Priyankar Banerjee

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p-banerjee

Research Interests

Quantum optics, Light-Matter Interaction, Cavity Optomechanics, Open Quantum Systems, Quantum information processing, Quantum many-body physics.

Education

2020 - 2022 **M.Sc. in Physics**, *Indian Institute of Technology*, Guwahati, India.
CGPA - 8.31/10

2017 - 2020 **B.Sc. (Honours) in Physics**, *Vidyasagar College*, University of Calcutta, India.
Percentage - 81.38% (Physics)

2015 - 2017 **Indian School Certificate**, *St. Jude's High School*, Kolkata, India.

2015 **Indian Council for Secondary Education**, *International Public School*, Kolkata, India.

Theses

Master Thesis

Title **Strong Mechanical Squeezing in a quadratically coupled Optomechanical MIM System**

Supervisor Dr. Amarendra Kumar Sarma

Description *Studying an effective way of achieving robust squeezing in a quadratically coupled optomechanical system by modulating the driving field.*

Status Submitted on 27^{th} April 2022. Manuscript in preparation. Thesis available **here**.)

Research Projects

May 2022 - Ongoing **Correlating spin squeezing and entanglement in multi-qubit states in a disordered system**, *Supervised by Dr. Ujjwal Sen (Professor H, Harish-Chandra Research Institute, Prayagraj, India)*, We check how the relation between the squeezing and pairwise entanglement in arbitrary symmetric states hold in presence of glassy disorder in the system. The work involves analytically and numerically simulating the one-axis twisting Hamiltonian with or without a transverse-field for different number of spins.

Nov 2021 - Mar 2022 **Implementation of quantum state tomography for multiple spins in a BEC**, *Supervised by Dr. Tim Byrnes (Associate Professor, New York University, Shanghai)*, Worked on developing an algorithm to reconstruct coherent spin state in a BEC comprising of two spins.

May 2021 - Feb 2022 **Studying the dynamics of Photon Squeezing using Holstein-Primakoff approach in Two-Photon Dicke Model**, *Supervised by Dr. Aranya Bhuti Bhattacherjee (Professor, BITS Pilani, Hyderabad)*, Studied the behaviour of squeezing time and strength near the unbounded region of the Two-Photon Dicke Model under the Holstein-Primakoff approximation and explored ways to enhance the quadrature squeezing of photons in the large spin limit.

Publications

P. Banerjee, D. Sharma, and A. B. Bhattacherjee, "Enhanced photon squeezing in two-photon dicke model," *Physics Letters A*, vol. 446, p. 128287, 2022.

Computational Proficiency

Programming Languages

Intermediate C, C++, JAVA, Fortran

Advanced: Python, Mathematica

Editors and IDEs

Intermediate JupyterLab

Advanced: LaTeX, MS Office

Operating Systems

Intermediate Microsoft Windows

Advanced: Linux

Achievements/Awards

- Ranked 1^{st} out of 75 students in the Department of Physics, Vidyasagar College, University of Calcutta.
- Scored 98.31 percentile in IIT-JAM Physics 2020 and secured an All India Rank 277 among 17000 applicants.
- Third for Poster Presentation on *Remote Sensing, an expert overview* at Vikram Sarabhai Space Exhibition at Bidhan Shishu Udyan, Kolkata.
- Gold Medal for excellent result in Higher Secondary Examination by New Barrackpur Municipality, New Barrackpur, West Bengal.

Workshops/Schools/Seminars/Courses

April 2022 **IEEE workshop on Quantum Photonics**, *Organized by International Institute of Information Technology, Hyderabad, India*.

July 2021 **Short online course on INTRODUCTION TO QUANTUM OPTICS**, *Organized by Indian Institute of Science Education and Research (IISER) Tirupati, India.*.

July 2021 **International Summer Program (ISP) 2021**, *Organized by Osaka University*.

Dec 2020 **Workshop on Condensed Matter, High Energy, Astrophysics and Cosmology**, *Organized jointly by IIT Guwahati-Tokyo Institute of Technology*.

Dec 2020 **C. K. Majumdar Memorial Workshop in Physics**, *Organized by S. N. Bose National Centre for Basic Sciences, Kolkata, India*.

July 2018 **Basic Concepts of Quantum Statistics**, *One-day seminar organised by the University of Calcutta, India.* .

Relevant Coursework

- Mathematical Physics
- Solid State Physics
- Electrodynamics
- Statistical Mechanics
- Computer programming and numerical methods
- Atomic and Molecular Physics
- Quantum Optics
- Quantum Information and Quantum Computing

Languages

Bengali	Native	*Mother Tongue*
Hindi	Fluent	*Full Working Proficiency*
English	Fluent	*Full Working Proficiency*

References

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