

IIT  
KANPUR



## DEPARTMENTAL BROCHURE

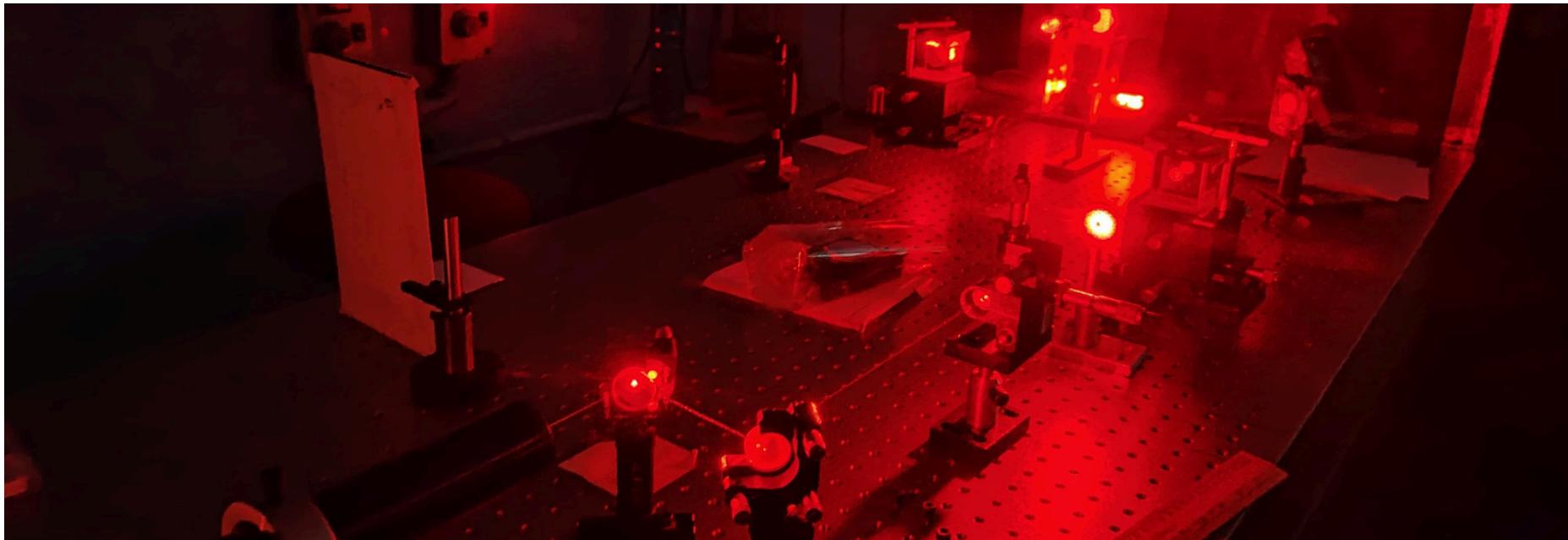
**CENTER FOR LASERS AND PHOTONICS (CELP)**

**Photonics Science and Engineering (PSE)**



VISIT DEPARTMENT'S  
WEBPAGE

# ABOUT US



The Center for Lasers and Photonics (CELP) is an interdisciplinary center of excellence that combines cutting-edge technology from engineering and theoretical advances in science to create new horizons in the field of photonics science and engineering.

Three PG programs are offered at CELP M.Tech, M.S(Research), and PHD in Photonics Science and Engineering (PSE). Graduates from this program have been playing important roles in various industries like telecom, networking, VLSI, and optics, as entrepreneurs, and in research and development organizations such as ISRO, DRDO, and C-DOT.

# MESSAGE from HEAD of the Department



For the placement season 2024-25, we would like to invite industry leaders to recruit the students of our program.

**Prof. Pradeep Kumar K  
HOD (PSE-CELP)**

This is a unique program that prepares our students to relate the intricate issues from the electrical, electronics, and physics domains to the software/hardware-based concepts of the Engineering Industry.

The coursework is designed to meet industry standards & and students are prepared to tackle various challenges faced by the industry through exposure to various industry-oriented projects in our excellent labs.

We believe that our students are highly skilled and will add great value to your organization

# CONTENTS

About us

Message from HOD

Curriculum

Labs and Resources

LAB Facilities

OnGoing Projects

Our Alumuni

Top Recruiters

Contact Information

## 1. Introduction to Photonics

- Introduction to Photonics (PSE601A)

## 2. Core Principles

- Principles of Lasers and Detectors (PSE602A)

## 3. Numerical and Analytical Skills

- Numerical Methods in Optics (PSE603A)
- Optical Coherent Imaging

## 4. Advanced Photonics Topics

- Photonics Systems and Applications (PSE604A)
  - Fiber Optic Systems
  - Nonlinear Fiber Optics Photonics
  - Photonics Applications in Medicine and Surgery
  - Laser Material Processing
  - Tomography (Tomographic Imaging Lab)
  - Optical Measurements
  - Special Topics: Plasmonic, Photonic Crystals, Optical Antennas, Photonic Metamaterials, Nanophotonics

