Tabish Qureshi

Curriculum Vitae

Centre for Theoretical Physics
Jamia Millia Islamia, New Delhi 110025
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Date of Birth	1st February 1965
Nationality	Indian

Contact Information

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Research Interests

Foundations of quantum mechanics, quantum entanglement, quantum information

Education

Jawaharlal Nehru University, New Delhi, INDIA

Ph.D., Physical Sciences, December 1993

- Thesis Topic: "Some models of quantum dissipative systems and applications"
- Supervisor: Sushanta Dattagupta

Jamia Millia Islamia, New Delhi, INDIA

M.Sc. Physics, 1987

University of Delhi (A.R.S.D. College) New Delhi, INDIA

B.Sc. (Hons) Physics, 1985

Academic Experience

Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, INDIA
Professor **February 2013 - present**

Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, INDIA
Associate Professor **21 April 2011 - February 2013**

Department of Physics, Jamia Millia Islamia, New Delhi, INDIA
Associate Professor **2006 - 21 April 2011**

Department of Physics, Jamia Millia Islamia, New Delhi, INDIA
Lecturer **August 1998 - 2006**

Indira Gandhi Centre for Atomic Research, Kalpakkam, INDIA
Visting Scientist **Sept. 1996 - June 1998**

Institute of Mathematical Sciences, Chennai, INDIA
Post-Doctoral Fellow **February 1994 - May 1996**

Editorial and Reviewer Duties

- Referee/Reviewer:
  - Physical Review A
  - Scientific Reports
  - Annals of Physics
  - Annalen der Physik
  - Foundations of Physics
  - American Journal of Physics
  - Euro-Physics Letters
  - Physica A
  - International Journal of Theoretical Physics
  - Canadian Journal of Physics
  - Physica D
  - Quanta
  - Journal of Quantum Information Science
  - Pramāna
- **95** Verified peer reviews till 2024.
- Editorial board:
  - Quanta

Publications

1. **A generalized formulation of two-particle interference**
   Kamran Nazir Dar, T. Qureshi, arXiv:2404.18468 [quant-ph]
2. **Understanding modified two-slit experiments using path markers**
   T. Qureshi, Found. Phys. 53, 38 (2023).
3. **Emergence of classicality in Stern–Gerlach experiment via self-gravity**
   S. K. Sahoo, R. Vathsan, T. Qureshi, Annalen der Physik 535, 2200627 (2023).
4. **Testing gravitational self-interaction via matter-wave interferometry**
   S. K. Sahoo, A. Dash, R. Vathsan, T. Qureshi, Phys. Rev. A 106, 012215 (2022).
5. **Characterization of two-particle interference by complementarity**
   N. Pathania, T. Qureshi, Phys. Rev. A 106, 012213 (2022).
6. **Coherence, path predictability, and I concurrence: A triality**
   A. K. Roy, N. Pathania, N. K. Chandra, P. K. Panigrahi, T. Qureshi, Phys. Rev. A 105, 032209 (2022).
7. **Quantifying entanglement with coherence**
   N. Pathania, T. Qureshi, Int. J. Theor. Phys. 61, 25 (2022)
8. **Multipath wave-particle duality with a path detector in a quantum superposition**
   A. Siddiqui, T. Qureshi, Phys. Rev. A 103, 022219 (2021).
9. **Momentum kicks in imperfect which-way measurement**
   N. Pathania, T. Qureshi, Quantum 5, 507 (2021).
10. **The Delayed-Choice Quantum Eraser Leaves No Choice**
    T. Qureshi, Int. J. Theor. Phys. 60, 3076 (2021).
11. **Predictability, distinguishability, and entanglement**
    T. Qureshi, Opt. Lett. (Letter) 46, 492 (2021) (Editor's Pick)
12. **Demystifying the delayed-choice quantum eraser**
    T. Qureshi, Eur. J. Phys. 41, 055403 (2020).
13. **Multipath wave-particle duality in classical optics**
    B. Paul, S. Kamal, T. Qureshi, Opt. Lett. (Letter) 45, 3204 (2020).
14. **Decoherence and visibility enhancement in multipath interference**
    S. Mishra, A. Venugopalan, T. Qureshi, Phys. Rev. A 100, 042122 (2019).

