# Arpita Chatterjee

*Assistant Professor*
*Department of Mathematics*
*J. C. Bose University of Science and Technology*
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*(+91) 8527635535*
*arpita.sps@gmail.com*


## At Present

2018–till date **Assistant Professor**.
*Department of Mathematics*
*J. C. Bose University of Science and Technology, YMCA*

## Education

2010 **Ph.D.**, *Indian Statistical Institute, Kolkata.*
**Thesis title:** *"Study of cavity quantum electrodynamics in boson Fock space and interacting Fock space"*

2003 **M.Sc. (77.7%)**, *Jadavpur University.*

2001 **B.Sc. (69.9%)**, *Burdwan University.*

1998 **Higher Secondary (73.3%)**, *West Bengal Council for Higher Secondary Education.*

1996 **Secondary (77%)**, *West Bengal Board for Secondary Education.*

## Research Experience

2014-2017 **DST Fast Track Young Scientist**, *Jawaharlal Nehru University,* **(Research Grant - Rs. 25,32,000/-)**.

2010-2013 **NBHM Post Doctoral Fellow**, *Jawaharlal Nehru University.*

2008-2009 **Senior Research Fellow**, *Indian Statistical Institute.*

2006-2008 **Junior Research Fellow**, *Indian Statistical Institute.*

2004-2005 **Project Assistant**, *Indian Statistical Institute.*

## Teaching Experience

2009-2010 **Assistant Professor**, *Shri Shikshayatan College, University of Calcutta.*

2008-2009 **Lecturer**, *Scottish Church College, University of Calcutta.*

2008 **Mathematics Instructor, ISEC Regular Course**, *International Statistical Education Centre, Indian Statistical Institute.*

2004 **Guest Lecturer**, *Maharaja Manindra Chandra College, University of Calcutta.*

## Awards & Fellowships

2025 **Research & Development Project** by **HSCSIT**
(Ref. No. HSCSIT/R&D/2025/1540), **(Research Grant - Rs. 20,00,000/-)**

2023 **State University Research Excellence (SURE)** grant by **DST SERB**
(Ref. No. SUR/2022/000899), **(Research Grant - Rs. 22,99,260/-)**

2017 **National Post-Doctoral Fellowship (N-PDF)** by **DST SERB**
(Ref. No. PDF/2017/000403), **(Research Grant - Rs. 19,20,000/-)**

2014 **Fast Track Young Scientist** grant by **DST SERB**
(Ref. No. SB/FTP/PS-151/2013), **(Research Grant - Rs. 25,32,000/-)**

2014 **Dr. D. S. Kothari Post Doctoral Fellowship (DSKPDF)** by **UGC**
(Ref. No. PH/13-14/0035)

2009 **NBHM Post Doctoral Fellowship** by **DAE**
(Ref. No. 2/40(21)/2009-R&D-II/527)

2005 **CSIR JRF NET**

2004 **GATE**

2004 **CSIR Lectureship NET**

## Research Publications

2025 "*Optimizing realistic continuous-variable quantum teleportation with non-Gaussian resources*"
Ankita and **A. Chatterjee***
Under review in **Quant. Infor. Procss.**, (2025),
(**SCIE**, Impact factor-2.349)

"*Dynamics of atom-field interaction inside a nonlinear Kerr-like medium filled optical cavity*"
Naveen Kumar and **A. Chatterjee***
**J. Mod. Opt.**, 72(7-9), 207-217 (2025),
https://doi.org//10.1080/09500340.2025.2479243
(**SCIE**, Impact factor-1.2)

2024 "*Analyzing performance of $f$-deformed displaced Fock state in continuous-variable quantum teleportation*"
Deepak and **A. Chatterjee***
**Phys. Scr.**, 99(9), 095124 (2024),
https://doi.org/10.1088/1402-4896/ad6ebd
(**SCIE**, Impact factor-2.6)

"*Quantum phase properties of a state driven by a classical field*"
Naveen Kumar and **A. Chatterjee***
**Int. J. Theo. Phys.**, 63(5), Article: 124(1-17) (2024),
https://doi.org/10.1007/s10773-024-05661-4
(**SCIE**, Impact factor-1.4)

