Shangrun Lu

PhD Student | School of Materials Science and Engineering, Peking University

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Research Interests

My research focuses on nanoscale topological spin textures and their collective behavior. I study three-dimensional skyrmion and antiskyrmion configurations, layer-dependent interactions, and how geometric confinement and external fields control morphology and lattice symmetry.

Education

Peking University 2025 - Present

PhD student in Materials Science | School of Materials Science and Engineering

Supervisors: Licong Peng; Yanglong Hou

Sun Yat-sen University Sep 2021 - Jun 2025

BSc in Physics | School of Physics

National Top-notch Students Training Program 2.0 in Basic Disciplines; Class Representative, Yan Jici Physics Honors Class, Institute of Physics, Chinese Academy of Sciences

Selected Publications

01 **Graph Learning and Order Parameters Reveal a Solid-to-Conformal Phase Transition in Skyrmion Lattices**

W. Zhao, **S. Lu**, Q. Luo, et al.

Advanced Functional Materials (2026), e78928 · Co-first author (listed second) · DOI

02 **Helicity-Dependent Ellipticity and Interstitial Vortices in Confined Anisotropic Skyrmions**

S. Lu, Q. Luo, Y. Liu, et al.

Advanced Materials 38 (2026), e75203 · Co-first author (listed first) · DOI

03 **Interaction Between Three-Dimensional Topological Spin Textures With Layer-Dependent Sign Change Tunes Lattice Symmetry**

S. Lu, Y. Hou, J. Masell, et al.

Advanced Materials 38 (2026), e74896 · First author · DOI

04 **Dynamically resolved evolution and quantitative mapping of conformal skyrmion lattice**

W. Zhao, **S. Lu**, Q. Luo, et al.

Newton 2 (2026), 100443 · Co-first author (listed second) · DOI

Collaborative Publications

05 **Bending-induced pseudo-piezoelectricity in suspended $FeTe_x$ nanosheets**
J. Chen, J. Ye, Y. Ma, C. Chen, **S. Lu**, et al.
Materials Today Physics 68 (2026), 102297 · DOI

06 **Deformation-Assisted Skyrmion Formation and Reorganization under Pulsed Currents**
G. Han, W. Zhao, S. Fan, L. Gao, Q. Luo, **S. Lu**, et al.
ACS Nano 20 (2026), 18306–18314 · DOI

Related Commentary

How current bends a skyrmion lattice

Alexander Samardak | Newton 2 (2026), 100585 | Commentary on the Newton research article | DOI

Honors and Awards

Academic Honors and Scholarships

2026	Molifang Scholarship; Merit Student Award, Peking University
2025	Outstanding Undergraduate Thesis; Outstanding Graduate; Academic Innovation Award (Special Scholarship), Sun Yat-sen University
2024	National Scholarship; Xiaomi Scholarship
2022-2024	First-Class Scholarship for Outstanding Students, Sun Yat-sen University (three awards)
2023	Yan Jici Class Scholarship, Institute of Physics, Chinese Academy of Sciences

Competitions

2024	Second Prize (Guangdong Division), China Undergraduate Mathematical Contest in Modeling
2023	National First Prizes, 9th China Undergraduate Physics Experiment Competition (Teaching and Innovation tracks)
2023	First Prize, South China Undergraduate Physics Experiment Design Competition; Honorable Mention, Mathematical Contest in Modeling

Patents and Applications

Magnetically levitated rechargeable loudspeaker (automatic dust removal), CN109379668B; granted in 2019

Magnetically levitated rechargeable loudspeaker (lifting mechanism), CN109511050A; application published in 2019

Research Skills

Microscopy: In situ Lorentz transmission electron microscopy (LTEM), aberration-corrected scanning transmission electron microscopy (STEM), four-dimensional STEM (4D-STEM)

Simulation and analysis: MuMax3 micromagnetic simulations; Python, PyTorch and Mathematica; quantitative image analysis