

DR. MARYAM SARDAR

ASSISTANT PROFESSOR - CENTRE OF EXCELLENCE IN SOLID STATE PHYSICS
UNIVERSITY OF THE PUNJAB, PAKISTAN

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PROFILE

Dynamic and research-driven Assistant Professor of Physics with over six years of experience in teaching and supervising advanced research in Solid-State and Materials Physics. Demonstrated expertise in laser-matter interaction, semiconductor materials, and computational modeling (COMSOL, MDI), with a strong record of developing and leading innovative experimental and simulation-based research projects. Passionate about mentoring emerging researchers and fostering a collaborative academic environment that promotes creativity, critical thinking, and scientific excellence. Committed to interdisciplinary collaboration and contributing to the advancement of scientific research and technological innovation through impactful work in laser physics, materials science, and applied energy research.

PROFESSIONAL EXPERIENCE

ASSISTANT PROFESSOR

CENTRE OF EXCELLENCE IN SOLID STATE PHYSICS, UNIVERSITY OF THE PUNJAB 2020 — Present

- Supervised over 25 M.Phil. theses at the Center of Excellence in Solid State Physics, University of the Punjab, since 2020.
- Developed and implemented innovative research projects in Solid State Physics.
- Collaborated with distinguished scientists to enhance institutional research capabilities.
- Led workshops and seminars focused on advanced research methodologies.
- Mentored early-stage researchers to foster development and academic growth.

EDUCATION

PhD - OPTICAL ENGINEERING (PHYSICS) 2014 — 2018

NANJING UNIVERSITY OF SCIENCE AND TECHNOLOGY, NANJING CHINA

- Investigations on Surface, Structural and Optical Properties of Laser Irradiated Semiconductors for Various Photovoltaic Applications

MPhil - APPLIED PHYSICS 2012 — 2014

UNIVERSITY OF ENGINEERING & TECHNOLOGY, LAHORE

- Laser Irradiation Effects on Para and Ferro-Magnetic Materials

MSc - APPLIED PHYSICS 2009 — 2011

UNIVERSITY OF ENGINEERING & TECHNOLOGY, LAHORE

- Laser Irradiation Effects on Bandgap Energy of Different Materials

BSc - PHYSICS 2006 — 2009

THE ISLAMIA UNIVERSITY OF BAHAWALPUR, BAHAWALPUR

- Physics, Mathematics A and Mathematics B

TECHNICAL SKILLS

Hard-Working (18/24)

Persuasive

Strategic

COMSO

Origin

Vision

SEM

Image J

Xpert Highscore

MDIJade

Spectrygraph

Motivator & Leader

RESEARCH INTERESTS AND EXPERTISE

Research focused on laser-matter interaction, semiconductor physics, and thin-film technology for optoelectronic and energy applications. Experienced in materials synthesis, characterization, and device fabrication, with strong expertise in bandgap engineering and laser-assisted surface modification using Nd:YAG and Excimer lasers. Proficient in SEM, EDS, XRD, Raman spectroscopy, ellipsometry, and four-point probe analysis. My current interests extend toward superconducting and radiation-interactive materials, integrating experimental and applied approaches to advance next-generation material technologies.

RESEARCH BACKGROUND

During Ph.D.

I conducted extensive research on diverse semiconductor materials for photovoltaic applications, with a primary focus on bandgap engineering of single-crystal boron-doped silicon. By optimizing laser processing parameters, I successfully achieved a reduction in silicon bandgap energy while preserving its intrinsic semiconducting characteristics. Furthermore, I developed and proposed an effective approach to minimize laser-induced thermal damage and mitigate unwanted heating effects on material surfaces, enhancing process stability and material performance.

During M. Phil.

My research explored the effects of laser irradiation on the structural, magnetic, and electrical properties of various paramagnetic and ferromagnetic materials. The study revealed a significant enhancement in electrical conductivity of laser-treated magnetic materials, underscoring the potential of laser processing as a precise tool for tailoring material properties toward advanced scientific and technological applications.

During M.Sc.

I investigated bandgap modification of silicon using an Nd:YAG laser, where controlled irradiation parameters enabled a notable decrease in bandgap energy without compromising material integrity. The results demonstrated the effectiveness of laser-assisted modification techniques in improving silicon-based optoelectronic and photovoltaic device performance, particularly in enhancing solar cell efficiency.