15. **Interference visibility and wave-particle duality in multipath interference**
    T. Qureshi, Phys. Rev. A 100, 042105 (2019).
16. **Coherence, interference and visibility**
    T. Qureshi, Quanta 8, 24–35 (2019).
17. **Path predictability and quantum coherence in multi-slit interference**
    P. Roy, T. Qureshi, Phys. Scr. 94(9), 095004 (2019).
18. **Quantum coherence and path-distinguishability of two entangled particles**
    M. Afrin, T. Qureshi, Eur. Phys. J. D 73, 31 (2019)
19. **Monitoring decoherence via measurement of quantum coherence**
    A. Venugopalan, S. Mishra, T. Qureshi, Physica A 516, 308-316 (2019).
20. **Which-way measurement and momentum kicks**
    T. Qureshi, EPL 123, 30007 (2018).
21. **Wave-particle duality in asymmetric beam interference**
    K. K. Menon, T. Qureshi, Phys. Rev. A 98, 022130 (2018).
22. **Biphoton Interference in a Double-Slit Experiment**
    A. Paul, T. Qureshi, Quanta 7, 1-6 (2018).
23. **Measuring Quantum Coherence in Multi-Slit Interference**
    T. Paul, T. Qureshi, Phys. Rev. A 95, 042110 (2017).
24. **Wave-Particle Duality in N-Path Interference**
    T. Qureshi, M.A. Siddiqui, Ann. Phys. 385, 598-604 (2017).
25. **Quantum eraser for three-slit interference**
    N.A. Shah, T. Qureshi, Pramana J. Phys. 89, 80 (2017).
26. **Hanbury Brown-Twiss Effect with Wave Packets**
    Ushba, T. Qureshi, Quanta 6, 61-69 (2017).
27. **Quantitative Wave-Particle Duality**
    T. Qureshi, Am. J. Phys. 84 (7), 517-521 (2016).
28. **Aspects of Complementarity and Uncertainty**
    R. Vathsan, T. Qureshi, Int. J. Quant. Inf. 14(3), 1640031 (2016).
29. **A Nonlocal Wave-Particle Duality**
    M. A. Siddiqui, T. Qureshi, Quantum Stud.: Math. Found. 3, 115-122 (2016).
30. **Understanding Ghost Interference**
    T. Qureshi, P. Chingangbam, S. Shafaq, Int. J. Quant. Inf. 14(3), 1640036 (2016).
31. **Duality of quantum coherence and path distinguishability**
    M.N. Bera, T. Qureshi, M.A. Siddiqui, A.K. Pati, Phys. Rev. A 92, 012118 (2015).
32. **Wave packet analysis of single-slit ghost diffraction**
    T. Qureshi, S. Shafaq, Eur. Phys. J. Plus 130, 173 (2015).
33. **Protective measurements: probing single quantum systems**
    T. Qureshi, N.D. Hari Dass, Curr. Sci. 109, 2023 (2015).
34. **Three-Slit Interference: A Duality Relation**
    Mohd Asad Siddiqui, Tabish Qureshi, Prog. Theor. Exp. Phys. 2015, 083A02 (2015).
35. **Theoretical Analysis of Two-Color Ghost Interference**
    S. Shafaq, T. Qureshi, Eur. Phys. J. D, 68 (2014) 52.
36. **Quantum Key Distribution with Qubit Pairs**
    M.A. Siddiqui, T. Qureshi, J. Quantum Inf. Sci. (2014) 4, 129-132.
37. **Master Key Secured Quantum Key Distribution**
    T. Qureshi, T. Shibli, A. Sheel, arXiv:1301.5015 [quant-ph]
38. **Einstein's Recoiling Slit Experiment, Complementarity and Uncertainty**
    T. Qureshi, Quanta 2 (2013) 58-65.
39. **Quantum Twist to Complementarity: A Duality Relation**

