

Shangyi Guo

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Education Background

School of Physics, Shandong University (SDU)

Sept.2020-Jun.2024 (expected)

Bachelor of Science in Physics, Jingwei Leading Talent Program

- Overall GPA: **90.90**/100 (1st to 4th semesters)
- Rank: **2**/80 (1st to 4th semesters)

Honors & Awards

- Excellent Student Award for Science and Technology Innovation, SDU Apr.2022
- DeEdu Scholarship, SDU Nov.2021
- Annual Academic Scholarship, SDU Sept.2021
- Outstanding Student Cadre Award, SDU Sept.2021
- Excellent Student Award of International Plasma Physics Summer School, HIT Aug.2021

Academic Interests

Condensed Matter Physics: Experimental and theoretical research on low-dimensional systems

- Experimental research of electronic and quantum properties of 2D systems via nanodevice fabrication and electronic transport measurements
- Experimental research of the novel optoelectronic performance of III-V nanowires via controllable synthesis and photoelectric measurements
- Theoretical research of deep potentials molecular dynamics of 2D systems via numerical calculation and machine learning neural networks

Academic Experience

Construction of TMDs-GP/BN potentials via Deep Potential Molecular Dynamic method

Sept.2022-present

Supervisor: Prof. Quansheng Wu, Institute of Physics, Chinese Academy of Science

- Developing molecular dynamics potentials of 2D systems (TMDs-Graphene, TMDs-hBN) as accurate as the DFT via Deep Potentials Molecular Dynamics.
- Working on the project now and participating in weekly group meetings.

Novel polymer-free assembly method of 2D systems under ultra-high vacuum

Jul.2022-Aug.2022

Supervisor: Prof. Yuanbo Zhang, Fudan University

- Developed a polymer-free process to pick up and assemble 2D materials (h-BN) using 300nm and 500nm Si_3N_4 thin film cantilevers coated with metals (2nm Cr, 6nm Au) under ultra-high vacuum.
- Designed a fixture for fixing the polymer-free pick-up tools via solid work.
- Presented individual internship report entitled "Polymer-free Assembly of 2D Systems under Ultra-high Vacuum" in the final seminar.

Controllable synthesis and photoelectric performance (infrared detection) investigation of Core-Shell III-V nanowires

Sept.2021-Jun.2022

Supervisor: Prof. Zai-xing Yang, Shandong University

- Synthesized Core-Shell III-V nanowires ($GaSb@SnS_2$, $GaAs@GeS_2$) with high aspect ratio and uniform shell thickness by controllable vapor-solid-solid growth mode of CVD.
- Discovered novel negative photoresponse which can enhance the photocurrent in near-infrared range (1310nm, 1550nm) of Core-Shell III-V nanowires ($GaSb@SnS_2$, $GaAs@GeS_2$) in visible wavelengths (405nm, 520nm) by using Semiconductor Device Analyzer and semiconductor laser.
- Read masses of papers with regard to the III-V nanowires and participated in weekly group meetings.

Design & development of a multifunctional passive filter for test circuits of 2D systems

Jul.2021-Aug.2021

Supervisor: Prof. Zhe Wang, Xi'an Jiaotong University

- Designed a kind of passive filter capable of adjusting cutoff frequency and passband range (1Hz, 100Hz and 1000Hz).
- Used the required components to weld the circuit according to the designed and simulated circuit diagram. (Three same multifunctional passive filters have been successfully fabricated and the performance is good.)
- Presented individual research report entitled "Multifunctional Passive Filter" in the group meeting.
- Learned laboratory operations of 2D quantum materials and devices, prepared 2D materials (*Graphene* and *h-BN*) with tapes, combined them into *hBN-Graphene-hBN* structures under high power microscopy, and tested the properties of samples.

Academic Visiting & Communication

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| • "Youth Talk Growth" Series Salons, Shandong University, China | Aug.2022 |
| • Winter camp for undergraduates, Shanghai Advanced Research Institute, Chinese Academy of Sciences, China | Jan.2022 |
| • International Plasma Physics Summer School, Harbin Institute of Technology, China | Aug.2021 |
| • Summer class "Preparation, Characterization and Application of Nanomaterials", Polytechnic Institute of Porto, Portugal | Jul.2021 |

Academic Skills

Laboratory:

- Material preparation skills: CVD growth of thin films and nanowires, Exfoliating the 2D material with tape, Printing nanometer array structure, Assembling of 2D systems, etc.
- Micro- and Nano-fabrication skills: Lithography, Ion beam evaporation, Reactive Ion Etching, etc.
- Characterization skills: AFM, Raman, XRD, etc.

Theory:

- Programming skills: LAMMPS, Linux, C, MATLAB, Python, VASP, Latex

Additional Information

Language:

- Mandarin (Native)
- English (Professional proficiency)
- Spanish (Hobby)

Position:

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| • Monitor of Physics class, School of Physics, SDU | Sept.2021-Present |
| • Striker of student football team, School of Physics, SDU | Sept.2020-Present |
| • Vice-monitor of physics class, School of Physics, SDU | Sept.2020-Sept.2021 |
| • Cadre of Academic Innovation Department of Student Union, SDU | Sept.2020-Sept.2021 |

Interests:

- Football
- Piano
- Rubik's cube
- Guitar