Somnath Pandit

Curriculum Vitae

West Bengal, Hooghly
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Education

July 2023 – **Doctor of Philosophy**, *Indian Institute of Technology Kharagpur*, Kharagpur - 721302, India, Nanoscience and Technology.
Broad Area of Research: Photonic Sensors.
Supervisor : Dr. Shivakiran Bhaktha B. N., Associate Professor, Department of Physics, Indian Institute of Technology Kharagpur, Kharagpur - 721302, India.
Joint Supervisor : Prof. Prasanta Kumar Guha, Professor, E& ECE Department, Indian Institute of Technology Kharagpur, Kharagpur - 721302, India.
Courses : CGPA – 9.64, Sem I - Optical Fiber Tech. (EX), Quantum Devices (A), Quantum Optics (EX).

2020 – 2022 **Master of Science (Physics)**, *Indian Institute of Technology Kharagpur*, Kharagpur, **CGPA – 8.48**
Specialized in Optics & Photonics
Courses: Electrodynamics, Optics, Quantum Mechanics, Statistical Mechanics, Condensed Matter, Nuclear and Particle, Atomic and Molecular, Fiber Optics, Nonlinear Optics, Quantum Information.

2017 – 2020 **Bachelor of Science (Physics Honours)**, *West Bengal State University, Ramakrishna Mission Vivekananda Centenary College*, Rahara, Kolkata - 700118, **CGPA – 8.18**
Courses : EM Theory, Optics, Stat. Mech., Quantum Mech., Thermal, Solid State, Analogue and Digital, Nuclear and Particle, Communication Electronics.

2015 – 2017 **Higher Secondary**, *West Bengal Council of Higher Secondary Education, Goghat High School*, Hooghly, **Marks – 92.4%**
Subjects : Physics, Chemistry, Mathematics, Biology, Bengali, English.

2015 **Secondary**, *West Bengal Board of Secondary Education, Kamarpukur Ramakrishna Mission Multipurpose School*, Hooghly, **Marks – 92.86%**
Subjects : Mathematics, Physical Science, Life Science, History, Geography, Bengali, English.

Research Interest

Photonic sensors, Photonic crystal, Bloch Surface Wave sensing.

Master's Thesis

Title *Study of One Dimensional Photonic Structures and Transfer Matrix Computation.*

Supervisor Dr. Shivakiran Bhaktha B.N., Associate Professor, Phys. Dept., IIT Kharagpur.

Description Analyzing one-dimensional photonic crystals (PhC) with microcavity modes and Tamm modes by transfer matrix method in Python and MATLAB. Fabrication of photonic crystals with dip-coating by the sol-gel synthesis method and characterization.

Experience

Research

July 2022 – April 2023 **Research Assistant**, *Photonics Systems Lab, IIT Kharagpur*, India
Worked on picosecond laser writing, photonic crystal Tamm laser, interferometric surface profiler, waveguides.
Detailed achievements:
- Photonic crystal Tamm laser experiment in end-fire coupling setup.
- Fabrication of waveguides using UV photolithography.
- Interferometric setup to measure the flatness of reflecting surfaces by analyzing the fringe pattern.
- Picosecond laser writing setup.
  - Reducing threshold with electric field confinement techniques;
  - With 20X objective lens < 1 μm structures on silicon, patterns at different depths in transparent polymers;

June 2022 – July 2023 **Summer Intern**, *Department of Physics, IIT Kharagpur*, India
Study of waveguiding in 1D photonic crystals and Tamm states.

Teaching

April 2020 – July 2020 **FOSSEE Summer Fellow**, *FOSSEE, IIT Bombay*, India
Mathematics with Python.
- Created lucid notes on Integrals of Multivariable Functions.
- Illustrations with animations generated with python MANIM library.
- Work is available at `https://fossee.in/fellowship/2020`.

2018 – 2022 **Local Volunteer Teacher**, *Ramakrishna Mission Vivekananda Centenary college*, Rahara
As a part of social service and skill enhancement taught students in my locality, emphasising on relating topics with their own experience.

Publications & Conferences

Opt. Lett. S. M. Lis S, **S. Pandit**, S. Patra, F. H. Lone, N. Singh, D. Banerjee, R. V. Nair, and S. Bhaktha B N, "Purcell enhanced laser action using a super-Tamm cavity mode," Opt. Lett. 50, 1869 (2025).

CLEO 2024 S. Dutta, **S. Pandit**, and B. N. Shivakiran Bhaktha, *"Spatial Correlation of Whispering Gallery Modes in an Active Micro-Bottle Resonator,"* in CLEO 2024 (Optica Publishing Group, 2024), p. JTu2A.10.

CLEO 2023 S. M. L. S, **S. Pandit**, S. Patra, D. Banerjee, and S. B. B N, *"Tamm Mode-Aided Amplified Spontaneous Emission in One-Dimensional Photonic Crystal Super-Tamm Structure,"* in CLEO 2023, Technical Digest Series (Optica Publishing Group, 2023), paper FF2D.4.

SAMDeV 2025 **Somnath Pandit**, Rahul Murali and Prasanta Kumar Guha, Sai Santosh Kumar Raavi, Shivakiran Bhaktha B.N., *"Bloch Surface Wave Enhanced Emission in Perovskite Embedded Photonic Crystal"*, SAMDeV 2025, Bose Institute, Kolkata, India.

NLS-31 Sarbojit Mukherjee, **Somnath Pandit**, R Hemant Kumar, Khanindra Pathak, Shivakiran Bhaktha B.N., *"Laser micromachined Moiré pattern strain sensors on polymer membrane"*, NLS-31, IIT Kharagpur.

COPaQ 2022 Sudha Maria Lis S, **Somnath Pandit**, Someprosad Patra, Debamalya Banerjee, and Shivakiran Bhaktha B N, *"Spectral Narrowing of Amplified Spontaneous Emission in One- Dimensional Photonic Crystal Super Tamm Structure"*, COPaQ 2022, IIT Roorkee.

Expertise & Skills

Experimental Photonic crystal fabrication, Waveguide characterization, UV-photolithography, Spectrometer, Focusing optics and filters, Picosecond and nanosecond laser, Spatial light modulator, Dip coater, Spin coater, 3D printer, High temperature furnace, Plasma cleaner, Ultrasonicator.

Technical proficiency PYTHON, MATLAB, GNU OCTAVE, SolidWorks, Comsol, GIT, LaTeX, Linux, Raspberry-Pi, Windows, MS Office.

Awards & Achievements

2023 – Prime Minister's Research Fellow.

2023 NET(UGC) qualified, Physics, Rank-201.

2023 GATE qualified, Physics, AIR-18, Score-841.

2017 – 2022 DST INSPIRE scholar.