

# DR ALI RAZA MIRZA (PhD)

Theoretical Physicist | Open Quantum Systems

Postdoctoral Research Fellow | University of Surrey, UK (Mar. 2023 – Aug. 2025)

 a.r.mirza@surrey.ac.uk



ResearchGate



ORCID



Website









+92 345 4477099

## CAREER SUMMARY





Theoretical physicist with a PhD and postdoctoral expertise in open quantum systems and quantum sensing at the University of Surrey. Author of eight research papers with strong contributions to quantum control and metrology. Holds an MEd and a Post-graduate Certificate in Higher Education Teaching, reflecting a clear commitment to academic excellence. Seeking an academic role to apply research and teaching skills in service of national priorities.

**Research Keywords :** [Open quantum systems](#) [Decoherence](#) [Quantum information science](#) [Quantum dots](#) [Non-equilibrium quantum dynamics](#)



## FELLOWSHIPS

2022-24	 <b>UNIVERSITY OF SURREY   Full-time</b> <span>📍 ENGLAND</span> <u>Postdoctoral Research Fellow</u> Project : Life on the Edge : quantum thermodynamics, quantum biology and the arrow of time <a href="https://www.surrey.ac.uk/people/ali-raza-mirza">https://www.surrey.ac.uk/people/ali-raza-mirza</a> <a href="#">Contract</a> <a href="#">Employment</a>
2016-23	 <b>LAHORE UNIVERSITY OF MANAGEMENT SCIENCES   Full-time</b> <span>📍 PAKISTAN</span> <u>PhD Student</u> Scholarship : A highly competitive PhD position with Tuition fee waiver and monthly stipend <a href="#">Offer</a>
2021-22	 <b>THE UNIVERSITY OF MANCHESTER   Full-time</b> <span>📍 ENGLAND</span> <u>Visiting Researcher</u> Award : 6-months competitive research fellowship awarded by Higher Education Commission <a href="#">View</a> Project : <i>Work</i> statistics in strongly coupled driven open quantum systems <a href="#">View</a> <a href="#">Offer</a> <a href="#">Letter</a>
2020-21	 <b>MONASH UNIVERSITY   Full-time</b> <span>📍 AUSTRALIA</span> <u>Visiting Researcher</u> Award : 6-months competitive research fellowship awarded by Higher Education Commission <a href="#">View</a> Project : To study the effect of initial correlations on Open system dynamics <a href="#">View</a> <a href="#">Offer</a> <a href="#">Letter</a>
2017-20	 <b>LAHORE UNIVERSITY OF MANAGEMENT SCIENCES   Full-time</b> <span>📍 PAKISTAN</span> <u>Research Associate</u> Grant No. : 5917/Punjab/NRPU/ R&D/HEC/2016 • Amount : 1.872 Million Pkr • <a href="#">View</a> Project : Open quantum systems beyond Born-Markov regime
2004-12	 <b>ALFALAH SCHOLARSHIP SCHEME</b> <span>📍 PAKISTAN</span> <u>Alfalsh Scholar</u> Scholarship : Monthly stipend to cover educational/living expenses <a href="#">Off. Lett.</a> <a href="#">Certificate</a>

## ACADEMIC RECORD

2016-23	 <b>LAHORE UNIVERSITY OF MANAGEMENT SCIENCES   Full-time</b> <span>📍 PAKISTAN</span> Degree : Doctor of Philosophy (PhD) in Physics   Open Quantum Systems <a href="#">View Degree</a> Thesis Title : Improving the understanding of the dynamics of open quantum systems <a href="#">View</a> PhD Country Directory (PCD) number 30861
2013-15	 <b>GOVERNMENT COLLEGE UNIVERSITY LAHORE   Full-time</b> <span>📍 PAKISTAN</span> Degree : Master of Philosophy (M Phil.) in Physics <a href="#">View Degree</a> Thesis Title : AC nuclear stark effect via super-intense laser-ion interaction <a href="#">View Thesis</a>
2011-13	 <b>QUAID I AZAM UNIVERSITY ISLAMABAD   Full-time</b> <span>📍 PAKISTAN</span> Degree : Master of Science (M Sc.) in Physics <a href="#">View Degree</a> Laboratory Courses : 12 credit hrs
2008-10	 <b>UNIVERSITY OF GUJRAT   Full-time</b> <span>📍 PAKISTAN</span> Degree : Bachelors of Science (B Sc.) <a href="#">View Degree</a> Subjects : Double Math and Physics <a href="#">View Certificate</a>

