***Dr. Alok Kumar Pan***

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***Personal***

* Sex: Male
* Nationality: Indian
* Married/Unmarried Married

***Research Interests***

Quantum foundations, Quantum communication, Quantum Information theory, Quantum Cryptography, Quantum metrology, Quantum machine learning, Quantum blockchain

***Employment***

* September 2022- Current : Associate Professor, IIT Hyderabad
* March 2014 – September 2022 : Assistant Professor, NIT Patna, India
* November 2012-March 2014 : **JSPS Postdoc**, Nagoya University, Japan
* March 2012-October 2012 : Visiting Scientist, IISER-Kolkata, India
* March 2011-February 2012 : Postdoc, CNRS 8089, Paris, France
* June 2010- February 2011 : Postdoc, Pusan National Univ., S. Korea
* May 2008 - April 2010 : RA, Bose Institute, Kolkata, India

**Education**

2003-2007 **Ph. D** in Physics (Submitted in **October 2007** and awarded in **November 2008**)

 **Supervisor:** Prof. Dipankar Home, Bose Institute, Kolkata, India.

2000-2002 **M. Sc** in Physics with ***First Class*** from Jadavpur University, Kolkata, India.

1997-2000 **B. Sc** in Physics with ***First Class*** from Vidyasagar University, Midnapore, India.

***Honors, awards and achievements***

* **Ramanujan Fellowship 2014,** awarded by SERB, Govt. of India
* **Invited talks** in International Conferences at RRI Bengaluru, HRI Allahabad, IISER-Kolkata, ISI Kolkata, IIT Patna, IIT Jodhpur, and Calcutta University.
* **Travel grant from abroad (**University of Cergy-Pontoise, Paris, France; Institute of Neel, Grenoble, France; Atom institute, Vienna, Austria; University of Gransk, Poland; University of Rome, Italy; INRIM, Turin, Italy; University of Torun, Poland; Imperial College, London, UK, NUS Singapore; Perimeter Institute, Canada.**)**
* **Referee** of Phys. Rev. Lett., Phys. Rev. A, J. Phys. A, IJQI, Entropy, Physica A, Q. Inf. Proc.
* **JSPS Postdoc Fellowship,** November 2012-October 2014, JSPS, Japan
* **CNRS Postdoc Fellowship,** March 2011-February 2012, University of Cergy-Paris, France
* Qualified **NET** in December 2002 with **CSIR Fellowship** (ranked among top 20 %)
* Qualified **JEST** in February 2002 with 93 percentile
* Qualified **GATE** in February 2002 with 96 percentile (Ranked 89)
* Qualified **BARC** in March 2002

**Sponsored projects**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl. no** | **Title of the project** | **Scheme (agency)** | **Year** | **Status** | **Amount** |
| **1** | **Chanakya postdoc fellowship** on Information Theoretic Advantage from Indefinite Causal Order of Channels | DST-iHUB-QFT | 2023-2026 | Awaiting grant | **Rs. 40 lacs (Approx)** |
| 2 | Device-independent quantum randomness certification using non-projective measurements | MATRIX(SERB) | 2022 -2025 | **Ongoing** | **Rs. 6 lacs** |
| 3 | Probing multipartite non-local correlations in various Quantum Network configurations and randomness certification | Core Research Grant (SERB) | 2022 -2025 | **Ongoing** | **Rs. 20 lacs** **(Approx.)** |
| 4 | Extensive study of quantum complexity theory, certification protocols, quantum networks, deep learning in AWS | MeitY | 2022- 2025 | **Ongoing** | **USD 40000****(Approx.)** |
| 5 | **Mission mode** project on *Multi‐Institutional Networked Programme on Quantum Enabled Science & Technology (QuEST)* | DST-ICPS division | 2021 -2024(Extendable up to 2026) | **Ongoing** | **Rs. 115 lacs****(Approx.)** |
| 6 | *Ramanujan Fellowship Research Grant* | SERB | 2016- 2021 | Completed | **Rs. 38 lacs** |
| 7 | Non-Ideal Quantum Measurement And Universally Valid Error-Disturbance Trade-Off Relation | Early Research Career (SERB) | 2017- 2020 | Completed | **Rs. 16 lacs****(Approx.)** |