"*Nonclassicality in a dispersive atom-cavity field interaction in the presence of an external driving field*"
Naveen Kumar and **A. Chatterjee***
**Int. J. Mod. Phys. B**, 38(31), 2450415(1-16) (2024),
https://doi.org/10.1142/S0217979224504150
(**SCIE**, Impact factor-1.404)

2023 "*Nonclassicality versus quantum non-Gaussianity of photon subtracted displaced Fock state*"
Deepak and **A. Chatterjee***
**Can. J. Phys.**, 101(10), 560-572 (2023),
https://doi.org/10.1139/cjp-2023-0085
(**SCIE**, Impact factor-1.358)

"*A comparative study of higher-order nonclassicalities of photon-added-then-subtracted and photon-subtracted-then-added quantum states*"
Deepak and **A. Chatterjee***
**Ind. J. Phys.**, 98(1), 41-54 (2024),
https://doi.org/10.1007/s12648-023-02792-y
(**SCIE**, Impact factor-1.778)

"*Detecting nonclassicality and non-Gaussianity of a coherent superposed quantum state*"
Deepak and **A. Chatterjee***
**J. Phys. B: At. Mol. Opt. Phys.**, 56(1), 015401(1-10) (2023),
https://doi.org/10.1088/1361-6455/aca850
(**SCIE**, Impact factor-1.917)

2022 "*Nonclassical properties of a deformed atom-cavity field state*"
Naveen Kumar, Deepak and **A. Chatterjee***
**J. Mod. Opt.**, 69(18), 1052-1059 (2022),
https://doi.org/10.1080/09500340.2022.2124462
(**SCIE**, Impact factor-1.293)

"*Realistic continuous-variable quantum teleportation using a displaced Fock state channel*"
Deepak and **A. Chatterjee***
**Quant. Infor. Procss.**, 21(4), 145(1-14) (2022),
https://doi.org/10.1007/s11128-022-03484-y
(**SCIE**, Impact factor-2.349)

"*Two-mode photon-added entangled coherent states and their entanglement properties*"
**A. Chatterjee***
**Acta Physica Polonica A**, 141(3), 183-190 (2022),
https://doi.org/10.12693/APhysPolA.141.183
(**SCIE**, Impact factor-0.725)

2021 "*A comparison between higher-order nonclassicalities of superposition engineered coherent and thermal states*"
Deepak and **A. Chatterjee***
**Can. J. Phys.**, 99(12), 1061-1072 (2021),
https://doi.org/10.1139/cjp-2021-0098
(**SCIE**, Impact factor-1.358)

"*Lower- versus higher-order nonclassicalities for a coherent superposed quantum state*"
Deepak and **A. Chatterjee***
**J. Opt. Soc. Am. B**, 38(11), 3212-3221 (2021),
https://doi.org/10.1364/JOSAB.424140
(**SCIE**, Impact factor-2.058)

"*Quantifying quantum correlation of quasi-Werner state and probing its suitability for quantum teleportation*"
**A. Chatterjee**, K. Thapliyal and A. Pathak
**Annalen der Physik**, 533(10), 2100201 (2021),
https://doi.org/10.1002/andp.202100201
(**SCIE**, Impact factor-3.317)

"*Dynamics of an atom cavity field system in interacting Fock space*"
P. K. Das and **A. Chatterjee***
**Int. J. Theo. Phys.**, 60(3), 954-967 (2021),
https://doi.org/10.1007/s10773-021-04718-y
(**SCIE**, Impact factor-1.708)

2019 "*Dynamics of a deformed atom cavity field system in presence of a Kerr-like medium*"
**A. Chatterjee***
**J. Mod. Opt.**, 66(6), 898-908 (2019),
https://doi.org/10.1080/09500340.2019.1584337
(**SCIE**, Impact factor-1.293)

2018 "*Entanglement potential versus negativity of Wigner function for SUP-operated quantum states*"
**A. Chatterjee***
**Int. J. Theo. Phys.**, 57(2), 339-352 (2018),
https://doi.org/10.1007/s10773-017-3566-5
(**SCIE**, Impact factor-1.708)

