



Shahab Ahmed Abbasi

CONTACT DETAILS

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RESEARCHER IDENTIFIERS

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EDUCATION

Degree/Certificate	Major/Field of Research	Institute	Duration
Post Doctorate	Optics	Institute of Physics (FZU) of the Czech Academy of Sciences, Prague, Czechia	2025-Present
<i>Project Title:</i>	<i>Fabrication of High Performance Transparent Plasmonic pn Junction by Pulsed Laser Deposition</i>		
Ph.D.	Laser Matter Interaction	University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan	2012-2019
<i>Thesis Title:</i>	<i>Electromagnetic Characterization of Energetic Ions Produced by Pulsed Laser Ablation of Solid Targets</i>		
<u>M. Phil</u>	Laser Matter Interaction	University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan	2006-2009
<i>Thesis Title:</i>	<i>Laser-Induced Breakdown Spectroscopy of Marbles and Measurement of their Plasma Parameters</i>		
M. Sc.	Physics	University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan	2003-2005

B. Sc.	Physics, Mathematics	University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan	2000-2002
HSSC/F.Sc.	Pre- Engineering	Govt. Post Graduate College, Muzaffarabad	1998-2000

EMPLOYMENT & RESEARCH EXPERIENCE

- **January 2025 – Present** MSCA COFUND Physics for Future (P4F) Postdoc Fellow at Institute of Physics (FZU) of the Czech Academy of Sciences, Prague, Czechia
- **May 2019– Present** Assistant Professor, Department of Physics, University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan
- **June 2014-January 2017** Ph.D. Research Fellow at Pakistan Institute of Nuclear Science and Technology (PINSTECH), Islamabad, Pakistan
- **January 2017-July 2017** Ph.D. Research Fellow at Trinity College Dublin, Ireland
- **December 2013– May 2019** Lecturer, Department of Physics, University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan
- **March 2009 – December 2013** Lecturer at Higher Education Department, Govt. of Azad Jammu and Kashmir, Muzaffarabad, Pakistan

RESEARCH INTERESTS

- Development of plasmonic substrates by laser and cold plasma processing for Surface Enhanced Raman Scattering (SERS) for biomedical and forensic applications
- Pulsed Laser Deposition (PLD) of transparent conducting oxides (TCOs)
- Synergic application of Atmospheric Pulsed Laser Deposition (APLD) and cold plasma for nanotechnology and material processing
- Development of passive radiative coolers (PRC)
- Laser produced highly charged ions
- Surface modification by laser surface interaction
- Laser-Induced Breakdown Spectroscopy (LIBS) in conjunction with machine learning
- Generation of nanocollides by Pulsed Laser Ablation in Liquid (PLAL)
- COMSOL MultiPhysics simulations of laser matter interaction

Languages

Urdu (Fluent), English (Fluent), Hindko (Native language)

EXPERIMENTAL SKILLS

- Hands on experience of handling pulsed laser deposition (PLD) systems
- Experience of handling nanosecond pulsed excimer, Nd:YAG and fiber lasers
- Hands on experience of working with electrostatic ion energy analyzers
- Hands on experience of handling chemicals and working in clean rooms
- Hands on experience of working with vacuum systems including turbo molecular, rotary and diffusion

pumps

- Experience of handling diagnostic tools; Raman/IR spectroscopy, UV-visible spectroscopy, SEM/EDX, XRD, XPS, Plasma diagnostics electrical/optical, ICCD fast optical imaging, Surface profilometer and wettability measurements.

● COMPUTER BASED SKILLS

- COMSOL MultiPhysics
- Machine learning
- Origin
- MATLAB
- LabVIEW
- MS Office

● SOFT SKILLS

- Communication
- Teamwork and collaboration
- Critical thinking
- Problem-solving
- Time management
- Leadership
- Scientific integrity and ethics
- Perseverance and resilience

● RESEARCH COLLABORATIONS

- National Autonomous University of Mexico (UNAM), Mexico
- National Institute of Laser Enhanced Sciences, Cairo University, Giza 12613, Egypt
- Pakistan Institute of Science and Technology (PINSTECH), Islamabad
- National Institute of Lasers and Optronics (NILOP) Islamabad
- Quaid-i-Azam University Islamabad
- King Saud University, Riyadh, Kingdom of Saudi Arabia
- Bina Nusantara University, Indonesia
- Universiti Kebangsaan Malaysia
- Sunway University, Malaysia