***PhD /MSc/Summer Student Guidance***

1. **Former PhD students**

1. Dr. Asmita Kumari (2015-2019) (Currently Postdoc at HRI Allahabad)
2. Dr. Swati Kumari (2015-2019) (Currently postdoc in National Univ. Taiwan)
3. Sumit Mukherjee ( 2019-2023 ) (Currently postdoc at IISER Kolkata)
4. Sneha Munshi ( 2019-2023 )(Currently postdoc at IIT Hyderabad)
5. Prabuddha Roy (2018-2023) (Currently postdoc at IISER Berhampur)
6. Shyam Sundar Mahato (2018-2023)
7. **Current PhD students**
8. Rahul Rishi (Joined in July 2019) **(UGC-CSIR-NET Fellow)**
9. Ritesh Singh (Joined in July 2021) (**CSIR-NET Fellow**)
10. Rajdeep Paul (Joined in December 2022) (CSIR-NET Fellow)
11. Vishnu (Joined in December 2022) (Institute Fellow)
12. Akarshit Barwanwal (Joined in December 2022) (DST-Inspire fellow)
13. **Masters project student**
14. Jatin Kumar (Completed in 2020, joined PhD at SkolTech Univ., Moscow, Russia)
15. Sambhab Antariksh (Completed in 2021, joined as PhD at HRI in September 2021)
16. Shivam Naonit (completed in 2022)
17. **Summer students:**

Guided 12 summer students and five of them are pursuing PhD in abroad (at University di Orsay France, Maryland University USA, Henry Poincare Institute France and ICFO Barcelona Spain ) and four of them in India (RRI, IIT Delhi, JNCASR, IISER-TVM).

***Administrative experience***

1. **Semester Officer** (unofficially **Associate Dean (Acad.)(PG & PhD))**

Duration: April 2014-March 2016:

Nature of duties: Helping Dean (Acad) in regular administrative activities along with the preparation/modification of PG and PhD regulations, coordinating PhD admission tests and interviews, preparing senate meeting matters and Academic Audit etc.

1. P**rofessor-in-charge Library**

Duration: June 2017-May 2018

**Conference/workshop arrangement experiences**

1. **Coordinator** of two-day *International Workshop on“Quantum Foundations”* which was held during 28-29 November 2015 at Patna. The website of workshop: <http://icqf15.nitp.ac.in/workshop.html>

Total participant: 50 ( **3 foreign speakers delivered lecture**)

Funding: From registration fee from participants. TEQUIP-II

1. C**onvener** of the 1st *International Conference* “*Quantum Foundations 2015”* (ICQF15) held during 30 Nov – 04 Dec 2015 at NIT Patna. Website: <http://icqf15.nitp.ac.in>

 Total participants: 100 ( **20 foreign speakers attended**)

Funding: DRDO, SERB, TEQUIP-II, registration fee from participants

1. **Convener** of the *2nd International Conference “Quantum Foundations 2016”* (ICQF16) held during 17-21 October 2016 at NIT Patna. Website: <http://icqf16.nitp.ac.in>

Total participants: 110 ( **22 foreign speakers attended**)

Funding: SERB, TEQUIP-II, registration fee from participants

1. **Convener** of the 3rd *International Conference “Quantum Foundations 2017”* (ICQF17) during 4-9 December 2017 at NIT Patna. Website: <http://icqf17.nitp.ac.in>

Total participants: 115 ( **22 foreign speakers attended**)

Funding: DRDO, SERB, TEQUIP-II, registration fee from participants

***Publications and Manuscripts***

1. **List of published papers in international peer-reviewed journals**

**2023**

1. *“*[*Device-independent self-testing of unsharp quantum devices*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:ijdKiLOsEJMC)*”*

P. Roy and AKP, **New Journal of Physics**, 25 013040 (2023).

1. *“Robust certification of unsharp instruments in a prepare-measure quantum game”*

 Abhyoudai S. S., S. Mukherjee, and AKP, **Phys. Rev. A** 107, 012411(2023).

1. *“*[*Sharing preparation contextuality in Bell test by arbitrary pair of sequential observers*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:wLxue7F8ec0C)*”*

A Kumari and AKP, **Phys. Rev. A** 107, 012615 (2023).

1. *“*[*Interplay of nonlocality and incompatibility breaking qubit quantum channels*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:nqdriD65xNoC)*”*

S Kumari, J Naikoo, S Ghosh and AKP, **Phys. Rev. A**, 107,02220(2023).