2016 "*Nonlinear displaced Kerr state and its nonclassical properties*"
**A. Chatterjee** and R. Ghosh
**J. Opt. Soc. Am. B**, 33(7), 1511-1522 (2016),
https://doi.org/10.1364/JOSAB.33.001511
(**SCIE**, Impact factor-2.058)

"*The nonclassicality and decoherence of a superposition state generated in a resonant cavity*"
P. K. Das, P. Haldar and **A. Chatterjee***
**Int. J. Theo. Phys.**, 55(11), 4951-4962 (2016),
https://doi.org/ 10.1007/s10773-016-3119-3
(**SCIE**, Impact factor-1.708)

2015 "*Generating continuous variable entangled states for quantum teleportation using a superposition of number-conserving operations*"
H. S. Dhar, **A. Chatterjee** and R. Ghosh
**J. Phys. B: At. Mol. Opt. Phys.**, 48(18), 185502 (2015),
https://doi.org/10.1088/0953-4075/48/18/185502
(**SCIE**, Impact factor-1.917)

2014 "*Mapping generalized Jaynes-Cummings interaction into correlated finite-sized systems*"
H. S. Dhar, **A. Chatterjee** and R. Ghosh
**J. Phys. B: At. Mol. Opt. Phys.**, 47(13), 135501 (2014),
https://doi.org/10.1088/0953-4075/47/13/135501
(**SCIE**, Impact factor-1.917)

2013 "*Controllable quantum correlations of two-photon states generated using classically driven three-level atoms*"
H. S. Dhar, S. Banerjee, **A. Chatterjee** and R. Ghosh
**Annals of Phys.**, 331, 97-109 (2013),
https://doi.org/10.1016/j.aop.2012.12.008
(**SCIE**, Impact factor-3.036)

2012 "*Nonclassical properties of states engineered by superpositions of quantum operations on classical states*"
**A. Chatterjee**, H. S. Dhar and R. Ghosh
**J. Phys. B: At. Mol. Opt. Phys.**, 45(20), 205501 (2012),
https://doi.org/10.1088/0953-4075/45/20/205501
(**SCIE**, Impact factor-1.917)

"*Nonclassicality generated by propagation of atoms through a cavity field*"
**A. Chatterjee***
**Phys. Lett. A**, 376(19), 1601-1607 (2012),
https://doi.org/10.1016/j.physleta.2012.03.060
(**SCIE**, Impact factor-2.654)

"*Nonclassicality of photon-added-then-subtracted and photon-subtracted-then-added states*"
**A. Chatterjee***
**J. Mod. Opt.**, 59(9), 814-822 (2012),
https://doi.org/10.1080/09500340.2012.670278
(**SCIE**, Impact factor-1.293)

2011 "*Dynamics of a three-level atom interacting with a bimodal field in a resonant cavity*"
**A. Ghosh***
**Int. J. Mod. Phys. B**, 25(8), 1091-1100 (2011),
https://doi.org/10.1142/S0217979211100126
(**SCIE**, Impact factor-1.404)

2009 "*Phase distribution of entangled state in interacting Fock space*"
P. K. Das and **A. Ghosh**
**Int. J. Mod. Phys. B**, 23(10), 2329-2337 (2009),
https://doi.org/10.1142/S0217979209052273
(**SCIE**, Impact factor-1.404)

"*Direct measurement of phase and quasiprobability distributions of states in cavity QED*"
**A. Ghosh** and P. K. Das
**Mod. Phys. Lett. B**, 23(4), 575-581 (2009),
https://doi.org/10.1142/S0217984909018060
(**SCIE**, Impact factor-1.948)

2008 "*Generation of a superposition of coherent states in a resonant cavity and its nonclassicality and decoherence*"
**A. Ghosh** and P. K. Das
**Can. J. Phys.**, 86(6), 811-818 (2008),
https://doi.org/10.1139/P08-013
(**SCIE**, Impact factor-1.358)