## TEACHING CERTIFICATIONS

- |  |   |            |
|--|---|------------|
| <br>2024-25 | <b>UNIVERSITY OF SURREY   Part-time</b><br>Certificate : Post Graduate Certificate in Learning and Teaching<br>Program : A nine-month Associate Fellowship pathway in the Higher Education Academy (AFHEA)<br><a href="https://PGCert/Module/2023-2024">https://PGCert/Module/2023-2024</a> <a href="#">View Certificate 1</a> <a href="#">View Certificate 2</a> | 📍 ENGLAND  |
| <br>2014-16 | <b>ALLAMA IQBAL OPEN UNIVERSITY ISLAMABAD   Part-time</b><br>Degrees : Bachelors of Education (B Ed.), Master of Education (M Ed.) <a href="#">Degree 1</a> <a href="#">Degree 2</a><br>Program : Education degrees earned through distance learning program  | 📍 PAKISTAN |

## HONORS/AWARDS, FUNDING

- Sep. 2004 Received a merit-based scholarship from the Alfalah Scholarship Scheme in Pakistan to support education from high school through to a master's degree. [View Scholarship Certificate](#)
- Dec. 2021 Scholarship Award from The Higher Education Commission of Pakistan to conduct a six month research at The University of Manchester, England. [View Award Letter](#)
- Sep. 2018 Officer Travel Grant awarded (twice) for annual SPIE (Society of Photo-optical Instrumentation Engineers) meetings in Strasbourg, France and in San Diego, USA. [Grant 1](#) [Grant 2](#)
- Aug. 2016 Secured competitive PhD fellowship in the department of Physics at Lahore University of Management Sciences, Pakistan. [View Scholarship](#)
- Feb. 2010 Awarded a Gold Medal, a Laptop, Cash prize and Certificate of Merit from the Governor of Punjab, Pakistan in the annual convocation ceremony at University of Gujrat, Pakistan. [View List of Position Holders](#) [View Gold Medal](#) [View Certificate](#)

## RESEARCH PUBLICATIONS

### POSTDOC PUBLICATIONS

- ▶ Work counting statistics of periodically driven open quantum systems coupled to harmonic oscillators reservoir  
Ali Raza Mirza, Ahsan Nazir, Adam Zaman Chaudhry, Jim Al-Khalili. (Drafting manuscript)
- ▶ Sensing high-frequency AC fields via a two-qubit probe  
Rizwan Abbas, Ali Raza Mirza, A.Z. Chaudhry, *Phys. Rev. A*. <https://arxiv.org/2505.19729> Submitted (2025)
- ▶ AC nuclear Stark effect in H-atom via super-intense laser-atom interaction  
Ali Raza Mirza, Rizwan Abbas, Atif Shahbaz, *Int. J. Q. Chem.* <https://arxiv.org/2502.12683> Submitted (2025)
- ▶ The effect of state preparation on the probe-bath parameters estimation  
Ali Raza Mirza, Jim Al-Khalili, *Physica Scripta*. <https://doi.org/10.1088/1402-4896/ada2be> Published (2025)
- ▶ The impact of quantum correlations on parameter estimation in a spin reservoir  
Ali Raza Mirza, Jim Al-Khalili, *Physica Scripta*. <https://doi.org/10.1088/1402-4896/ad7f11> Published (2024)
- ▶ Evolving Pedagogies : A Portfolio of Reflective Practice and Innovation in Higher Education Teaching and Learning  
Ali Raza Mirza, *Personal website*. <http://alirazamirza.com/PGCert-Portfolio.pdf> (2024)













