Dr. Syamsundar DE

a. **Integrated Quantum Light Sources on LNOI Platform**

Develop scalable on-chip quantum light sources based on nonlinear optical processes in thin-film lithium niobate (LNOI) for generation of entangled photon pairs and squeezed states, targeting applications in quantum communication, sensing, and photonic quantum computing.

b. **Programmable Photonic Quantum Circuits for Quantum Information Processing**

Design and experimentally demonstrate reconfigurable photonic quantum circuits on LNOI photonic integrated platforms using electro-optic control for implementing quantum gates, interference networks, and small-scale quantum processors.

c. **Frequency Conversion Interfaces for Hybrid Quantum Systems**

Investigate efficient nonlinear frequency conversion techniques in integrated lithium niobate waveguides to enable wavelength translation between disparate quantum platforms such as atomic systems, solid-state emitters, and telecom photonic networks.

d. **Integrated Quantum Photonic Sensors Based on Nonclassical States of Light**

Develop chip-scale quantum sensing architectures using squeezed light and two-photon interference on integrated photonic platforms to enhance measurement precision beyond classical limits for applications in metrology and environmental sensing.

e. **Hybrid Integration of Two-Dimensional Materials with LNOI Photonic Circuits**

Explore integration of two-dimensional materials with lithium niobate photonic integrated circuits for realizing active optoelectronic and quantum-functional devices such as modulators, detectors, and nonlinear interfaces for next-generation quantum photonic systems.

Dr. Shaili Shett

a. **B. Tech, Dual-degree and M. Tech:**

- Area of research

Next-Generation Nano-electronic Devices Using Two-Dimensional Materials

- Requirement

Students from EE/ECE/Physics/Materials or related disciplines

Basic knowledge of electronics or solid-state physics

Interest in nanotechnology, 2D materials, or device engineering

Familiarity with at least one programming tool (e.g., Python) for data analysis

Motivation to perform data analysis

b. **Ph. D and Post-Doc:**

- Area of research

Nanoelectronics and Optoelectronics using Two-Dimensional Materials

- Requirement

Students from EE/ECE/Physics/Materials or related disciplines

Strong foundation in semiconductor physics and electronic devices

Familiarity with at least one of the following:

Nanofabrication processes

Electrical and optoelectronic characterization techniques

Optical spectroscopy

Programming skills (e.g.,) for data analysis

Ability to read and critically analyze research literature

Strong motivation for experimental research

Dr. Pranabendu Gangopadhyay

a. **Design and fabrication of Arrayed Waveguide Gratings in LNOI platform**

b. **Tunable Plasmonic devices in Lithium Niobate**

c. **Passive waveguide devices in Silicon substrate**

d. **Waveguide based sensors using MZI and MRR structures**