

# Sampreet Kalita

Pursuing PhD in Quantum Optics,  
Dept. of Physics, IIT Guwahati.

Quantum info., comm. and tech. enthusiast.  
Native/web app. developer and musician.



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## LATEST PUBLICATIONS

R. Nongthombam, S. Kalita and A. K. Sarma Jan. 30, 2023  
**Synchronization of a Superconducting Qubit to an Optical Field Mediated by a Mechanical Membrane**  
[Phys. Rev. A 107, 013528 \(AIP\)](#)

S. Kalita, P. Kumar, R. Kanamoto, M. Bhattacharya and A. K. Sarma Jan. 26, 2023  
**Pump-probe Cavity Optomechanics with a Rotating Atomic Superfluid in a Ring**  
[Phys. Rev. A 107, 013525 \(AIP\)](#)

S. Kalita, S. Shah and A. K. Sarma Oct. 3, 2022  
**Significant Optoelectrical Entanglement and Mechanical Squeezing in a Multimodulated Optoelectromechanical System**  
[Phys. Rev. A 106, 043501 \(AIP\)](#)

S. Kalita, S. Chakraborty and A. K. Sarma Nov. 2, 2021  
**Switching of Quantum Synchronization in Coupled Optomechanical Systems**  
[Journal of Physics Communications 5, 115006 \(IOP\)](#)

A. K. Sarma, S. Chakraborty and S. Kalita Jan. 6, 2021  
**Continuous Variable Quantum Entanglement in Optomechanical Systems: A Short Review**  
[AVS Quantum Science 3, 015901 \(AIP\)](#)

## RESEARCH EXPERIENCES

**Junior Research Fellow** 2017 - 2018  
Dept. of CSE, Tezpur University 13 months

- Wearable health monitoring and safety device ([Springer CIPR 999, 621](#))
- Archiving old Assamese texts via optical character recognition
- Smartphone-based application for wired and wireless connections
- Low-energy wireless sensing devices for data collection

**Full-stack/SD Intern** 2016  
R&D, Rupeek Fintech Pvt. Ltd. 3 months

- Purity estimation of gold from limestone images using computer vision
- Workflow of digital contracts and pledge card digitalization
- APIs for cloud notification and credibility of customers for gold loans
- Map-based web application for internal analysis and dispatch

**Summer Intern** 2013 & 2014  
Dept. of CSE, Tezpur University 4 months

- Master-slave smartphone-based DDoS attacks
- Watermarking MP3 metadata using DES protocol

## EDUCATION

**Ph.D., Physics** 9.23/10  
Indian Institute of Technology Guwahati Ongoing

**B.Tech., Engineering Physics** 8.26/10  
Indian Institute of Technology Guwahati 2012 - 2017

**Senior Secondary** 93.4%  
Central Academy Shikshantar, Kota 2010 - 2012

**Higher Secondary** 90.5%  
Don Bosco High School, Tezpur 1999 - 2010

**B.Mus., Violin** 83.17%  
Bhatkhande Music Institute, Lucknow 2002 - 2005

## FELLOWSHIPS

**Prime Minister's Research Fellows**  
MHRD, Govt. of India

**Kishore Vaigyanik Protsahan Yojana**  
DST, Govt. of India

**National Talent Search Scholarship**  
NCERT, Govt. of India

**Cultural Talent Search Scholarship**  
CCRT, Ministry of Culture, Govt. of India

## ASSISTANTSHIPS

**Numerical Techniques** PH 206, IITG  
Dr. M. C. Kumar 2023

**Quantum Technology** NOC22-PH15, NPTEL  
Prof. Amarendra K. Sarma 2022

**Quantum Optics** PH 536, IITG  
Prof. Amarendra K. Sarma 2021

**Quantum Computing** PH 441, IITG  
Prof. Amarendra K. Sarma 2020

## PARTICIPATIONS

**QIP 2023** Presenter (Poster)  
Ghent University International Conference

**COPaQ 2022** Presenter (Poster)  
IIT Roorkee (OSI) National Conference

**IBM QGSS'21** School (Quantum Excellence)

**IBM QC 2020** Hackathon (Advanced Badge)

**CIPR 2019** Presenter (Paper)  
IEST Shibpur (Springer) International Conference

## PROGRAMMING SKILLS

### Languages:

Bash, C, C++, C#, CSS, HTML, Java, JavaScript, MATLAB, MongoDB, Python, SQLite, XAML, XML