## 5. Computing and VLSI Design

- Quantum Computing and Communication
- VLSI System Design
- Semiconductor Device Modeling
- Solid-State Devices
- IC Fabrication Technology
- Quantum Electronics
- Analog and Digital VLSI Circuits
- Semiconductor Optical Communication Devices

## 6. Machine Learning and Image Processing

- Image Processing and Speech Recognition

## 7. Laboratory Techniques

- Photonics Lab Techniques (PSE605A)

## 8. Research Preparation

- Research in Photonics and Lasers (PSE606A)

## 9. Special Topics

- Special Topics in Photonics (PSE607A)
  - Quantum Mechanics Recap
  - Semi-classical Interaction
  - Quantization of Electromagnetic Field
  - Non-classical States of Light
  - Quantum Mechanical Interaction
  - Cavity QED

# LABs and Resources

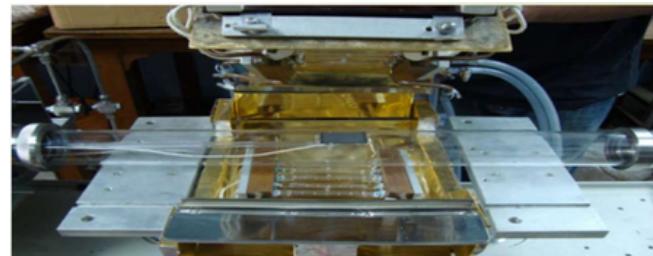
- Cold ion Quantum Technology Lab
- Photonics Lab
- Advanced Fiber and Quantum Optics and Quantum Key Distribution Laboratory
- OptoElectronics and Nanofabrication Lab
- Diffuse Light Imaging Laboratory
- Photonics Devices Lab
- Bio Photonics Laboratory
- Tomographic Imaging Lab
- Femtosecond and Laser spectroscopy Laboratory
- Microfluidics and Sensors Laboratory
- Optical Metrology and Imaging Laboratory
- Femto Lab
- Laser Fabrication Laboratory
- Optical Instrumentation Lab

# LAB FACILITIES

We have excellent lab facilities in following fields

## Opto-Electronics and Nano-Fabrication Laboratory

- Multiquantum Well Intermixed Waveguide Grating Assisted Couplers
- High Speed Waveguide Photodiodes
- Photodiode Arrays
- SiGeC/SiC Quantum Dash LEDs on silicon by spin-on technique
- Laser assisted vision through Fog



## Microscale Transport Laboratory

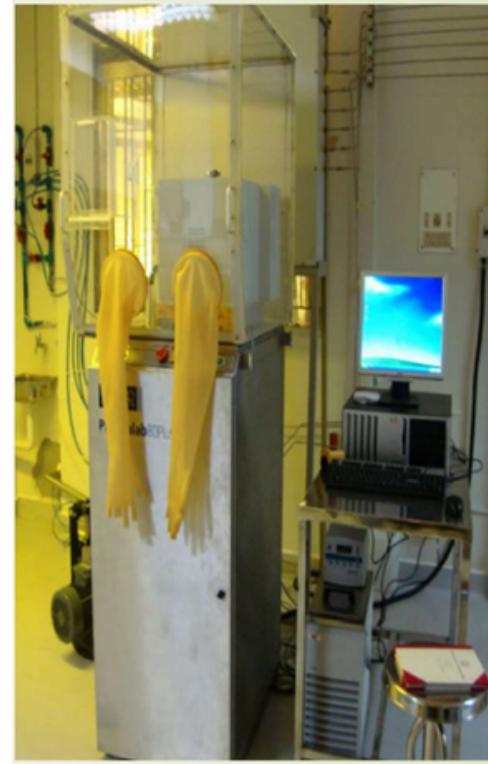
- MICRO PIV/LIF
- Confocal Microscopy
- Digital Holography
- Laser/Color Schlieren
- PIV
- Interferometry
- Femtosecond Laser Microfabrication



# LAB FACILITIES

## Photonics Lab

- Photonics
- Nonlinear Optics
- Fiber Optics
- Photonic crystals
- Optical Nanostructures



## Bio Photonics Lab

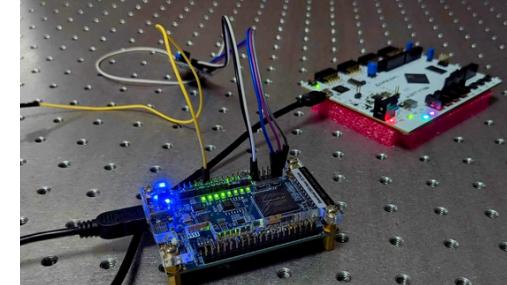
- Fluorescence Mueller matrix imaging
- Spectroscopy
- Attenuation free fluorescence based diagnostics



