ABM contact lithography machines, and serve as equipment administrator from 2019 to 2022, participating in equipment management and maintenance;
- Familiar with the mechanism and characterization of superconducting thin films grown by magnetron sputtering, served as the administrator of LAB 18 magnetron sputtering produced by Kurt J. Lesker, repaired various faults of the equipment and made modifications to the equipment;
- Familiar with the process of preparing superconducting qubits by oblique evaporation of electron beams, and build a probe station for testing the room temperature resistance of qubits;
- Proficiency in operating the EBPG 5200 electron beam exposure machine produced by

Raith to prepare aluminum nanowires with a line width of 50 nm over a large area;
- Familiar with the working principles of various vacuum pumps, and have maintained Edwards XDS 35i, Ulvac DIS 501 and 205 scroll pumps;
- Proficiency in the operation of precision dicing machines and participation in maintenance;
- Proficiency in operating Bluefors LD 400 dilution refrigerator and participating in maintenance;
- Design and build a high vacuum sample storage system;
- Designed for the preparation of superconducting qubits ultra-high vacuum electron beam evaporation system, ultra-high vacuum multi-target gun magnetron sputtering system for the preparation of low microwave loss superconducting thin films, and multi-chamber physical vapor deposition systems for the preparation of niobium-based Josephson junctions, etc.

IT Skills

- Latex edited a 1700-page exercise set
- relatively proficient in o ice series software
- Solidworks to design vacuum systems
- AutoCAD and LinkCAD to design layout of devices
- CST simulation of metasurfaces and superconducting resonators

Language

CET-6 passed

Hobbies

Watching movies, hiking, badminton, table tennis,LaTeX