T. Qureshi, Prog. Theor. Exp. Phys. (Letters) 2013(4) (2013) 041A01.

40. **Popper's Experiment: A Modern Perspective**
T. Qureshi, Quanta 1 (2012) 19-32.
41. **Ghost Interference and Quantum Erasure**
P. Chingangbam, T. Qureshi, Prog. Theor. Phys. 127 (2012) 383-392.
42. **Decoherence, Time Scales and Pointer States**
T. Qureshi, Physica A 391, 2286-2290 (2012)
43. **Minimum Uncertainty and Entanglement**
N.D. Hari Dass, T. Qureshi, A. Sheel, Int. J. Mod. Phys. B 27, 1350068 (2013).
44. **Comment on "On Visibility in the Afshar Two-Slit Experiment"**
T. Qureshi [arXiv:quant-ph/1002.3686v1]
45. **Modified Two-Slit Experiments and Complementarity**
T. Qureshi, J. Quantum Inf. Sci. 2, 34-39 (2012).
46. **Analysis of Popper's Experiment and Its Realization**
T. Qureshi, Prog. Theor. Phys. 127, 645-656 (2012).
47. **Quantum eraser using a modified Stern-Gerlach setup**
T. Qureshi, Z. Rehman, Prog. Theor. Phys. 127, 71 (2012).
48. **Decoherence and matter wave interferometry**
T. Qureshi, A. Venugopalan, *Int. J. Mod. Phys. B* 22 (2008) 981-990
49. **Dynamics of rolling massive scalar field cosmology**
P. Chingangbam, T. Qureshi, Int. J. Mod. Phys. A 20(26) (2005) 6083-6092
50. **Understanding Popper's Experiment**
T. Qureshi, Am. J. Phys. 53(6) (2005) 541-544
51. **Popper's experiment, Copenhagen interpretation and nonlocality**
T. Qureshi, Int. J. Quant. Inf. 2(3) (2004) 407-418
52. **Cosmological aspects of rolling tachyon**
M. Sami, P. Chingangbam, T. Qureshi
Pramana 62(2004) 765
53. **Aspects of tachyonic inflation with an exponential potential**
M. Sami, P. Chingangbam, T. Qureshi, Phys. Rev. D 66, 043530 (2002)
54. **Critique of Protective Measurements**
N. D. Hari Dass and T. Qureshi, *Phys. Rev. A* **59**, 2590 (1999)
55. **d-electron induced icosahedral packing in strontium clusters**
T. Qureshi and V. Kumar, in *5th IUMRS Conference in Bangalore 1998*
56. **Dynamics of a strongly damped two-level system: beyond the DBGA**
T. Qureshi, *Phys. Rev. B* **53** (1996) 3183-3189
57. **Dynamics of tunneling centers in metallic systems**
T. Qureshi, *Phys. Rev. B* **52** (1995) 7976-7981
58. **Analysis of spectroscopic data in Kondo systems**
T. Qureshi and S. Dattagupta, *Phys. Rev. B* **49** (1994) 12848
59. **A stochastic model for Transient Magnetic Fields as observed by perturbed angular distribution of gamma rays**
T. Qureshi and S. Dattagupta, *Z. Phys. D* **31** (1994) 135-142
60. **Quantum diffusion of muons in metals**
T. Qureshi and S. Dattagupta, *Phys. Rev. B* **47** (1993) 1092
61. **Theoretical analysis of low-temperature quantum tunneling of hydrogen in Nb(OH)x**
S. Dattagupta and T. Qureshi, *Physica B* **174** (1991) 262-267
62. **Dynamics of an impurity spin coupled to a spin-boson dissipative system**
T. Qureshi and S. Dattagupta, *J. Phys.- Cond. Matt.* **3** (1991) 1079-1087

63. **Relaxation theory of spectral properties of dissipative two-state systems**
S. Dattagupta and T. Qureshi, in *"Fluctuations in macroscopic and mesoscopic systems"*, Eds. H. Cerdeira, F. Guinea and U. Weiss (World Scientific Press, 1991)
64. **Dynamics of an impurity spin coupled to a spin-boson dissipative system**
S. Dattagupta and T. Qureshi, *Ber. Bunsenges. Phys. Chem.* **95** (1991) 433-437
65. **Relaxation behavior of a biased two-level system in metals in the weak damping limit**
T. Qureshi and S. Dattagupta, *Pramana - Journal of Physics* **35** (1990) 579-591