1. *“*[*Device-independent certification of degeneracy-breaking quantum measurements*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:ijdKiLOsEJMC)*”*

P. Roy, S. Mahato, S. Mukherjee and AKP, **Phys. Rev. A**, 107,022204(2023).

1. *“Nonlocal correlations in an asymmetric quantum network”*

 S. Sasmal, S. Mahato and AKP, **Phys. Rev. A**, 107,022425(2023).

1. [*Longitudinal and Transverse Optical Beam Shifts Show Non‐separability*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:yY3RG6sOEgwC)

 N. Modak, S. Ashutosh, S. Das, A.K. Pan and N Ghosh, Laser & Photonics

 Reviews, 2300166 (2023); <https://doi.org/10.1002/lpor.202300166>

1. [*Leggett-Garg test of macrorealism using indefinite causal order of measurements*](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:Og1tA8FjbJAC)

 A.K Pan, Phys. Lett. A 478, 128898 (2023).

1. [Sharing nonlocality in a network using the quantum violation of chain network inequality](https://scholar.google.co.in/citations?view_op=view_citation&hl=en&user=65c_QkIAAAAJ&sortby=pubdate&citation_for_view=65c_QkIAAAAJ:wSy_KLzO7YEC)

 R Kumar, A. K Pan, Quantum Studies, 1-20 (2023)

 <https://doi.org/10.1007/s40509-023-00300-9>

1. Optimal Quantum Violations of *n*-Locality Inequalities with Conditional Dependence

[Sneha Munshi](https://onlinelibrary.wiley.com/authored-by/Munshi/Sneha), [A. K. Pan](https://onlinelibrary.wiley.com/authored-by/Pan/A.%2BK.), Annalen der Phyzik (2023)

<https://doi.org/10.1002/andp.202300060>

**2022**

1. “Characterizing nonlocal correlations through various n-locality inequalities in network”

S. Munshi and A. K. Pan, **Phys. Rev. A, 105**, 032216 (2022).

1. “[Discriminating mirror symmetric states with restricted contextual advantage](https://arxiv.org/abs/2112.15452)”

S. Mukherjee, S. Naonit and A. K. Pan**, Phys. Rev. A, 106, 012216 (2022).**

1. Sharing nonlocality in a quantum network by unbounded sequential observers

S. Mahato and A. K. Pan, **Phys. Rev. A, 106, 042218 (2022).**

1. “Violation of Lueders bound of Leggett-Garg inequality implies retrocausality”
2. Kumari and A. K. Pan, **Annalen der Physics**, 2100401 (2022).
3. “Standard and variant of Leggett-Garg inequality under quantum Channel”

 A.Kumari and A. K. Pan, **J. Phys. A: Math. Theor,** 55, 135301(2022).

1. Device-independent randomness certification using multiple copies of entangled states

S. Mahato and A. K. Pan**, Phys. Lett. A, 456, 128534 (2022).**

1. Quantum violation of trivial and non-trivial preparation non-contextuality

P. Roy and A. K. Pan, **Eur. Phys. Jour. D, 76, 1, (2022).**

1. Generalized n-locality inequalities in Linear-Chain network for arbitrary inputs

R. Kumar and A. K. Pan, **Annalen der Physik, 2200182 (2022).**

**2021**

1. “Oblivious communication game, self-testing of projective and non-projective measurements, and certification of randomness”

A. K. Pan, **Phys. Rev. A**, 104, 022212 (2021).

1. “Generalized non-n-locality inequality in quantum network”

S. Munshi and A. K. Pan, **Phys. Rev. A,** 104, 042217 (2021).

1. “Semi-device independent certification of unsharp measurement through sequential quantum advantages in a communication game”

S. Mukherjee and A. K. Pan, **Phys. Rev. A**, 104, 062112 (2021).

1. “First experimental test of commutation relation using weak values”

R. Wagner, A. Danner, H. Lemmel, A. K. Pan and S. Sponar, **Phys. Rev. Research**, **3**, 023243 (2021). (**I provided the theory**.)

1. Facets of quantum information under generalized dichotomic measurements” J. Naikoo, S. Banerjee, A. K. Pan and S. Ghosh, **Phys. Rev. A**, 104, 04608 (2021).
2. “Two definitions of maximally $ψ$-epistemic ontological model and preparation non-contextuality”

 A.K. Pan, **EPL**, 133, 50004 (2021).

1. “Macrorealistic inequalities Stronger than Leggett-Garg inequalities”

S. Kumari and A. K. Pan, **J. Phys. A: Math. Gen. 54,** 035301 (2021).

1. “Semi-device independent Randomness certification using Kochen-Specker theorem”
2. K. Pan, **Eur. Phys. Jour. D**, 75, 98 (2021).
3. Maximum coherence and violation of LGIs at exceptional points in a PT symmetric qubit

J. Naikoo, S. Kumari, A. K. Pan and S. Banerjee,***J. Phys. A: Math. Theor.***54, 275303(2021).

1. “Lueders rule, von Neumann rule and CHSH inequality”

A.Kumari and A. K. Pan, **Int. Jour. Theor. Phys.** 60, 4103(2021).