"*Influence of cavity decay on phase distribution and Rabi flopping in cavity QED*"
**A. Ghosh** and P. K. Das
**Int. J. Theo. Phys.**, 47(6), 1731-1741 (2008),
https://doi.org/10.1007/s10773-007-9615-8
(**SCIE**, Impact factor-1.708)

2007 "*Quasi-probability distributions of nonclassical states in interacting Fock space*"
P. K. Das and **A. Ghosh**
**Banach Centre Publications**, 78, 81-90 (2007),
https://doi.org/10.4064/bc78-0-6

2006 "*Phase changes in nonlinear processes in interacting Fock space*"
P. K. Das and **A. Ghosh**
**Int. J. Mod. Phys. B**, 20(4), 433-443 (2006),
https://doi.org/10.1142/S0217979206033371
(**SCIE**, Impact factor-1.404)

(*** Corresponding Author**)

## Papers in Conference Proceedings

2023-24 "*General expansion of natural power of linear combinations of bosonic operators in normal order*"
Deepak and **A. Chatterjee**
**Progress of Mathematics**, 46(1), 55-71 (2024)
**NCAPM-RAMAA-2022 Conference Proceedings** organized by DST-Centre for Interdisciplinary Mathematical Sciences, Institute of Science, BHU on 07-08th May 2022

"*Nonclassical properties of a state generated by a driven dispersive interaction*"
Naveen Kumar and **A. Chatterjee**
**AIP Conference Proceedings**, 2819(1), 050008(1-8) (2023),
https://doi.org/10.1063/5.0136968

"*A comparison of higher- and lower-order nonclassicalities of photon-added Bell-type entangled coherent states*"
Deepak and **A. Chatterjee**
**ICMM Conference Proceedings** of "International Conference on Mathematical Modeling in Physical Sciences, Social Sciences and Technology" organized by CBLU, Bhiwani on 17-18th December 2021

## Sponsored Projects

2025 **HSCSIT:** HSCSIT/R&D/2025/1540 (Ongoing)
Project Title: *"The potential benefits of using non-Gaussian resources in ideal and realistic continuous-variable quantum teleportation"*
Awarded by: HSCSIT, Govt. of Haryana Grant: **Rs. 20,00,000/-**
Duration: August 2025 to July 2028 (3 years)
Host Institute: J. C. Bose University of Science and Technology, YMCA Faridabad
Status: Ongoing

2023 **SURE:** SUR/2022/000899 (Ongoing)
Project Title: *"Analyzing the effect of photon subtraction on non-classicality and non-Gaussianity of displaced Fock state"*
Awarded by: DST SERB, New Delhi Grant: **Rs. 22,99,260/-**
Duration: October 2023 to October 2026 (3 years)
Host Institute: J. C. Bose University of Science and Technology, YMCA Faridabad
Status: Ongoing

2017 **N-PDF:** PDF/2017/000403 (Not availed)
Project Title: *"Higher order nonclassical properties of engineered quantum states"*
Awarded by: DST SERB, New Delhi Grant: **Rs. 19,20,000/-**
Duration: July 2018 to June 2020 (2 years)
Host Institute: Jaypee Institute of Information Technology, Noida
Status: Not availed

2014 **Fast Track Young Scientist:** SB/FTP/PS-151/2013 (Completed)
Project Title: *"Study of the applications of a coherent superposition of products of field annihilation and creation operators for quantum state engineering"*
Awarded by: DST SERB, New Delhi Grant: **Rs. 25,32,000/-**
Duration: October 2014 to September 2017 (3 years)
Host Institute: School of Physical Sciences, Jawaharlal Nehru University
Status: Completed

## Memberships

Life member of "The Indian Science Congress Association" (Membership no. L36321)

Life member of "The Indian Mathematical Society" (Membership no. L/2022/8)

## Research Guidance

Ph.D. **Naveen Kumar** (Thesis submitted)
**CSIR-SRF** (Grant no. 09/1256 (0004)/2019-EMR-I)
Thesis Title: "*A study of non-classical properties of quantum states manufactured by an atom-field interaction*"