Recent Talks Delivered

1. **Generalized two-particle interference**
Invited talk in *Online conference on Quantum Optics and Related Topics*, Steklov Mathematical Institute of Russian Academy of Sciences, Moscow, 2 – 12 September 2024.
2. **Emergence of Classicality from the Quantum World: Role of Gravity**
Invited talk in Department of Physics, Manipur University, Imphal, 3 April 2024.
3. **The enigma of two-particle interference**
Invited talk in *Susegad Symposium on Physics with Quantum Technology*, BITS Pilani Goa Campus, Goa, 3 – 5 January 2024.
4. **Quantum-To-Classical Transition: Role of Gravity**
Invited talk in *Meeting on Quantum Information Processing and Applications*, HRI, Prayagraj, 4 – 10 December 2023.
5. **Two-Particle Interference and Complementarity**
Plenary talk in *Quantum Information and Quantum Technology - 2023*, IISER, Kolkata, 8 May – 15 June 2023.
6. **Understanding the Delayed-Choice Quantum Eraser**
Plenary talk in *Quantum Information and Quantum Technology - 2022*, IISER, Kolkata, 1 – 4 June 2022.
7. **Coherence, interference and complementarity**
Invited talk in *International Conference on Quantum Information and Foundations 2022*, ISI, Kolkata, 14 – 24 February 2022.
8. **Coherence, interference and visibility**
Invited talk in *Quantum Information and Computation: From Foundations to Applications -2021*, IIT, Jodhpur, 18 – 23 October 2021.
9. **The Delayed-Choice Quantum Eraser**
Plenary talk in *National Quantum Science and Technology Symposium*, IIIT, Hyderabad, 26 July – 3 August 2021.
10. **Wave-Particle Duality and the Quantum Eraser**
Invited talk in *Summer School on Quantum Information and Quantum Technology -2021*, IISER, Kolkata, 14 June – 14 July 2021.
11. **Is there a momentum tranfer in which-way measurement?**
Invited talk in *International Conference: Quantum Frontiers and Fundamentals 2020*, RRI, Bangalire, 13 – 18 January 2020.
12. **The Enigma of Wave-Particle Duality**
Contributed talk in *Quantum Science & Technology (DST sponsored FDP)*, BGSB University, Rajouri, 26 December 2019.
13. **Wave particle duality in multipath interference**
Invited talk in *Conference on Quantum Information & Computing 2019*, IIT, Jodhpur, 13 – 18 January 2019.
14. **Momentum kicks in interference experiments**
Invited talk in *Meeting on Quantum Information Processing and Applications 2018*, HRI, Allahabad, 2 –

8 December 2018.

15. **Two-slit interference with entangled particles**
    Contributed talk in *Quantum Frontiers and Fundamentals*, RRI, Bangalore, 30 April – 4 May 2018.
16. **Measuring coherence in multislit interference**
    Invited talk in *International Conference: Quantum Foundations 2017*, NIT, Patna, 4 – 9 December 2017.
17. **Entanglement and the EPR paradox**
    Invited talk in *Hans Raj College*, New Delhi, 30 March 2017.
18. **Emergent Reality in Quantum to Classical Transition**
    Invited talk in *International Conference on Quantum Reality and Theory of Shunya*, ICCR, New Delhi, 9 – 10 December 2016.
19. **Wave-Particle Duality: Going Beyond Two Slits**
    Invited talk in *2nd International Conference on Quantum Foundations*, NIT Patna, 17 – 21 October 2016.
20. **Wave-particle duality in multi-slit interference**
    Invited talk in *International School & Conference on Quantum Information*, IOP, Bhubaneswar, 15 – 18 February 2016.
21. **Nonlocal wave particle duality**
    Invited talk in *International Conference on Quantum Foundations*, NIT Patna, 30 Nov 2015 – 4 Dec 2015.
22. **Ghost Interference and Non-Local Wave-Particle Duality**
    Invited talk in *Congress of Philosophy and Foundations of Science XIX 2014*, India International Centre, New Delhi, 19th December 2014
23. **Protective measurements: Probing single quantum systems**
    Invited talk in *Discussion Meeting on Quantum Measurements*, IISc, Bangalore, 22 – 24 October 2014.
24. **Understanding Ghost Interference**
    Invited talk in *International Program on Quantum Information 2014*, IOP, Bhubaneswar, India, 22 – 28 February 2014.
25. **Quantum twist to complementarity**
    Invited talk in *International Meet on Quantum Correlations and Logic, Language and Set Theory*, IIT, Jodhpur, 9 – 14 December 2013.
26. **Master-key controlled quantum key distribution**
    Invited talk in *Meeting on Quantum Information Processing and Applications*, HRI, Allahabad, 2 – 8 December 2013.
27. **Language of Wave-Particle duality: Quantum correlations or uncertainty?**
    Invited talk in *8th Nalanda Dialogue on Philosophy & Science*, Nalanda, Bihar, 21 – 24 January 2013.
28. **Minimum uncertainty for entangled states**
    Invited talk in *International Workshop on Quantum Information 2012*, HRI, Allahabad, 20-26 February 2012.
29. **Decoherence and the measurement problem**
    Invited talk in *In Many Minds about Many Worlds*, Poornaprajna Institute of Scientific Research, Devanahalli, Karnataka, Dec 17–Dec 19, 2009.
30. **Complementarity and Afshar's Experiment**
    Invited talk in *Symposium on Quantum Information*, J.N.U., Delhi, 2007.
31. **What is wrong with Popper's experiment**
    Invited talk in *International Symposium organised by CPFS*, Delhi, 2006.
32. **Decoherence: A fresh look at time-scales and pointer states**
    Invited talk in *SPS March Meeting*, Jawaharlal Nehru University, New Delhi, March 2002.
33. **Decoherence, time-scales and pointer states**