**2020**

1. “Interference experiment, anomalous weak value and Leggett-Garg test of macrorealism”

 A.K. Pan, [**Phys. Rev. A** 102, 032206 (2020)](http://link.aps.org/doi/10.1103/PhysRevA.102.032206).

(*Proposal is being tested in Neutron optics group at Atominstitute in Vienna*)

1. “Device-independent quantum dimension witness using a family of Bell’s inequality”

A. K. Pan and S. Mahato, **Phys. Rev. A, 102**, 052221 (2020).

1. Disembodiment of arbitrary number of properties in quantum Cheshire cat experiment

A.K.Pan, **Eur. Phys. Jour. D**, 74, 1 (2020).

(*Proposal is tested in Neutron optics group at Atominstitute in Vienna*)

1. Probing inequivalent forms of Legget-Garg inequality in subatomic systems

J. Naikoo, S. Kumari, S. Banerjee and A. K. Pan, **Journal of Physics G**: Nuclear and Particle Physics 47, 095004 (2020).

**2019**

1. “Revealing universal quantum contextuality through communication game”

A.K. Pan, **Scientific Reports**, 9, 1-8 (2019).

1. “Swapping intraphoton entanglement to interphoton entanglement using linear optical devices”

A.Kumari, A. Ghosh, M. Bera, and A. K. Pan, **Phys. Rev. A,** 99, 032118 (2019).

1. Sharing preparation contextuality by any arbitrary number of observers

A. Kumari and A.K. Pan, **Phys. Rev. A,** 100, 062130 (2019).

1. “CHSH inequalities with response function for POVM and their quantum violation”

A. Kumari and A. K. Pan, **Quant. Inf. Processing,** 18, 239 (2019).

**2018**

1. Optimal quantum preparation contextuality in n-bit parity-oblivious multiplexing task

 S. Ghorai and A. K. Pan, **Phys. Rev. A,**98, 032110(2018).

1. Violation of the Lüders bound of macrorealist and noncontextual inequalities

A.Kumari, Md. Qutubuddin and A. K. Pan, Phys. Rev. A, 98, 042135 (2018).

1. Quantum violation of variants of LGIs upto algebraic maximum for qubit system

A.K. Pan, Md. Qutubuddin and S. Kumari, **Phys. Rev. A,** 98, 062115 (2018).

(Experimentally tested by a Chinese group: Phys. Rev. A 102, 022214 (2020) )

1. Faithful pointer in qubit measurements

Asmita Kumari and A. K. Pan, **Int. J. Theo. Phys, 57, 554 (2018).**

**2017**

1. Inequivalent Leggett-Garg inequalities

S.Kumari and A.K Pan, **EPL 118, 50002 (2017).**

1. Probing various formulations of macrorealism for unsharp quantum measurements

S. Kumari, A.K Pan, **Phys. Rev. A, 96, 042107 (2017).**

1. Joint weak value for all order coupling using continuous variable and qubit probe

A.Kumari, A.K Pan, P.K. Panigrahi, **Eur. Phys. J. D, 71, 275 (2017).**

**2016**

1. “Which verification qubits perform best for secure communication in noisy channel?

R.D. Sharma, K. Thapliyal, A. Pathak, A. K. Pan, A. De, **Quant. Inf. Processing**, 15, 1703(2016).

1. “Quantum contextuality for qutrit system sans realism”

 A.K.Pan and K. Mandal, **Int. J. Theor. Phys**, 55 , 3472(2016).

**2015**

1. “Toward secure communication using intra-particle entanglement

S. Adhikari, D. Home, A.S. Majumdar, A.K. Pan, A. Shenoy, R. Srikanth**, Quant. Inf. Processing**, 14, 1451(2015).

1. “Sub-Planck structure in mixed state”

Asmita Kumari, A.K. Pan and P. K. Panigrahi, **Eur. Phys. Journal. D**, 69, 248(2015).