### PHD PUBLICATIONS

- ▶ Improving the estimation of the environment parameters via a two-qubit scheme  
Ali Raza Mirza, Adam Zaman Chaudhry, *Nature – Scientific Reports*.  
<https://www.nature.com/articles/s41598-024-57150-7> Published (2024)
- ▶ The role of initial system-environment correlations with a spin environment  
Ali Raza Mirza, Mah Noor Jamil, and Adam Zaman Chaudhry, *International Journal of Modern Physics B*.  
<https://www.worldscientific.com/doi/10.1142/S0217979224504290> Published (2024)
- ▶ Improving the understanding of the dynamics of open quantum systems  
Ali Raza Mirza, *PhD thesis*. <https://arxiv.org/2402.10901.pdf> Published (2023)
- ▶ Master equation incorporating the system-environment correlations present in the joint equilibrium state  
Ali Raza Mirza, Muhammad Zia, Adam Zaman Chaudhry, *Physical Review A*.  
<https://journals.aps.org/PhysRevA/104.042205> Published (2021)

### MPHIL THESIS





- ▶ To Study AC Nuclear Stark Effect Via Super-Intense laser-ion Interaction  
Ali Raza Mirza, *Personal website*. <http://alirazamirza.com/MPhilThesis.pdf> (2015)

## TEACHING EXPERIENCE



2018-22		<b>LAHORE UNIVERSITY OF MANAGEMENT SCIENCES   Part-time</b> As a Teaching Assistant Course taught : Electricity and Magnetism • Undergraduate level Course taught : Quantum Mechanics II • Undergraduate level Course taught : Quantum Mechanics I • Undergraduate level Course taught : Advance Quantum Mechanics • Graduate level	 PAKISTAN <a href="#">View</a>
2021-22		<b>RIPHAH INTERNATIONAL UNIVERSITY LAHORE CAMPUS   Part-time</b> As a Lecturer Course taught : Electricity and Magnetism • Undergraduate level Course taught : Quantum Mechanics II • Undergraduate level	 PAKISTAN <a href="#">View</a>
2014-15		<b>SUPERIOR COLLEGE/UNIVERSITY KHARIAN CAMPUS   Full-time</b> As a Lecturer Course taught : Basic Electronics • Undergraduate level Course taught : Calculus I • Undergraduate level	 PAKISTAN <a href="#">View</a>
2017-18		<b>ALLAMA IQBAL OPEN UNIVERSITY ISLAMABAD   Part-time</b> As a Tutor Courses taught : Physics • Undergraduate level	 PAKISTAN <a href="#">View</a>
2017-20		<b>SYEDANWALA GIRLS HIGHER SECONDARY SCHOOL   Part-time</b> As a Teacher & Teacher Trainer Provided training to the high school science teachers Course taught : Physics, Mathematics • A level/GCSE/HSSC	 PAKISTAN <a href="#">View</a>
2015-16		<b>GARRISON COLLEGE KHARIAN CANTONMENT   Full-time</b> As a Lecturer Course taught : Physics • A level/GCSE/HSSC	 PAKISTAN <a href="#">View</a>

## INTERNATIONAL CONFERENCES




### Talks as an invited speaker

2025	18th National Symposium on Frontiers in Physics	<a href="#">View Certificate</a>	 PAKISTAN
2024	Blue sky thinking workshop held The University of Surrey	<a href="#">View Speakers</a>	 ENGLAND
2023	Polaron day workshop at The University of Manchester	<a href="#">View Inv. Letter</a>	 ENGLAND
2023	Arrow of time conference held at University of California	<a href="#">View Inv. Letter</a>	 USA








### Talks in group seminars

2023	Quantum foundations group at University of Surrey, Guildford	 ENGLAND
2022	Quantum dynamics group at Lahore University of Management Sciences, Lahore	 PAKISTAN