RESEARCH PUBLICATIONS

No. of Citations:140 | H. Index: 8

1. Tailoring the pressure effects to optimize the global structural features in Ni₈₀P₂₀ Metallic Glass
Solid State Communications – (2025)

[10.1016/j.ssc.2025.115872](https://doi.org/10.1016/j.ssc.2025.115872)

Aasma Tabassum, Tahir Bashir, YuWei Liu, Maryam Sardar, Zaka Ullah, Wang Jin Tao

2. A Systematic and Precise Study Of Deformed Zr_{52.5}Cu_{17.9}Ni_{14.6}Al₁₀Ti₅BMGs for Notable Shear Bands Towards Better Global Plasticity

Journal of Non-Crystalline Solids – (2024)

<https://doi.org/10.1016/j.jnoncrysol.2024.123009>

Aasma Tabassum, Ren Zhiqiang, Sunkulp Goel, Fateh Hayat, Amir Muhammad, Ahmad Hussain, Maryam Sardar, Zaka Ullah, Ying Liu, Wang Jing Tao

3. Kinetically Controlled Hydrothermal Synthesis and Characterization of Photocatalytic Activities of Bismuth Tungstate Nanostructures

Universal Journal of Green Chemistry (Submitted) – (2024)

Maryam Sardar, Ibraheem Saif, Saira Riaz, Shahzad Naseem

4. A single-phase full-color phosphor Sr₂Ca₂La(PO₄)₃O: Eu²⁺, Tb³⁺, Mn²⁺: Photoluminescence and energy transfer
Journal of Rare Earths **04**, 40 – (2022)
<https://doi.org/10.1016/j.jre.2021.01.018>
J Cheng, X Bian, Z Zhai, M Sardar, J Lu
5. Tailoring the Laser Irradiation Effects by Covering the Targets with Adhesive Tapes
Optical Materials **110**, 110405 – (2020)
<https://doi.org/10.1016/j.optmat.2020.110405>
Maryam Sardar, Jun Chen, Zaka Ullah, Ju Cheng, Sundas Javed and Jian Lu
6. Synthesis and Spectroscopic Investigation of Blue-Emitting (SrCa)₂La(PO₄)₃O: Eu²⁺+Phosphors
Optical Materials **12**, 107 – (2020)
<https://doi.org/10.1016/j.optmat.2020.110104>
Ju Cheng, Hui Wang, Xuyi Tang, Xintian Bian, Chunlin Ma, Maryam Sardar, Zhangyin Zhai, Jin Shi
7. Investigations on surface morphology and bandgap engineering of single crystal boron-doped silicon irradiated by nanosecond laser
Applied Optics **57**, 1296 – (2018)
<https://doi.org/10.1364/AO.57.001296>
Maryam Sardar, Jun Chen, Zaka Ullah, Aasma Tabassum, Mohsan Jelani, Ju Cheng, Yuxiang Sun, Xueming Lv, Jian Lu
8. Thermomechanical response of aluminum alloys under the combined action of tensile loading and laser irradiations
Chinese Physics B **27**, 3 – (2018)
<http://dx.doi.org/10.1088/1674-1056/27/3/037901>
Mohsan Jelani, Zewen Li, Zhonghua Shen and Maryam Sardar
9. Mechanical behavior and fracture characteristics of simultaneously tensile loaded and laser heated Ti₆Al₄V alloy
Materials Research Express **6**, 036506 – (2018)
<http://dx.doi.org/10.1088/2053-1591/aae4f7>
Mohsan Jelani, Zewen Li, Zhonghua Shen, Najam Ul Hassan and Maryam Sardar
10. Mechanical Response and Failure Evolution of 304L Stainless Steel under the Combined Action of Mechanical Loading and Laser Heating
Metals **8**, 620 – (2018)
<http://dx.doi.org/10.3390/met8080620>
Mohsan Jelani, Zewen Li, Zhonghua Shen, Najam Ul Hassan and Maryam Sardar
11. Combining Cubic Spline Interpolation and Fast Fourier Transform to Extend Measuring Range of Reflectometry
Chinese Physics Letters **35**, 050701 – (2018)
<http://dx.doi.org/10.1088/0256-307X/35/5/050701>
J Cheng, J Lu, HC Zhang, F Lei, M Sardar, XT Bian, F Zuo, ZH Shen, XW Ni, J Shi
12. Luminescence and energy transfer properties of color-tunable Sr₄La(PO₄)₃O: Ce³⁺, Tb³⁺, Mn²⁺ phosphors for WLEDs
Optical Materials Express **8**, 1850 – (2018)
<http://dx.doi.org/10.1364/OME.8.001850>
Ju Cheng, Jia Zhang, Jian Lu, Hongchao Zhang, Sardar Maryam, Zhonghua Shen, Xiaowu Ni, Xintian Bian, Pengcheng Ma, and Jin Shi
13. Failure response of simultaneously pre-stressed and laser irradiated aluminum alloys
Applied Sciences **7**, 464 – (2017)
<https://doi.org/10.3390/app7050464>
Mohsan Jelani, Zewen Li, Zhonghua Shen and Maryam Sardar