**2013**

1. “Entropic violation of noncontextuality for four-dimensional system”

## A.K. Pan, M. Sumanth and P. K. Panigrahi, Phys. Rev. A, 87,014104(2013).

1. **“**Larmor precession reexamined: Testable correction and its ramifications”

D. Home, A. K. Pan and A. Banerjee, **Eur. Phys. Journal. D**, **67, 72(2013).**

1. Reply to ``Comment on `Quantitative probing of the quantum-classical transition for the arrival time distribution'"

D. Home, A. K. Pan and A. Banerjee, **J. Phys. A: Math. Theor**, **46,208002(2013).**

1. “Three-box paradox and ``Cheshire cat grin'': the case of spin-1 atoms”

A.Matzkin and A.K.Pan, **J. Phys. A: Math. Theor. 46, 315307 (2013).**

(Noted in Nature News and Views, [Nat. Phys](https://www.nature.com/nphys). 10, 11–12(2014))

1. “Cat state, sub-Planck structure and weak measurement”

A.K. Pan and P. K. Panigrahi, **Eur. Phys. Journal. D**, 67, 182(2013).

1. “Comment on `Weak Measurements with Orbital-Angular-Momentum Pointer states”

A.K. Pan and P. K. Panigrahi, **Phys. Rev. Lett. 111, 028901 (2013).**

**2012**

1. “Weak measurement as an instant of non-ideal measurements”

A.K. Pan and A. Matzkin, **Laser Physics, 22, 1(2012).**

1. “Quantum violation of noncontextuality for separable states using fewer measurement settings”

A.K. Pan and D. Home, **Eur. Phys. Journal D, 66, 62(2012).**

1. **“**Quantum teleportation using non-orthogonal entangled channels”

[S. Adhikari](http://arxiv.org/find/quant-ph/1/au%3A%2BAdhikari_S/0/1/0/all/0/1), [A. S. Majumdar](http://arxiv.org/find/quant-ph/1/au%3A%2BMajumdar_A/0/1/0/all/0/1), [D. Home](http://arxiv.org/find/quant-ph/1/au%3A%2BHome_D/0/1/0/all/0/1), [A. K. Pan](http://arxiv.org/find/quant-ph/1/au%3A%2BPan_A/0/1/0/all/0/1), [P. Joshi](http://arxiv.org/find/quant-ph/1/au%3A%2BJoshi_P/0/1/0/all/0/1), **Phys. Scr.**,

**85, 045001(2012)**.

1. “Weak and semiweak values in non-ideal measurements: an exact treatment”

A.K. Pan and A. Matzkin, **Phys. Rev. A, 85**, **022122 (2012).**

**2011**

1. “An interplay between nonlocality and quantum violation of path-spin noncontextuality”

 D. Home and A. K. Pan, **Int. J. Quant. Inf**.**9, 1279 (2011).**

1. “On empirical scrutiny of the Bohmian model using a spin rotator and the arrival/transit time distribution”

 A.K. Pan and D. Home, **Int. J. Theor. Phys. 51, 374(2011).**

**2010**

1. “Swapping of path-spin entanglement of a single particle with the spin-spin entanglement of two qubits”

 S. Adhikari, A.Majumdar, D.Home and A.K.Pan, EPL, 89, 10005(2010).

1. “Information transfer using a single particle path-spin hybrid entangled state”

T. Pramanik, S. Adhikari, A. Majumdar, D. Home and A. K. Pan , **Phys. Lett.**

 **A 374, 1121(2010)**.

1. “Reply to the ``Comment on `Contextuality within quantum mechanics  manifested in subensemble mean values[Phys. Lett. A 373(2009)3430]’”

 A.K. Pan and D. Home, **Phys. Lett. A, 374,2195(2010).**

1. “A variant of Peres-Mermin proof for testing noncontextual realist models”

 A.K. Pan, **Euro. Phys. Lett., 90, 40002 (2010).**

1. “Understanding the spreading of a wave packet using the Bohmian Machinery”

 A.K. Pan, ***Pramanna- J. Phys*, 74,867(2010).**

1. “Quantum mechanical effect of path-polarization interdependence for a single photon”

 A.K. Pan and D. Home, **Int. J. Theor. Phys.49, 1920(2010).**

**2009**

1. “Using the no-signaling condition for constraining the nonidealness of a Stern-Gerlach setup”

 D. Home and A. K. Pan, **J. Phys. A: Math. Theor. 42, 085301 (2009).**

1. “Quantitative probing of quantum-classical transition using nonminimum uncertainty wave Packet”

 D. Home, A. K. Pan and A. Banerjee **J. Phys. A: Math. Theor. 42, 165302**

 **(2009).**

1. “Contextuality within quantum mechanics manifested in subensemble statistics”