FUNDING/PROJECTS

- **Project:** Fabrication of Plasmonic Active Substrates by Novel Atmospheric Pulsed Laser Deposition (APLD) Technique for detection of chemical and biomedical materials using Surface Enhanced Raman Spectroscopy (SERS). **Role:** Project Investigator (**PI**), **Source:** Higher Education Commission of Pakistan (HEC), **Amount:** 7.7 million PKR / 40000 USD, **Year:** 2022
- **Project:** Development of Spray Pyrolysis System for Thin Film Fabrication of Transparent Conducting Oxides (TCOs), **Role:** Project Investigator (**PI**), **Source:** University of Azad Jammu and Kashmir, Muzaffarabad, **Amount:** 0.285 million PKR /1800 USD, **Year:** 2019

AWARDS & FELLOWSHIPS

- MARIE SKŁODOWSKA-CURIE ACTION (MSCA) COFUND, Physics for Future (P4F) Postdoc Fellowship, Institute of Physics, FZU, Czech Academy of Science, Prague, Czechia, 2024
- Won the Presidents International Fellowship Initiative (PIFI) fellowship at Changchun Institute of Optics and Fine Mechanics and Physics (CIOMP), Chinese Academy of Science (CAS) Changchun, China, 2024
- Won the Postdoctoral Fellowship, Research Council of Lithuania, 2024
- Won the Higher Education Commission (HEC) Pakistan Postdoctoral Fellowship for Purdue University, USA
- Research Fellowship at Trinity College Dublin (TCD), Ireland, under Higher Education Commission (HEC) International research support initiative program (IRSIP), 2017.

PROFESSIONAL ASSOCIATION

- Member of European Research Society (EMRS)
- Member of American Physical Society (APS)
- Member of Optical Society of America (OSA)

TEACHING EXPERIENCE

Courses taught at BS, M.Sc. and M.Phil/PhD level:

Introduction to Laser Physics, Electrodynamics- I, II , Laser Matter Interaction, Atomic and Molecular Physics, Quantum Mechanics, Statistical Mechanics and Thermal Physics, Nuclear Physics-I,II, Classical Mechanics and Theory of Relativity, Atomic Physics, Lab Course: Modern Physics, Lab Course: Nuclear Physics

RESEARCH STUDENT SUPERVISION

- Ph.D. students: 02
- M. Phil students: 08

MANAGERIAL ACTIVITIES:

- Principal Investigator (PI) of research projects
- Head of the seminar organizing committee

- Member of the examination committee
- Member of the Admission committee
- Supervisor and co-supervisor of several M.Phil and Ph.D. students

ORGANISATION MEMBERSHIP & ACTIVITY

- Reviewer for several international research journals in the field of optics and nanotechnology including Applied Optics, Optics Express, and Optics and Lasers in Engineering

SELECTED CONFERENCES

1. European Optical Society Annual Meeting (EOSAM) 2026, August 24-28, Tampere, Finland
2. European Material Research Society (EMRS) 2026 Spring Meeting, May 25-29, Strasbourg, France
3. European Material Research Society (EMRS) 2025 Spring Meeting, May 26-30, Strasbourg, France
4. 8th International Symposium on Laser Matter Interaction (ILMI) – September 23-24, 2024, National Centre for Physics (NCP), Islamabad
5. 7th International Symposium on Laser Matter Interaction (ILMI) – September 18-19, 2023, National Centre for Physics (NCP), Islamabad
6. 6th National Symposium on Laser Matter Interaction (LMI) – September 12-13, 2022, National Centre for Physics (NCP), Islamabad
7. 47th International Nathia Gali Summer College, (20th - 25th June, 2022), (Virtual)
8. 5th National Symposium on Laser Matter Interaction (LMI) – September 14-15, 2021, National Centre for Physics (NCP), Islamabad (Virtual)
9. Education and Training in Optics & Photonics Conference (ETOP), 2021 (Virtual)
10. 2020 OSA Laser Congress, Canada, 2020 (Virtual)
11. LIBS2020, Japan, 2020 (Virtual)
12. International Nathia Gali Summer College On Physics And Contemporary Needs, July 15-20 , 2019, Islamabad, Pakistan
13. Symposium on ‘Light and Life’ is being, 14-16 October 2015, COMSATS Institute of Information Technology (CIIT), Islamabad, Pakistan
14. 20th International Symposium On Heavy Ions Inertial Fusion (HIF) , August 11-15, 2014, Lanzhou, China.
15. International Nathia Gali Summer College On Physics And Contemporary Needs, August 4-9 , 2014, Islamabad, Pakistan
16. Seminar On Physics , Accelerators And Applications Of Synchrotron Radiation , May 11-15 ,2014 , Pakistan Institute Of Nuclear Science And Technology(PINSTECH),Islamabad ,Pakistan
17. International Scientific Spring, March 10-14, 2014, National Centre For Physics (NCP), Islamabad, Pakistan
18. First ICTP-NCP International College On Plasma Physics, February 12-16 ,2014, National Centre For Physics (NCP), Islamabad , Pakistan