### Poster Presentations

2025	Quantum Thermodynamics Conference at Centre of Quantum Technologies	<a href="#">View</a>	 SINGAPORE
2024	Quantum Thermodynamics Conference at The University of Surrey	<a href="#">View</a>	 ENGLAND
2024	Noise and Decoherence in Qubits at ASPEN center of Physics, Colorado	<a href="#">View</a>	 USA

### As an Attendee

2024	Frontiers in Optics + Laser Science organized by OPTICA	<a href="#">View</a>	 USA
2024	Quantum Simulation Conference conducted by University of Maryland	<a href="#">View</a>	 USA
2024	Advance Photonics Congress conducted by LAVAL University	<a href="#">View</a>	 CANADA
2024	SPIE Photonics west Exhibition, SPIE Quantum west Exhibition, San Francisco		 USA
2023	Blue Sky Thinking Conference held at University of California, Los Angeles	<a href="#">View</a>	 USA
2021	Quantum Information Summer school International Business Administration	<a href="#">View</a>	 PAKISTAN
2019	International m.School on Quantum & Ultrafast Optics COMSATS University	<a href="#">View</a>	 PAKISTAN







## SKILLS

Programming	Wolfram Mathematica, Matlab, Origin, <del>TeX</del> /Overleaf, Python
Laboratory	Spin Coating, Optical Microscopy
Microsoft	Word, PowerPoint, Excel, Outlook






## + STRENGTHS

- > Analytical/Mathematical
- > Workaholic
- > Presentation, Organizational skills
- > Independent research ability

## MEMBERSHIP WITH SCIENTIFIC SOCIETIES

2025-26		<b>AMERICAN PHYSICAL SOCIETY (APS)   Part-time</b> Early Career Researcher Roles/Benefits : Networking, Access to cutting edge research, Travel Funding, Research Collaboration, Publishing, Mentorship, Awards and grants <a href="#">Evidence 1</a> <a href="#">Evidence 2</a>	UNITED STATES
2024-27		<b>CENTRE OF EXCELLENCE ON AGEING (CEA), GLOBAL INITIATIVE ON AGEING   Part-time</b> As a CEA Fellow International organization supported by the United Nation to lead the Global Initiative on Ageing Responsibilities : Research, Collaboration, Networking <a href="#">View Appointment Letter</a>	ENGLAND
2017-22		<b>SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS (SPIE)   Part-time</b> As a President of Student Chapter, Corporate Member Honor : Awarded Officer travel grant (twice) for SPIE meetings in France & USA. <a href="https://spie.org">https://spie.org</a> <a href="#">Travel Grant 1</a> <a href="#">Travel Grant 2</a> <a href="#">View Certificate</a>	USA
2024-27		<b>OPTOSIGMA   Part-time</b> As a Quantum Coordinator Responsibility : Spearheading the assembly & integration of the quantum computer for the GRFBSF <a href="https://www.optosigma.com">https://www.optosigma.com</a> <a href="#">Evidence</a>	USA
2018-22		<b>KHWARIZMI SCIENCE SOCIETY (KSS) LAHORE   Part-time</b> As an Experiments Demonstrator Responsibility : To demonstrate Physics experiments in the outreach events, e.g. annual <i>Lahore Science Mela</i> <a href="https://KhwarizmiScienceSociety.org">https://KhwarizmiScienceSociety.org</a> <a href="#">View Appreciation</a> <a href="#">View Certificate</a>	PAKISTAN
2013-15		<b>JONES PHYSICS SOCIETY (JPS) LAHORE   Part-time</b> As an MPhil Coordinator Responsibility : To organise scientific workshops and conferences <a href="https://jonesphy.org">https://jonesphy.org</a> <a href="#">View Membership</a> <a href="#">View Certificate</a>	PAKISTAN