**Deepak** (Degree awarded on 13th June 2025)
**CSIR-SRF** (Grant no. 09/1256 (0006)/2019-EMR-I)
Thesis Title: "*A theoretical study of non-classical features of different engineered quantum states*"

**Ankita** (pursuing)
**UGC-JRF** (NTA Ref. no. 231610110670)
Thesis Title: "*A theoretical investigation of continuous-variable quantum teleportation using non-Gaussian resources*"

**Swapnil Sabharwal** (pursuing)
**Project JRF, GATE** (Regn. no. MA24S43004193)
Thesis Title:

M.Sc. projects

2023-24
- Arti Garg (23001753004)
- Kunal Tewatia (23001753019)
- Nisha (23001753029)

2022-23
- Ankit Kumar (22001753005)
- Kanchan Chauhan (22001753018)
- Palak Kathuria (2201753035)
- Sonali (22001753052)

2021-22
- Anoop Tewatia (21001753004)
- Gunjan Yadav (21001753019)
- Neha (21001753032)
- Rashmi Pawar (21001753047)
- Sonika Yadav (21001753057)

2020-21
- Asha (20201753008)
- Himani (20201753023)
- Monika (20201753036)
- Prerna (20201753048)
- Chetna Singh (20201753064)

2019-20
- Chanchal (19001753005)
- Gunika Anand (19001753014)
- Kavita (19001753021)
- Kavita (19001753022)
- Monika (19001753034)
- Pooja (19001753040)
- Tamanna (19001753060)
- Vaishali (19001753061)

2018-19
- Anjali (18001753004)
- Deepak (18001753014)
- Parul Pal (18001753036)
- Payal Rao (18001753037)
- Poonam (18001753038)
- Sandhya Saini (18001753044)
- Sonia (18001753050)

2017-18
- Asha Sharma (17001753007)
- Chetna Sharma (17001753010)
- Deeksha Gambhir (17001753011)
- Mansi Agarwal (17001753025)
- Naveen Kumar (17001753032)
- Pawan Kumar Mandal (17001753039)
- Sandeep (17001753050)

## Workshops and Conferences

Invited Talk
"*Non-classical Light and Its Manufacturing*"
CTP Seminar, Centre for Theoretical Physics, Jamia Millia Islamia (April 27, 2017)

Oral Presentations
"*Dynamics of a deformed atom cavity field system in presence of a Kerr-like medium*"
106th Indian Science Congress, LPU Jalandhar (January 03-07, 2019)

"*Influence of cavity decay on Rabi Flopping and phase distribution in cavity QED*"
National Meet of Research Scholars in Mathematical Sciences, IIT Kanpur (October 30-November 03, 2007)

Organized
30th International Conference of International Academy of Physical Sciences (CONIAPS XXX) on "*Recent Advances in Science and Technology towards Sustainability*" (RASTS 2024), J C Bose University of Science and Technology, YMCA (February 28-29, 2024)

Attended

- Second National Workshop on Techniques in Applied Mathematics, University of Calcutta (June 20-28, 2006)
- Third National Workshop on Techniques in Applied Mathematics, University of Calcutta (October 10-18, 2006)
- International Workshop on Complex Systems in Fluid Flows and Sedimentation Processes, Indian Statistical Institute, Kolkata (August 27-31, 2007)
- International Conference on Recent Developments in Theoretical Physics, Indian Statistical Institute, Kolkata (December 04-07, 2007)
- International Conference on Quantum Optics and Quantum Computing, Jaypee Institute, Noida (March 24-26, 2011)
- 3rd International Conference on Current Developments in Atomic, Molecular, Optical and Nano Physics with applications, University of Delhi (December 14-16, 2011)

## Other Activities

**Expert Talk** on "Basics of Biostatistics" at NIPER Guwahati

**Coordinator**

A Two Week Value added Course: "*An Introductory Course in Latex for Scientific Writing*", JCBUST (February 15-27, 2021)

**Reviewer in**

- Chin. Opt. Lett.
- Int. J. Theo. Phys.
- Opt. Exp.
- J. Opt. Soc. Am. B
- J. Mod. Opt.
- Opt. Lett.
- Phys. Scr.
- Quant. Infor. Proc.