1. Latif, M., Khan, T. M., Aslam, N., **Abbasi, S. A.**, & Khan, M. A. (2026). Laser-produced dry metal aerosol processing and deposition under dynamic gas and plasma environments. Optical Materials Express. Advance online publication.
2. Khan, T. M., Aslam, N., Javed, M. Q., Zakria, M., **Abbasi, S. A.**, & Kocik, M. (2026). IR Laser-Induced Functionalization of Au-Coated Oxide Glass via Formation of Shell-Like Nanostructures. *Surface and Interface Analysis*.
3. **Abbasi, S. A.**, Ahmad, A., Hedwig, R., El-Bashar, R., Mughal, M. S., & Hamdy, O. (2026) EXPRESS: Analysis of Specificity and Limitations Applying the Receiver Operating Characteristic Curve and Laser-Induced Breakdown Spectroscopy for Differentiating Iron Ore. *Applied Spectroscopy*, 00037028251396585.
4. Aslam, N., Khan, T. M., Zakria, M., Abbasi, S. A., & Ahmed, I. (2025). ns laser-Si interaction in air flow: The phenomena of surface etching and hetero-structuration. *Optik*, 321, 172171.
5. **Abbasi, S. A.**, Javed, J., Qayyum, H., Khan, T. M., Ali, D., Iqbal, A., ... & Nazir, N. (2024). Composite Liquid Media Influence on the Optical and Bactericidal Properties of Silver Nanoparticles Synthesized by Pulsed Laser Ablation in Liquids. *Plasmonics*, 1-12.
6. Aslam, N., Khan, T. M., Javed, M. Q., Rehman, A., **Abbasi, S. A.**, Shah, A., & Raffi, M. (2023). Formation Mechanisms of Silicon Surface Structuring using Single-Multiple Nanosecond Laser Pulses in Ambient Air and Cold Plasma. *Surfaces and Interfaces*, 103252.
7. Khan, T. M., Aslam, N., Iqbal, A., **Abbasi, S. A.**, & Ali, D. (2023). Cold Plasma Jet Coupled Nanosecond Laser Ablation Scheme For Plasmonic Nanostructured Surfaces. *Advanced Materials Interfaces*, 2300280.
8. Ishtiaq, M., Ali, D., Ahmad, R., Muneer, I., Bashir, F., Hanif, M., Khan, T.M. and **Abbasi, S.A.**, 2023. A comparison of antibacterial activity in dark-UV light in perspective of surface and structural properties of spray pyrolysis grown Cu doped Cr2O3 thin films. *Surfaces and Interfaces*, p.102741.
9. **Abbasi, S. A.**, Dogar, A. H., Rafique, M., Dawood, A., Qayyum, H., & Qayyum, A. (2023). Influence of axial magnetic field on angular distribution of charge and energy of laser produced slow and fast tungsten ion groups. *Vacuum*, 209, 111781
10. **Abbasi, S.A.**, Ilyas, B., Dogar, A., Qayyum, H., Ahmed, N., Khan, T.M. and Qayyum, A., 2022. Charge state and Energy distribution of carbon ions and protons emitted from laser-produced graphite plasma. *Physica Scripta*.
11. Rafique, M., Iqbal, J., Lone, K.J., Mir, A.A., Kearfott, K.J., Iqbal, A., Qureshi, **S.A.**, **Abbasi, S.A.** and Nikolopoulos, D., 2022. Multifractal detrended cross-correlation analysis of radioactivity borne radon, thoron and meteorological time series. *Physica A: Statistical Mechanics and its Applications*, 607, p.128214.
12. Dawood, A., Bashir, S., Ahmed, N., Hayat, A., AlFaify, A.Y., Sarfraz, S.M.A., **Abbasi, S.A.** and Ur Rehman, A., 2022. Surface Structuring and Thin Film Coating through Additive Concept Using Laser Induced Plasma of Mg Alloy: A Comparison between the Presence and Absence of Transverse Magnetic Field (TMF). *Coatings*, 12(9), p.1316.
13. Ahmed, N., Awan, J.A., Fatima, K., Iqbal, S.M.Z., Rafique, M., **Abbasi, S.A.** and Baig, M.A., 2022. Machine learning-based calibration LIBS analysis of aluminium-based alloys. *The European Physical Journal Plus*, 137(6), pp.1-14.
14. Ahmed, N., Shahida, S., Kiani, S.M., Razzaq, M.I., Hameed, M.U., Iqbal, S.M.Z., **Abbasi, S.A.**, Rafique, M. and Baig, M.A., 2022. Analysis of an Iron-Copper Alloy by Calibration-Free Laser-Induced Breakdown Spectroscopy (CF-LIBS) and Inductively Coupled Plasma–Mass Spectrometry (ICP-MS). *Analytical Letters*, pp.1-12.
15. Rafique, M., Shahzadi, C., Jabbar, A., Khan, M., Ur Rahman, S., Bukhari, S.S.H., **Abbasi, S.A.** and

