



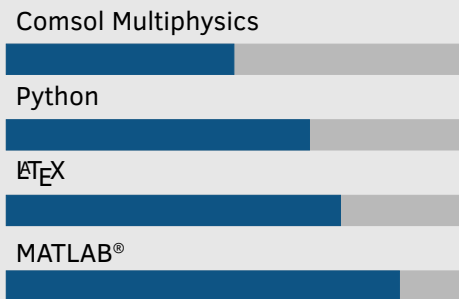
Nishant K Pathak

- DOB: 1st April, 1995
- Dept. of Physics, IIT Delhi, New Delhi, 110016, India
- (+91) 78368 57708
- web.iitd.ac.in/~phz188328
- nishantphysics100@gmail.com

About Me

I am a dedicated quantum technology enthusiast focusing on developing Quantum Communication systems. My work involves crafting secure communication solutions, including single and entangled photon sources. I have successfully implemented various QKD protocols. The QKD protocols that I have worked on include DPS, BB84, B92, BBM92, and COW QKD protocols. Beyond my research pursuits, I am passionate about mentoring and assisting Master's students with their research endeavors. I also possess expertise in working with telecom fiber components and COMSOL Multiphysics simulations. In my free time, I enthusiastically explore and develop my skills in machine learning, web development, blogging, photography, and music.

Skills



Objective

To learn and contribute to the development of Quantum Technologies in the world. To leverage my expertise in generating single and entangled photon sources to advance the field of quantum communications and play a pivotal role in developing secure and high-performance quantum technologies worldwide.

Education

- 2018-Now Ph.D. Experimental Quantum Optics
Thesis: Quantum Key Distribution at Telecom wavelengths
Indian Institute of Technology Delhi, New Delhi, India
- 2016-2018 M.Sc. Physics
Thesis: Increasing Depth of Focus
Indian Institute of Technology Delhi, New Delhi, India
- 2012-2015 B.Sc. (Honours) Physics
Thesis: Synthesis and Characterization of Lead-Free Ceramics
St. Xavier's College, Ranchi, Jharkhand, India

Experience

- Since 2020 Senior Research Fellow, Indian Institute of Technology Delhi
I am working on various experimental and theoretical studies on quantum optics having applications in Quantum Technologies. I am exploring single and entangled photon sources in quantum communication. I played a crucial role in demonstrating India's first QKD link between two cities across 100km. I also worked on improving the performance of DPS QKD in terms of channel length, key rate, and QBER. I have installed and set up various instruments like cryogenic SNSPDs, PPLN waveguides, lasers, amplifiers, high-end oscilloscopes, and signal generators. I have experimentally implemented polarization encoding-based QKD protocols in telecom fiber, including B92 and BB84 protocols.
- 2018-2020 Junior Research Fellow, Indian Institute of Technology Delhi
I set up a quantum optics lab for research and development in quantum technologies at telecommunication bands.
- 2013-2015 Intern, Central Research Laboratory, St. Xavier's College, Ranchi
I got my first exposure to experimental research and worked on the synthesis of lead-free piezoelectric ceramics. I learned wet milling techniques using Retsch PM100 and making dielectric pellets to study their dielectric properties.

Research Publications

- 2023 Pathak, N. K., & Kanseri, B. Polarization entanglement distribution over 50 km in ITU 22 channel in all waveguide geometry. *Frontiers in Optics + Laser Science 2023 (FIO, LS)*, Optica Publishing Group, JM7A.11.
- 2023 Pathak, N. K., Chaudhary, S., Sangeeta, & Kanseri, B. Phase Encoded Quantum Key Distribution up to 380 km in standard telecom grade fiber enabled by baseline error optimization. *Scientific Reports*, 13, 15868.
- 2023 Pathak, N. K., Konno, Y., Ko, Y. K., Maeda, Y., Kobayashi, T., Yabushita, A., & Kanseri, B. Intermolecular vibrational energy transfer between SWCNTs with different chiralities. *Chemical Physics*, 565, 111759.

- 2021 Sharma, P., Pathak, N. K., & Kanseri, B. Controlling polarization entanglement in biphotons generated with partially spatially coherent pump beam. Results in Physics, 27, 104506.
- 2021 Joshi, R., Pathak, N. K., & Kanseri, B. Relationship between degree of polarization and two-time degree of coherence of electromagnetic fields. Applied Physics B, 127, 1-7.

Achievements & Recognitions

Field Demonstration of Quantum Key Distribution between two cities 100 kilometers apart
 Recognized and appreciated by Govt. of India and National media, 2022
 Best Poster Award
 Frontiers in Optics and Photonics, 2021
 Graduate Aptitude Test in Engineering (GATE), 2018
 95.45 percentile
 IIT Joint Admission test for Masters (IIT-JAM), 2016
 All India Rank- 100

Conferences & Workshops

- Conference Polarization entanglement distribution over 50 km in ITU 22 channel in all waveguide geometry (Accepted)
 Frontiers in Optics + Laser Science (FiO LS), October 2023
- Workshop Hands-on training on FPGA-based implementation of Post-Processing for QKD
 SETS, Chennai, India, June 2023
- Conference 265 km fiber quantum key distribution using differential phase shift protocol at 2.5 GHz clock
 Central European Workshop on Quantum Optics, 2023
- Conference Field Demonstration of DPS QKD Over 100 km Intercity Link With Narrow Band Laser and Polarization Sensitive Interferometer
 6th IEEE International Conference on Emerging Electronics, 2022
- Conference Towards High Rate Differential Phase Shift Quantum Key Distribution
 Best Poster Award
 Frontiers in Optics and Photonics, 2021
- Conference Towards Quantum Key distribution at telecom wavelength
 Student Conference on Photonics and Quantum Technology, 2021

Education and Technical Proficiencies

- Quantum Information and Computation
- Advanced Quantum Mechanics
- Fiber Optic Component and devices
- Quantum Field Theory
- Other Technical Proficiencies:
 Mathematica, LabVIEW, Qiskit, C++, HTML, JS, CSS
- Quantum Optics
- Fiber Optics
- Lasers
- Atomic Physics

Volunteering

- 2024-Now President
 Optica (OSA) IIT Delhi Student Chapter
- 2023-2024 Vice President
 Optica (OSA) IIT Delhi Student Chapter
- 2022 Anchor & Vocalist
 Indo-Israel Bilateral Workshop on Quantum Technologies (I2QT-2022)

2020	Media Coordinator IONS India Conference 2020, IIT Delhi
2019	Volunteer and Vocalist International Workshop on Terahertz Technologies, IIT Delhi
2018	Convener Co-Curricular And Academic Interaction Council (CAIC), IIT Delhi
2011-2012	Head Boy, High School DAV Public School, Hazaribag, Jharkhand