Invited talk in *International Symposium: Quanta to Qubits*, New Delhi, December 2001.

34. **Measurable and unmeasurable in protective measurements**
Invited talk in *International Symposium on Wave-particle duality*, New Delhi, December 1998.

Conference and Symposia Attended

- *Winter School on Chemical Applications of Statistical Mechanics*, Indian Institute of Technology, Bombay, India. December 1988.
- *DAE Symposium on Solid State Physics*, Indian Institute of Technology, Madras, India. December 1989.
- *International Conference on Neutron Scattering*, Bhabha Atomic Research Center, Bombay, India, January 21-25 1991.
- *Workshop on Nonlinear Waves and Turbulence*, Jawaharlal Nehru University, New Delhi, India. 1992
- *Discussion Meeting on Dynamical Aspects of Complex Fluids*, Jawaharlal Nehru University, New Delhi, India. January 4-8 1993.
- *Winter School on Some Recent Developments in Quantum Many- Body Physics*, Indian Institute of Science, Bangalore, India. December 19, 1994 - January 6, 1995.
- *Workshop on Novel Physics in Low-Dimensional Electron Systems*, Instt. of Mathematical Sciences, Madras, India. January 9-14, 1995.
- *Workshop on Strongly Correlated Electron Systems*, ICTP, Trieste, Italy. 1995.
- *Workshop on Quantum Dissipative Systems*, ICTP, Trieste, Italy. 1996.
- *Workshop on Foundations of Quantum Theory*, TIFR, Bombay, India. 1996.
- *International Symposium on Wave-particle duality*, New Delhi, December 1998.
- *International Symposium: Quanta to Qubits*, New Delhi, December 2001.
- *CPFS Science Congress*, New Delhi, 2002.
- *CPFS Science Congress*, New Delhi, 2003.
- *International Symposium: Quanta to Cosmos*, New Delhi, December 2006.
- *Symposium on Quantum Information*, J.N.U., New Delhi, March 2007.
- *In Many Minds about Many Worlds: A discussion meeting on the Many-Worlds Interpretation of Quantum Mechanics*, Poornaprajna Institute, Bangalore, 17-19 December 2009
- *75 Years of Quantum Entanglement*, Kolkata, January 6-10, 2011.
- *International Workshop on Quantum Information*, HRI, Allahabad, 20th February 2012 – 26th February 2012.
- *International Conference on Quantum Information and Quantum Computing 2013*, Bangalore, India, 7 – 11 January 2013.
- *8th Nalanda Dialogue on Philosophy & Science*, Nalanda, Bihar, 21 – 24 January 2013.
- *Meeting on Quantum Information Processing and Applications*, HRI, Allahabad, 2 – 8 December 2013.
- *International Meet on Quantum Correlations and Logic*, Language and Set Theory, IIT, Jodhpur. 9 – 14 December 2013.
- *International Program on Quantum Information 2014*, Bhubaneswar, India, 22 – 28 February 2014.
- *Discussion Meeting on Quantum Measurements*, IISc, Bangalore 22 – 24 October 2014.
- *Congress of Philosophy and Foundations of Science XIX 2014*, India International Centre, New Delhi 19th December 2014.

Computer Skills

- Languages: C, Fortran, some use of Unix shell scripts
- Applications: Mathematica, LaTeXdatabase, spreadsheet, and presentation software
- Experience programming Monte Carlo simulations, Molecular dynamics simulations
- Operating Systems: Unix/Linux, Windows.