 A. K. Pan and D. Home, **Phys. Lett. A, 373, 3430 (2009).**

**2008**

1. “Reply to the Comment on “Quantum time-of-flight distribution for cold trapped atoms"”

Md. M. Ali, D. Home, A. Majumdar and A. K. Pan**, Phys. Rev. A, 77,**

 **026102 (2008) .**

**2007**

1. "Quantum time-of-flight distribution for cold trapped atoms"
 Md. M. Ali, D. Home, A. Majumdar and A. K. Pan, **Phys. Rev . A 75,**

**042110(2007).**

1. “Aspects of nonideal Stern–Gerlach experiment and testable ramifications”

D. Home, A. K. Pan, Md. M.Ali and A.S. Majumdar, **J. Phys. A: Math.**

 **Theor. 40, 13975(2007).**

**2006**

1. "The Quantum-Classical comparison of the Arrival Time Distribution through the Probability Current"
     Md. M. Ali, A. S. Majumdar and A. K. Pan, **Found. Phys. Lett. 19, 723 (2006).**
2. "On the quantum analogue of Galileo's leaning tower experiment"

Md. M. Ali, A. S. Majumdar, D. Home and A. K. Pan, **Class. Quant. Grav. 23,**

**6493(2006).**

1. **"**Observability of the arrival time distribution using spin-rotator as a quantum clock**"**
2. K. Pan, Md. M. Ali and D. Home,  **Phys. Lett. A 352, 296(2006).**
3. **List of contributions to proceedings/Book Chapter**
4. “Quantum Transit Time Distribution, its Testability and Foundational Implications”

 A.K. Pan and D. Home, in “Quantum Optics - Coherence, Entanglement and Nonlinear

Dynamics”, eds. J. Banerji, P.K. Panigrahi, and R.P. Singh, (Macmillan India Limited, New Delhi, 2008) p 13-33.

1. “On the possibility of empirically probing the Bohmian model in terms of the testability of quantum arrival/transit time distribution”

D. Home and A. K. Pan in Quantum Trajectories, ed. P. Chattaraj(Telyor and Fransis, July 2010)) .

1. “Swapping of pure path-spin entangled state onto mixed spin-spin entanglement involving amplitude damping channel”

 S. Adhikari, A. Majumdar, D. Home and A. K. Pan , AIP Conf. Proc., 1384, 108(2011).

1. “Facets of contextual realism in quantum mechanics”

 A.K. Pan and D. Home, AIP Conf. Proc.,1384, 42(2011).

1. **List of manuscripts submitted/arXived\***
2. “Certifying degeneracy-breaking measurements through sequential Bell test”

P. Roy, S.Mahato, S. Mukherjee and A. K. Pan (Submitted to **Phys. Rev. Research**)

1. “Leggett-Garg test of macrorealism using indefinite causal order of measurements”

A.K.Pan (Submitted to **Phys. Rev. A**).

1. “Sequential semi-device-independent robust self-testing”

Abhyuidai SS, S. Mukherjee, A. K. Pan (Submitted to **Phys. Rev A**).

1. “Device-independent self-testing of unsharp instruments through sharing of nonlocality”

P. Roy and A. K. Pan (Submitted to **Phys. Rev. A**)

1. Non-separable optical beam shifts and emergence of position-position classical entanglement

N. Modak, S. Ashutosh, S. Guchait, S. Das, A. K. Pan and N. Ghosh, arXiv: 2208.09288

1. Interplay of nonlocality and incompatibility breaking channels

S. Kumari, J. Naikoo, S. Ghose and A. K. Pan, arXiv 2210.02744 **(Submitted to Phys. Rev. A)**

1. **List of manuscripts in final preparation\***
2. “Self-testing of arbitrary two-qubit entangle states in parallel and mutually unbiased basis”

P. Roy and A. K. Pan (To be submitted to **PRX Quantum**).

1. “Intraparticle entanglement can also be a resource”
2. K. Pan (To be submitted to **Phys. Rev. A**)
3. Study of coherence and Leggett-Garg inequalities in qubit system using indefinite causal order

J. Kumar, J. Naikoo, S. Banerjee and A. K. Pan (To be submitted to **Phys. Rev. A**).

1. “Weak values are contextual: A simple and elegant proof”

A.K. Pan (to be submitted to **Phys. Rev A**).

1. “Device-independent randomness certification using random access code as tool”

S. Mahato and A. K. Pan (To be submitted to **Phys. Rev. A**).

1. “Error-disturbance trade-off relation for qubit system explained”

A.K.Pan (To be submitted to **Am. J. Phys.**).