### Environments:

Anaconda, Android Studio, Arduino, Blender, Visual Studio

### Frameworks:

CUDA, Express, OpenCV, Qiskit, QuTiP, React, Xamarin

## POSITIONS OF RESPONSIBILITY

### Mentor

Since 2019

B.Tech. Engg. Physics and M.Sc. Physics, IIT Guwahati

### Organizer

2020 & 2021

SPIE Workshops, Outreach Activities and Lecture Series

### Organizer

2013 & 2014

Cryptophobia, Techniche, IIT Guwahati

## PREVIOUS ACADEMIC ACHIEVEMENTS

- First in the department to secure an SPI of 10 on a scale of 10 in any semester during the B.Tech. Engg. Physics curriculum at IIT Guwahati.
- Ranked among top 0.46 percentile (AIR 2224) in IIT-JEE 2012.
- Ranked among top 0.34 percentile (AIR 3441) in All India Engg. Entrance Examination 2012 (B. Tech.).
- Ranked among top 0.01 percentile (AIR 52) in All India Engg. Entrance Examination 2012 (B. Arch.).
- Intl. Rank 280 in 5th International Mathematics Olympiad, 2011 held by Science Olympiad Foundation (SOF).
- National Rank 166 in 13th National Science Olympiad, 2011 held by Science Olympiad Foundation (SOF).
- Intl. Rank 183 in 4th International Mathematics Olympiad, 2011 held by Science Olympiad Foundation (SOF).
- National Rank 231 in National Level Talent Search Examination, 2011 held by Unified Council.
- Recipient of the Anundoram Borooh Award 2010 from the Education Department, Govt. of Assam.
- Secured 5th Position in Jigyas Talent Search Examination, 2009 organized by Jigyas Educational Trust.
- Secured 9th Position in Mathematics Olympiad, 2009 organized by Assam Academy of Mathematics.
- National Rank 90 in National Level Talent Search Examination, 2008 held by Unified Council.
- Secured 2nd Position in Mathematics Olympiad, 2007 organized by Assam Academy of Mathematics.
- National Rank 40 in National Level Talent Search Examination, 2005 held by Unified Council.
- Secured positions in several other competitive examinations in National level (NSTSE) as well as State level (MTSE, JTSE, etc).

## CO-CURRICULAR ACHIEVEMENTS

- Awarded 2nd in Solo Strings Senior Category in violin at the Global Cultural Diversity, 2009 organized by ABSS, Pune, India with UNESCO.
- Invited to perform at the Bharatiyam Cultural Multiplex, Kolkata as the youngest empanelled artist of EZCC, Govt. of India in 2005.
- Participated as well as performed in National Cultural Workshops organized by CCRT, Govt. of India in Pune and Shillong.
- Artwork selected and exhibited in the 9th North-East States Exhibition of Art (NESEA) 2016 at Srimanta Sankaradeva Kalakshetra, Guwahati.

## OTHER ACADEMIC PROJECTS

### Numerical Solution of GNLSE

IITG (2015)

Simulated the propagation of a bright soliton of order N and studied its dispersion and nonlinearity effects.

### Parallelization of the AES

IITG (2015)

Achieved the block-wise parallelization for 16-byte plaintext and 128-bit keys with a speedup of upto 16 times.

### Relaying Images via Chirps

IITG (2014)

Created a system to transfer images over phone calls by encoding them into audio bursts and reconstructing back.

## TEACHING EXPERIENCES

### Adv. Math. Physics

PHY-HC-5036

Dept. of Physics, North Gauhati College

2022, 2021

### Math. Physics III

PHY-HC-4016

Dept. of Physics, North Gauhati College

2022

### Solid State Physics

602Th

Dept. of Physics, North Gauhati College

2021

### Mechanics

PHY-HC-1026

Dept. of Physics, North Gauhati College

2021

## CERTIFICATIONS

### IBM Certified Associate Developer

IBM Professional Certification Program

2022

### English for Media Literacy

University of Pennsylvania (Coursera)

2017

### French Course - A1 Introduction

IIT Guwahati

2017

### Cryptography I

Stanford University (Coursera)

2015

### Programming in C# Jump Start

Microsoft (Microsoft Virtual Academy)

2014

### 3D Animation & Game Designing

Virscen Technologies Pvt. Ltd.

2013

### Programming in C

Epitome

2013

## REFERENCE

### Amarendra K. Sarma

Ph.D. Supervisor

Professor, Department of Physics,

Indian Institute of Technology Guwahati,

Guwahati - 781039, Assam, India

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