- Ahmed, N., 2022. Measurement of age-dependent radiation ingestion doses due to gross alpha and gross beta exposure from medicinal plants. *Isotopes in Environmental and Health Studies*, pp.1-14.
16. Ahmad, A., **Abbasi, S.A.**, Hafeez, M., Khan, T.M., Rafique, M., Ahmed, N., Ahmad, P., Faruque, M.R.I., Khandaker, M.U. and Javed, M., 2021. Detection and Quantification of Precious Elements in Astrophyllite Mineral by Optical Spectroscopy. *Materials*, 14(21), p.6277.
 17. **Abbasi, S.A.**, Rafique, M., Khan, T.M., Khan, A., Ahmad, N., Faruque, M.R.I., Khandaker, M.U., Ahmad, P. and Saboor, A., 2021. Chemical Analysis of Thermoluminescent Colorless Topaz Crystal Using Laser-Induced Breakdown Spectroscopy. *Minerals*, 11(4), p.367.
 18. D. Ali, M.Z. Butt, I. Muneer, F. Bashir, M. Hanif, T. M. Khan, **S. A. Abbasi**. Synthesis, characterization and antibacterial performance of transparent c-axis oriented Al doped ZnO thin films, *Surfaces and Interfaces*, 2021
 19. **Abbasi, S.A.**, Aziz, Z., Khan, T. M., Ali, D., ul Hassan, T., Iqbal, J., ... & Khan, E. M. (2020). Enhancement of optical signal and characterization of palladium plasma by magnetic field-assisted laser-induced breakdown spectroscopy. *Optik*, 224, 165746.
 20. Ahmed, N., Farooq, K., Shahida, S., ul Haq, K., **Abbasi, S. A.** Umar, Z. A., & Baig, M. A. (2020). Spectrochemical Analysis of Pakistani Bakery Breads Using Laser Induced Breakdown Spectroscopy. *Optik*, 165743.
 21. Ahmad, A., Hafeez, M., **Abbasi, S. A.**, Khan, T. M., Faruque, M. R. I., Khandaker, M. U., ... & Haleem, N. (2020). Compositional Analysis of Chalcopyrite Using Calibration- Free Laser-Induced Breakdown Spectroscopy. *Applied Sciences*, 10(19), 6848.
 22. Andleeb, S., Tariq, F., Muneer, A., Nazir, T., Shahid, B., Latif, Z., **Abbasi, S.A.**, ul Haq, I., Majeed, Z., Khan, S.U.D. and Khan, S.U.D., 2020. In vitro bactericidal, antidiabetic, cytotoxic, anticoagulant, and hemolytic effect of green-synthesized silver nanoparticles using Allium sativum clove extract incubated at various temperatures. *Green Processing and Synthesis*, 9(1), pp.538-553.
 23. Khan, T.M., Khan, S.U.D., Khan, S.U.D., Ahmad, A., **Abbasi, S.A.**, Khan, E.M. and Mehigan, S. 2020. Silver nanoparticle films by flowing gas atmospheric pulsed laser deposition and application to surface-enhanced Raman spectroscopy. *International Journal of Energy Research*. <https://doi.org/10.1002/er.5767>
 24. Khan, T.M., Khan, S.U.D., Khan, S.U.D., Ahmad, A. and **Abbasi, S.A.**, 2020. A new strategy of using dielectric barrier discharge plasma in tubular geometry for surface coating and extension to biomedical application. *Review of Scientific Instruments*, 91(7), 073902.
 25. J. Iqbal, H. Asghar, S. K. H. Shah, M. Naeem, **S. A. Abbasi**, and R. Ali. 2020. Elemental analysis of sage (herb) using calibration-free laser-induced breakdown spectroscopy. *Applied Optics* 59(16): 4927-4932.
 26. **S. A. Abbasi**, M. Rafique, A. A. Mir, K. J. Kearfott, S. U. Khan, S. U. Khan, T. M. Khan, J. Iqbal. 2020. Quantification of Elemental Composition of Granite Gneiss collected from Neelum Valley using Calibration free Laser-Induced Breakdown and Energy-dispersive X-ray Spectroscopy. *Journal of Radiation Research and Applied Sciences* 13 (1): 362-72
 27. M. Hafeez, **S. A. Abbasi**, M. Rafique, R. Hayder, M. Sajid, J.Iqbal, N. Ahmad and S. Shahida. 2020. Calibration Free-Laser Induced Breakdown Spectroscopic Analysis of Copper-Rich Mineral Collected from GilgitBaltistan Region of Pakistan. *Applied Optics*. 59(1) : 68-76
 28. M. Firdos, K. Abbas, **S. A. Abbasi**, and N. Y. Abbasi. (2020). Modeling And Comparison Of Maximum Likelihood And Median Rank Regression Methods With Fréchet Distribution. *Proceedings on Engineering Sciences*. 2(2) : 2683-4111
 29. **S. A. Abbasi**, A.H. Dogar, S. Ullah, M. Rafique and A. Qayyum. 2017. Highly charged tungsten ions generated by nanosecond pulsed laser and influence of magnetic field on ion charge state. *Nuclear Instruments and Methods in Physics Research B*, 408: 244-247.
 30. Dogar, A.H., **S.A. Abbasi**, H. Qayyum, S. Ullah, S. and A. Qayyum. 2017. Estimation of ion accelerating potential inside the nanosecond pulsed laser produced tungsten plasma. *European Physical Journal*