1. “Certification of measurement incompatibility through preparation contextuality”

S. Mukherjee and A. K. Pan (To be submitted to **Phys. Rev. A**).

1. “On the temperature induced metrological advantage using complex weak value”

A.K.Pan (To be submitted to **Phys. Rev. A**).

*\*Will provide the draft of the manuscript on demand.*

**Conferences/Visits/Talks**

1. Delivered **Invited Talk** o “Characterizing non-local correlations in network” in the online International Conferences on Quantum Foundations and Information theory at **ISI Kolkata** during 14-24 February 2022.
2. Delivered **Invited Talk** on “Generalized quantum network” in the Quantum fundamentals and applications 2021 at **IIIT Jodhpur** during 18-23 October 2021
3. Delivered **Invited Talk** on “Generalized quantum network” in the Online Quantum Symposium 2021 at **IIIT Hyderabad** from 29 July- 4 August 2021
4. Delivered **Invited Talk** on “Quantum Foundational issues” in the Online Quantum Workshop 2020 at **IISER Kolkata** from 10 June to 14 July 2021
5. Delivered **Invited Lecture** on “Facets of Quantum Contextuality” in the Online Quantum Symposium 2020 at **IIIT Hyderabad** during 28 June to 2 July 2020
6. Delivered **Invited Talk** on “Sharing preparation contextuality by multiple observer” in the International Conference “Quantum Frontier and Fundamentals 2020” held at **Raman Research Institute Bengaluru** during 13-18 January 2020
7. Delivered **Invited Talk** on “Universal Quantum Contextuality and Communication Games” ” in the National Conference “Quantum Information and Computation 2019” held at **IIT Jodhpur** during 8-11 December 2019.
8. Delivered **Invited Talk** on “Universal Quantum Contextuality and Communication Games” in the National Conference “Recent Trends in Applied Mathematics” held at **Calcutta University** during 10-12 March 2019.
9. Delivered **Invited Talk** on “Probing Macrorealism in Quantum Theory” in the International Conference “Asia-Pacific conference on Quantum Information” held at **IISER-Kolkata** during 18-22 December 2018.
10. Delivered **Invited Talk** on “Optimal Preparation contextuality in n-bit Random Access Code” in “International Conference on Quantum & Atom Optics 2018” held at **IIT Patna** during 16-18 December 2018.
11. Delivered **Invited Talk** on “Probing Macrorealism in Quantum Theory” in the International Conference “Quantum Information Processing and Application 2018” held at **HRI, Allahabad** during 2-8 December 2018.
12. Delivered **Invited Talk** on “Ontological models, contextuality and unsharp measurement and CHSH inequality” in the International Conference “Quantum Frontiers and Fundamentals 2018 ” held at **Raman Research Institute, Bengaluru** during 30th April – 04 May 2018.
13. Delivered **Invited Talk** on “Optimal Preparation contextuality in n-bit Random Access Code” in “[International Symposium on New Frontiers in Quantum Correlations](http://newweb.bose.res.in/Conferences/ISNFQC18/)” held at **S. N. Bose Centre, Kolkata** during 29th January to 2nd February 2018.
14. Visited Dr. Cyril Branciard, Institute Neel, Grenoble, France during 01-07 July 2016 for collaborative purpose.
15. Visited Prof. Y. Hasegawa, **Atominstitute Vienna, Austria** during 26-30 June 2016 (Presented a **Talk** on “Preparation contextuality for pure state and state-dependent ontological models”.
16. Delivered **Invited Talk** on “On the possible metrological advantage using complex weak value”. In “International Conference on Quantum information” at **IOP Bhubneswar** during 14-18 February 2016
17. Delivered Invited Lecture on “Weak and strong quantum measurements” in the “Summer School on Quantum Foundations and information” held at **ISI Kolkata** during 22 June to 3 July 2015.
18. Visited **CNRS 8089, university of Cergy-Pontoise, Paris, France**, 10-31 October 2013((Presented **Talk** “On the possible metrological advantage using complex weak value”)
19. Visited **IISER-Kolkata**, India, from 25-30 September 2013(Presented a **Talk** on “Aspects of weak measurement: Conceptual and metrological implications”)
20. Visited **Raman Research Institute, India**, from 22-24 September 2013(Presented a **Talk** on “On the possible metrological advantage using complex weak value”)
21. Visited **IISER-Mohali, India**, from 12-14 September 2013(Presented a **Talk** on “Aspects of weak measurement: Conceptual and metrological implications”)