# LAB FACILITIES

## Cold ion Quantum Technologies Lab

- Quantum simulation
- Cold ion trapping
- FPGA based on Laser experiment



## Advanced Fiber and Quantum Optics and Quantum Key Distribution Laboratory

- Quantum cryptography
- Quantum optics
- Non Linear Optics

## Laser Fabrication Lab

- High speed Flow Visualization
- Emission spectroscopy



## Tomographic Imaging Lab

- analyse solutions to quantitative imaging problems
- biomedical, remote sensing
- battle field surveillance
- tracking domains

# LAB FACILITIES

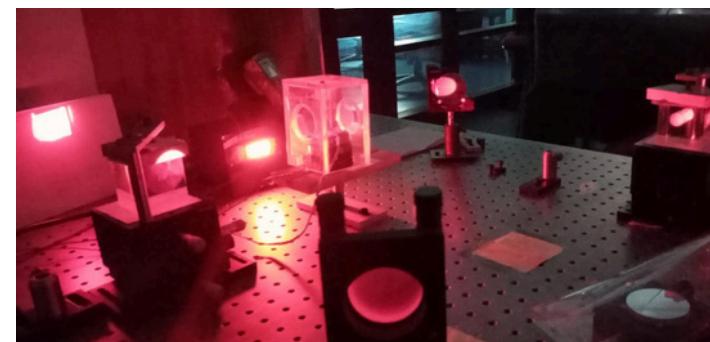
## Optical Metrology and Imaging Laboratory

- Digital holography
- Structured light imaging
- Quantitative phase microscopy
- Phase retrieval methods
- Phase gradient estimation
- High performance techniques
- Machine learning algorithms for optical metrology



## Femtosecond LASER Spectroscopy Laboratory

- fluorescence spectroscopy,
- excited state photo physics and relaxation dynamics,
- active-site protein dynamics,
- synergistic solvation and heterogeneity in binary solvent mixture
- deep eutectic solvent



# LAB FACILITIES

## Photonics Devices Lab

- Flat devices
- Quantum Communications
- Non-Invasive Optical technology
- Flexible Photonics
- Optoelectronic devices

## Femto Lab

- Quantum Computing
- Pulse Shaping
- Optical Tweezers
- Thermal Lensing and Imaging



## Diffuse Image Laboratory

- Quantum Optics
- Non linear Optics
- Photonics Bandgap materials
- Metamaterials

## Optical Instrumentation Lab

- Optical Techniques
- Flow control hierarchical porous medium

# Ongoing Projects

- Design, Fabrication And Characterization of Nanoparticle-Based Photonic Elements
- Photodiode Arrays for Near-Infrared Detection and Tracking
- Electro-Optic and Magneto-Optic interaction-based high-speed High Speed distribution
- Fluorescence Diffuse Optical Tomography for Grading of Dysplasia in Cervical Cancer Progression
- RTE-Tomography-Based Cloud Monitoring
- Quantum Key Distribution Using Magneto-Optic Interactions in Epitaxial Garnet Film
- Development of Frequency-Coded Quantum Key Distribution Solutions Suitable for development on 25-km fiber optical Fiber Optic Links

# OUR ALUMUNI



**Aditya Madipadaga**  
**(MS – Y21 Batch)**

Multimedia Systems Engineer Qualcomm



**Lakshay Thukral**  
**(M. Tech. – Y21 Batch)**  
**SoC DV Engineer**  
**Qualcomm**



**Vastavikta Singh**  
**(M. Tech. – Y20 Batch)**  
**Application Development Engineer**  
**KLA**



**Tarique Anwar**  
**(M. Tech. – Y18 Batch)**  
**CAD Engineer**  
**Intel**



**Debabrata Chowdhury**  
**(MS – Y21 Batch)**  
**Asic Engineer 2**  
**Juniper Networks**



**Mukund Anandam**  
**(M. Tech. – Y13 Batch)**  
**Simulink Quality Engineer**  
**Mathworks**

# OUR ALUMUNI



**Anand Chintamani Sabne**  
**(M. Tech. – Y21 Batch)**  
**Engineer**  
**Sedemac**



**Suchismita Bose**  
**(MS(R)-Y21 Batch)**  
**NVIDIA**  
**ASIC ENGINEER-II**



**Kanchi Tejaswi**  
**(M.Tech - Y22 Batch)**  
**Volvo Eicher Commercial Vehicles**



**Srivansh Srivastav**  
**M.Tech - Y21 Batch**  
**India Today Group**

# TOP RECRUITERS



सी-डॉट  
C-DOT

# CONTACT INFORMATION



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