## AFFILIATION WITH JOURNALS

	<b>AMERICAN JOURNAL OF MODERN PHYSICS   Part-time</b> As a Manuscript Reviewer/Referee <a href="http://www.ajmp.org/reviewers">http://www.ajmp.org/reviewers</a> <a href="#">View Certificate</a>	USA
	<b>PHYSICA SCRIPTA &amp; JOURNAL OF PHYSICS B   Part-time</b> As a Manuscript Reviewer/Referee <a href="https://iopscience.iop.org/PhysScr">https://iopscience.iop.org/PhysScr</a> <a href="https://iopscience.iop.org/JPB">https://iopscience.iop.org/JPB</a>	ENGLAND
	<b>INTERNATIONAL JOURNAL OF MODERN PHYSICS B   Part-time</b> As a Manuscript Reviewer/Referee <a href="https://www.worldscientific.com/ijmpb">https://www.worldscientific.com/ijmpb</a> <a href="#">View Certificate</a>	SINGAPORE
	<b>MOLECULAR &amp; CELLULAR BIOMECHANICS   Part-time</b> As a Manuscript Reviewer/Referee <a href="https://ojs.sin-chn.com/mcb">https://ojs.sin-chn.com/mcb</a> <a href="#">View Certificate</a>	SINGAPORE
	<b>INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS   Part-time</b> As a Manuscript Reviewer/Referee <a href="https://link.springer.com/journal/10773">https://link.springer.com/journal/10773</a> <a href="#">View Certificate</a>	GERMANY

## HOBBIES





- > Arabic/Urdu Calligraphy (Professional)
- > Documentaries
- > Explore Nature
- > Adventures/Travels

## LANGUAGES

English	CEFR B2	● ● ● ● ○
Urdu	Native	● ● ● ● ●
Punjabi	Native	● ● ● ● ●
Hindi	Basic	● ● ● ○ ○

## COMMERCIAL SUCCESSES/CERTIFICATES

---

- 2022 List of Visas : United Kingdom , Germany , Canada , Dubai , United States 
- 2021 Demonstrated bending of light and secure first position in a Photographic competition held on the *International day of Light* in Pakistan [View Evidence](#)
- 2021 Conducted a workshop based demonstrating Properties of light at Lahore University of Management Sciences, Pakistan [View Workshop Poster](#)
- 2021 Offered Nastaleeq (Urdu) and Arabic (Thuluth) Calligraphy courses and workshops as an Instructor, Pakistan [View Poster](#)
- 2019 Hosted a workshop demonstrating Properties of light at Nusrat Jahan Postgraduate College Rabwa, Pakistan [View Certificate](#)
- 2019 Presented demonstrations on Properties of light in a workshop at Divisional Public School Lalamusa, Pakistan [View Certificate](#)
- 2018 Worked as a Physics instructor at Lahore University of Management Sciences, Pakistan under National Outreach Program [View Certificate 1](#) [View Certificate 2](#)
- 2010 Awarded a merit certificate upon securing first position in BSc, Pakistan [Cert. 1](#) [Cert. 2](#)
- 2005 Distinction in the Matriculation exams and won the Talent Award, Pakistan [View Inv. Letter](#)

## REFERENCES

---


### Dr Jim Al-Khalili | Postdoctoral Boss

*Emeritus Professor, CBE FRS, Distinguished Chair, Centre Director,*  
Department of Physics,  
UNIVERSITY OF SURREY, ENGLAND

 [j.al-khalili@surrey.ac.uk](mailto:j.al-khalili@surrey.ac.uk)

### Dr Adam Zaman Chaudhry | PhD Supervisor

*Associate Professor, Head of Department,*  
Department of Physics,  
LAHORE UNIVERSITY OF MANAGEMENT SCIENCES, PAKISTAN

 [adam.zaman@lums.edu.pk](mailto:adam.zaman@lums.edu.pk)

### Dr Ahsan Nazir | PhD Co-Supervisor

*Associate Professor, Head of Theoretical Physics Group,*  
Department of Physics,  
UNIVERSITY OF MANCHESTER, ENGLAND

 [ahsan.nazir@manchester.ac.uk](mailto:ahsan.nazir@manchester.ac.uk)

## DECLARATION

---

I responsibly declare that the provided information above is correct up to the best of my knowledge.

Signature

  
Ali Raza Mirza