D.,71(10): 250.

31. **S.A. Abbasi**, A.h. Dogar, A. B. Ilyas, S. Ullah, M. Rafique, A. Qayyum. 2016. Ion charge state and energy enhancement by axial magnetic field applied during laser produced plasma expansion. *Laser and Particle Beams.*, 34(4): 606-614.
32. Hussain, M. S., A.H. Dogar, A. Qayyum and **S.A. Abbasi**. 2016. Angular Distribution of Tungsten Material and Ion Flux during Nanosecond Pulsed Laser Deposition. *Surface Review Letters.*, 23(03): 1650004.
33. **S.A. Abbasi**, M.S. Hussain, B. Ilyas, M. Rafique, A.H. Dogar and A. Qayyum. 2015. Characterization of highly charged titanium ions produced by nanosecond pulsed laser. *Laser and Particle Beams.*, 33(1): 81.
34. Rafique, M., Mirza, N. M., Mirza, S. M., Kearfott, K. J., **Abbasi, S. A.**, & Naeem, S. F. (2015). Parametric Study of Time-Dependent Corrosion Product Activity due to 56Mn, 58Co, and 60Co in the Primary Coolant Circuit of a Typical Pressurized Water Reactor. *Journal of Chemistry*, 2015.
35. S. Mahmood, **S.A. Abbasi**, S. Jabeen, & M. A. Baig. 2010. Laser-induced breakdown spectroscopic studies of marbles. *Journal of Quantitative Spectroscopy and Radiative Transfer*, 111(5), 689-695.
36. Iqbal, A., Baig, M. S., Akram, M., & **Abbasi, S. A.** (2010). Indoor radon concentration, outdoor gamma dose rates and impact of geology in the Dhirkot area, Azad Jammu and Kashmir, sub-Himalayas, Pakistan. *Radioprotection*, 45(4), 523-535.

References

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