14. Experimental investigations on the thermomechanical behavior of aluminum alloys subjected to tensile loading and laser irradiation

Proceedings of SPIE 10173: 10173E - (2017)

<http://dx.doi.org/10.1117/12.2267781>

Mohsan Jelani, Zewen Li, Zhonghua Shen, Maryam Sardar and Aasma Tabassum

15. Synthesis and photoluminescence properties of Sr₄La(PO₄)₃O:RE³⁺ (RE=Eu/Tb/Ce) phosphors

Chinese Optics Letters 15, 121602 - (2017)

<http://dx.doi.org/10.3788/COL201715.121602>

Ju Cheng (程菊), Jia Zhang (张佳), Hongchao Zhang (张宏超), Sardar Maryam, Xintian Bian (边心田), Zhonghua Shen (沈中华),

Xiaowu Ni (倪晓武) and Jian Lu (陆建)

16. Numerical simulation and experimental investigation of Ti-6Al-4V melted by CW fiber laser at different pressures

Optoelectronics Letters 13, 299 - (2017)

<http://dx.doi.org/10.1007/s11801-017-7062-1>

A Tabassum, J Zhou, B Han, X Ni, M Sardar

17. Multipulse nanosecond laser irradiation of silicon for the investigation of surface morphology and photoelectric properties

Materials Research Express 4, 125902 - (2017)

<http://dx.doi.org/10.1088/2053-1591/aa9b68>

Maryam Sardar, Jun Chen, Zaka Ullah, Mohsan Jelani, Aasma Tabassum, Ju Cheng, Yuxiang Sun, Jian Lu

18. Optical Response of UV Laser Irradiated Extrinsic Semiconductor

Armenian Journal of Physics 8, 79 - (2015)

<https://arar.sci.am/dlibra/docmetadata?showContent=true&id=23403>

Maryam Sardar, Zaka Ullah, Anwar Latif, Bushra Jabar, Abida Perveen, Muhammad Shahid Rafique, Muhammad Khaleeq-Ur-Rahman

19. Analysis of Different Parameters of Crater Evolution at Acrylonitrile Butadiene Styrene (ABS) Polymer Surface using Nd:YAG Laser

International Journal of Engineering Research & Technology (IJERT) - (2015)

<https://www.academia.edu/43114984/IJERT>

Tehseen Naz, Anwar Latif, Maryam Sardar

SUBJECTS TAUGHT

- Semiconductor Physics (PhD and Master's Level)
- Applications of Nanostructures (PhD and Master's Level)
- Chemical Synthesis of Nanostructures (PhD and Master's Level)
- Lattice Dynamics (Master's Level)
- Defects in Solids (Master's Level)
- Electricity & Magnetism (BS Level)
- Concepts of Modern Physics (BS Level)
- Waves & Oscillation (BS Level)
- Mechanics & Optics (BS Level)

AWARDS & CERTIFICATIONS

- Certificate of Appreciation for serving as External Examiner (Viva Voce), The University of Lahore, Department of Physics.
2025 — 2025
- Organized the International Conference on Solid State Physics (ICSSP 21) conducted by COE Solid State Physics, University of the Punjab, Lahore.
Dec, 2021 — Dec, 2021
- Attended one-month teaching training of National Academy of Higher Education (NAHE) conducted by Higher Education Commission (HEC) of Pakistan.
Jul, 2020 — Aug, 2020
- Won Nanjing Municipal Government Scholarship for PhD study in China.
2014 — 2018
- Attended 2 days Conference on Laser Matter Interaction, organized by Nanjing University of Science and Technology, Nanjing, China.
2016 — 2016
- Attended one day workshop on Lasers and Nanotechnology, organized by Department of Physics UET Lahore, Pakistan.
Jun, 2012 — Jun, 2012
- English Language Certificate issued by University of Engineering and Technology, Lahore.
- Certificate of Honor for Culture Festival from Nanjing University of Science and Technology, Nanjing, China.
- Life Member of National Academy of Young Scientists (NAYS).

LANGUAGES

Languages: Urdu (**Fluent**), Chinese (**Fluent**), English (**Fluent**)

REFERENCES

Shell be furnished upon request.