22. Visited **Jamia Islamia University**, New Delhi, from 10-11 September(Presented a **Talk** on “Aspects of weak measurement: Conceptual and metrological implications”)
23. Visited Prof. Kitano, **Kyoto University, Japan**, from 20-25 March 2013(Presented a **Talk** on “Joint weak measurement for all order coupling”).
24. Participated the Conference “[The Fourth Nagoya Winter Workshop on Quantum Information, Measurement, and Foundations](https://sites.google.com/site/fourthnww2013/)”, held in Nagoya, Japan, from 18-22 February 2013.
25. Visited Prof. H. Rauch and Dr. Y. Hasegawa, **Atominstitute, Vienna, Austria** from 8-12 November 2011
26. Participated the Conference “Entanglement, quantum foundations and high energy physics” held in **Imperial Collage London, UK**, from 13-15 September 2011(Presented a **Talk** on “*Nonideal measurements and weak value: Entanglement, no-signaling and nonlocality*”).
27. Participated the Conference “Lphys’11” held in **Sarajevo, Bosnia & Herzegovina** from 11-15 July 2011(Presented a **Talk** on *“Weak and semiweak values of a dichotomic observable*”).
28. Participated the Conference “75 Years of quantum entanglement”, held in Kolkata, India from 6-10 January 2011(Presented a **Poster** on “*Larmor precession reexamined: Testable correction and its ramifications”*).
29. Participated the Conference **“The Second International Conference on Quantum Information and Technology - New Trends in Quantum Information Technology” held in Tokyo, Japan** from 21-22 October 2010(Presented a **Poster** on “*Facets of contextual realism in quantum mechanics*”).
30. Participated the Conference “Updating Quantum Cryptography and Communications” held in **Tokyo, Japan** from 18-20 October 2010.
31. Participated the Conference “Quantum Information Processing”, held in **Zurich, Switzerland** from 16-22 January 2010 (Presented a **Poster** on “*Contextuality within quantum mechanics sans realism*”).
32. Participated the Conference “5thNalanda Dialogue: Reality in Science and Buddhism”, held at Nalanda, India from 22-27 October 2009 (Presented a **talk** on “*Facets of contextual realism in quantum mechanics*”)
33. Visited Prof. M. Genovese, **INRIM, Turin, Italy** from 17-25 May 2009(Presented a **talk** on “*Nonlocality andcontextuality using path-spin intraparticle entanglement*”)
34. Visited Prof Mataloni, **University of Rome, Italy** from 8-9 May 2009(Presented a **talk** on “*Contextuality within quantum mechanics manifested in subensemble statistics*”)
35. Visited Prof. H. Rauch and Dr. Y. Hasegawa, **Atom Institute, Vienna, Austria** from 23 April- 3 May 2009(Presented a **talk** on “*Observability of arrival time distribution and empirical scrutiny of the Bohmian model*”.
36. Visited Prof. M. Horodecki, **University of Gdansk, Poland** from 14-15 April 2009 (Presented a **talk** on “C*ontextuality within quantum mechanics devoid of realist models*”).
37. Visited Prof. K. Banaszek, **Nicolas Copernicus University, Poland** from 31March -20 April, 2009(Presented a **talk** on “*Nonideal quantum measurement theory and the no-signaling condition*”) .
38. Participated the Conference “Quantum Coherence and Decoherence”, held at **Benasque Centre for Science, Spain,** 13-21 September 2008.
39. Visited Prof. Andreas Winter, **National University of Singapore** from 29th March to 5th April, 2008(Presented a **talk** on “*On the empirical falsifiability of the Bohmian model using spin-rotator as a quantum clock*”).
40. Visited Prof. Lucien Hardy, **Perimeter Institute, Canada** from 17-27 February, 2008 (Presented a **talk** on “*Observability of transit time distribution and testability of the Bohmian model*”).
41. Participated the Conference “Quantum Correlation and Quantum Computing”, held at **Indian Institute of Technology, Kharagpur, India**, 11-13 December, 2007.
42. Participated the Conference “Quantum Information Processing”, held at New Delhi, India, 17-21 December, 2007.
43. Participated in the “International Summer School Quantum Information Processing and Computing”,held at **Benasque Center for Science, Benasque, Spain**, 12-24 June, 2006(Presented a **poster** on “*Observability of Arrival Time Distribution using spin-rotator as a Quantum Clock*”).

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